

الجمهورية الجزائرية الديمقراطية الشعبية  
PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA  
وزارة التعليم العالي والبحث العلمي  
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH  
جامعة عباس لغرور- خنشلة  
UNIVERSITY OF ABBES LAGHROUR –KHENCHELA



كلية الآداب واللغات  
FACULTY OF LETTERS AND LANGUAGES  
قسم الآداب واللغة الإنجليزية  
DEPARTMENT OF ENGLISH LANGUAGE



# *Fostering Learners' Digital Literacy Via Project Based Learning (PjBL)*

*Case Study Algerian Secondary Education (SE)  
First Year Secondary School Learners - Khenchela*

*Thesis submitted to the Department of Letters and English in Candidacy for  
the Degree of Doctorat "Es-Sciences" in Applied Linguistics*

*By Belhouchet Khawla*

*Supervised by Dr. Salim Ounis*

*Board of Examiners:*

الجمهورية الجزائرية الديمقراطية الشعبية  
PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA  
وزارة التعليم العالي والبحث العلمي  
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH  
جامعة عباس لغرور- خنشلة  
UNIVERSITY OF ABBES LAGHROUR –KHENCHELA



كلية الآداب واللغات  
FACULTY OF LETTERS AND LANGUAGES  
قسم الآداب واللغة الإنجليزية  
DEPARTMENT OF ENGLISH LANGUAGE



# *Fostering Learners' Digital Literacy Via Project Based Learning (PjBL)*

*Case Study Algerian Secondary Education (SE)  
First Year Secondary School Learners - Khenchela*

*Thesis submitted to the Department of Letters and English in Candidacy for  
the Degree of Doctorat "Es-Sciences" in Applied Linguistics*

*By Belhouchet Khawla*

*Supervised by Dr. Salim Ounis*

*Board of Examiners:*

## **Dedication**

Every challenging work needs self-efforts as well as guidance of elders especially those who were very close to our heart, my humble effort to my sweet and loving parents for their incomparable never ending love, unmeasured patience, and outstanding understanding. To whom I am gratefully indebted.

To my number one man, my hero, and my life mentor “father **Sebaa Belhouchet**” I owe an extremely vital debt to his endless educational and emotional support through my entire life. I will never thank you enough.

To my sweet mother, **Nadia Belhouchet** who has been a source of encouragement all along this journey, and whose patience, sacrifice, generosity and unconditional love have provided me with comfort and suitable conditions to fulfill this work. I will never thank you enough.

To my beloved husband “**Moussa Allaoui**” who supported me a lot, as you added sweetest into my life, May Allah add more joy and sweetness into every area of your life.

To my lovely little Angel “**Manissa Allaoui**” and her terrific brother “**Anis Allaoui**”, may Allah bless you with endless happiness, may Allah fulfill all your dreams, aspiration and may Allah respond your dues.

To my tender sister **Asma Belhouchet** and dearest brothers who have been a constant source of knowledge and inspiration.

To my dear inspector “**Mohamed El Kamal Hadid**” who imparted guidance that shaped my career and professional life. An educational man who made differences that I will always treasure.

To all my special friends and colleagues who have directly or indirectly contributed to this research, for their insightful comments, illuminating discussions and warm encouragements.

I am truly grateful to all of you

# *Acknowledgements*

Doubtlessly, this work could not have reached fruition without the unflagging assistance and participation of so many experts whom I would never thank enough for the unparalleled contribution that made this work what it is now.

First and foremost, heartfelt gratitude and praises go to the Almighty Allah who guided me through and through and for all the strength he has provided us with to complete this work.

We wish to acknowledge the great debt we owe to our terrific supervisor, honorable teacher and advisor “**Salim Ounis**” for his invaluable advice, judicious guidance, and for his unmeasured irreplaceable support.

Our sincere deepest thanks go to our dear Profosser “**Baghzou Sabrina**” and our terrific teachers “**Beddiaf Abderrazak**” “**Yousfi Nabila**” “**Karim Ayadi**” for efforts and cooperation during this academic years.

We are also grateful for all our teachers for all what they have given us throughout our studies at the Department of English and languages, University of Khenchela.

Special thanks and gratitude in advance to the Inspectors of English language in Batna and Khenchela “**Mohammed El Kamal Hadid**” and “**Grabsi Abd Elmajid**” who have shared intellectual support, assistance, suggestion and recommendations to make this work reliable.

Furthermore, we would like to extend our gratitude to all secondary school teachers who contributed effectively in the data collection process.

We are thankful for the headmaster of Messoud Arab secondary school “**Hadji Saber**” for his inspiring facilities and encouragement and to learners who cooperate with us kindly.

To all the above mentioned, I am truly grateful and I will never thank you enough.

## **Abstract**

Doubtlessly, the research paper aims to examine the impact of Project Based Learning (PjBL) and Pedagogy in maximizing learners' digital literacy (DL) as well as digital soft competencies. Interestingly, it has been hypothesized PjBL plays vital role in boosting learners' digital abilities, furthermore the more or the less teachers implement high quality project based pedagogy in classrooms, the more or the less learners enhance their digital literacy, thus Learners will be digital natives who are engaged successfully with blended learning. They will be more digital active agents, autonomous learners and motivated individuals to be engaged in cooperative supportive conductive learning community consequently they will acquire new soft and transferable skills and competencies, build strong high meta-cognitive abilities, and reflect objectively and rationally on new concepts and perspectives. Additionally, they will successfully navigate a complex uncertain future being equipped with 21<sup>st</sup> century skills and competencies. Interestingly, this study is based on a mixed methods research approach. It includes qualitative and quantitative research approaches. The aim behind choosing a mixed methods approach is to systematically deduce a more comprehensive understanding. Notably, in the current research study, the researcher opted for an experimental approach in order to underscore the impact of PjBL in enhancing learners' digital literacy. This research study was additionally based on the qualitative research approach in order to explore deeply learners 'experiences in promoting PjBL to enhance their digital literacy. All in all, the explanatory sequential mixed methods design validates the quantitative results critically, furthermore it maximizes the credibility of the findings, and it increases the validity and reliability of the final outcomes. It proves to be a vital significant research design to delve deeply into the reasons behind a quantitative data. Purposefully, after reviewing the literature linked to the effectiveness of project based learning in enhancing learners' digital literacy, it is vital to explore critically the empirical work. It is therefore extremely valuable to identify in details the research tools employed for data collection. This research study uses various data collection tools rationally, as a result data were collected via multiple data methods and tools. The paper uses pre and post digital literacy test, questionnaires, systematic observation, and in depth interview. The tools support each other to ensure full set of final outcomes. Worthy noted that various ethical considerations must be regarded by the researcher. The study proves the impact of PjBL in maximizing learners' digital literacy and concludes with top educational recommendations and implications towards building effective framework for PjBL to maximize learners' digital literacy, and for further research study.

**Key words:** Project Based Approach / learning Digital Literacy. Soft Skills. Pedagogy.

## **Table of Contents**

## **List of Abbreviations**

**A.M:** Authentic Materials.

**DL:** Digital Literacy

**E.F.L:** English as a Foreign Language

**E.g.:** Example given

**E-Book:** Electronic Books

**H:** Hour

**ICTs :** Information and Communication Technologies

**L-L:** learner to learner

**L-S:** learner to self

**N:** Number

**P:** Page

**PjBA:** Project Based Approach

**PjBL HQ:** Project Based Learning of a High Quality

**PjBL LQ:** Project Based Learning of a Low Quality

**PjBL:** Project Based Learning

**PjBP:** Project Based Pedagogy

**Q:** Question

**SE:** Secondary Education

**T.T.T:** Teaching Talking Time

**T-L:** teacher to learner

**U.S.A:** United States Of America

## List of Tables

## List of Figures

**Enhancing  
Learners'  
Digital  
Literacy  
Through  
Project Based  
Learning**

## **General Introduction**

1. Background of the Study
2. Statement of the Problem
3. Aims of the Study
4. Research Questions and Hypotheses
5. Research Methodology and Tools
6. Structure of the Thesis
7. Limitation of the Study

# **General**

# **Introduction**

# **Table of Contents**

## **General Introduction**

Introduction

1. Background the Study
2. Statement of the Problem
3. Aims of the Study
4. Research Questions and Hypotheses
5. Research Methodology and Tools
6. Structure of the Thesis
7. Limitation of the Study

Conclusion

## **Introduction**

Evidently, this research presents the final findings, and it proposes an effective framework for high quality digital education based on project based approach. Digital skills and competencies are major concern of educators now, since digital literacy presents a lifelong learning ability, a primary competence in participation systematically in digitalized world. And yet, international researches, surveys as well as academic literature warn that learners and teachers lack digital skills and capabilities thus to fill the digital literacy gap, it is very essential to agree on a high quality framework to foster learners' digital literacy.

The research is based on a data collection phase, (literature review, case study analysis and online questionnaire), and on intensive stakeholder consultation (real project presentations, interviews, workshop, reviews by experts, presentations at seminars and national/international conferences on the same topic).

### **1. Background of the Study**

Notably, towards optimal high quality education, the learning and teaching process had marked a paradigm shift from ancient to present era. Interestingly it involved a move away from the tenets of behaviorist psychology to more contextualized meaning based views of language. A move away from teacher centeredness to learner centeredness, thus project based approach is one of the instructional approaches that are learner centered. Rationally, it did not appear out of the blue yet it had multi precursors. Remarkably, outstanding advocates and terrific forerunners of project based approach are unforgettable pioneers such as John Dewey and William Kilpatrick. Effectively Various scholars, educators, and trends have contributed to the effective adoption of PjBL as a 21<sup>st</sup> century instructional approach for learning and teaching and as the most engaging educational approach. Worthy noted that Both Confucius and Aristotle stressed the ultra-efficiency of learning by doing. Fast-forward to John Dewey, the father of science education,

PjBL mirrors a superb legacy of his outstanding terrific work, Dewey (1916) highlighted the significance of learning by doing, through total engagement of learners in learning, as he declared “education is not preparation to life, education is life itself”. He severely criticized the traditional approaches to learning that were teacher centered and demanded instead more engaging instructional approach wherein an active interactive and cooperative learning will take place. In 1918, William Heard Kilpatrick formalized “The Project Method’ as a form in the Progressive Education movement, the famous American pedagogue called for the implementation of the PjBL by the early twilight years of the 20th century. In addition to that, Thomas (2000) demanded the use of PjBL since it gains widespread credence among educators. Other studies mirrored the advantages gained in implementing PjBL (Chang, 2008). Friedman and Heafner (2008) found that PjBL increases learners motivation, engagement and knowledge. Bell (2010) too linked PjBL with motivation, creativity and autonomy and described it as an engaging instructional approach. Bezon (2007) viewed that PjBL benefits learners to the maximum. Furthermore it maximizes the skills of making inferences, predicting and interpreting ( Wu & Krajcik, 2006). Worthy noted that Bell (2010) defined it as a student driven method of instruction that helps learners to demonstrate their own understanding through projects.

Worthy noted that several studies acknowledge the importance of fostering learners’ digital literacy (DL) thus it becomes clear that investing in digital literacy in no longer an option but a need and necessity. This soft skill furnishes learners effectively with all competencies and sub skills needed to take part in the economic, social, civic, cultural and intercultural domains. It is therefore doubly important to state that digital literacy is the ability to have access to a globalized range of practices via digital tools, the capacity to make, create, read, share and communicate ultra efficiently via digital means consequently Britt, Rouet & Durik (2017) declared that digital literacy gains popularity among learners since digitally literate learners

turn to be more good at searching and selecting, integrating and critically evaluating information.

This study discusses the impact of PjBL in maximizing learners' DL It aims at investigating the valuable role and vital significance of PjBA in boosting learners' soft abilities such as informational literacy, media literacy and internet communicative literacy.

## **2. Statement of the Problem**

Unquestionably, towards valuable encyclopedic education, the interdisciplinary PjBA to teaching is theorized effectively to meet superb amazing aims of deeper learning, thus it is carefully demonstrates its effectiveness, merits and efficiency in numerous ways, chiefly it maximizes learners readiness, reflectiveness, resourcefulness as well as responsibility and it enhances several competencies. Thus providing 21<sup>st</sup> century learners with effective training to deal with modern changes of the world of globalization has become a challenge for educators, syllabus designers and teachers. Recently, information and communication technology (ICT) has become widely used in modern teaching and learning processes since globalization technology has its impact upon almost all aspects of modern times. Teachers had better maximize the ultra-efficient use of ICT's and work towards revolutionized digital learning therefore they had better find teaching methods that fosters digital literacy and competencies.

The problem that we are confronted with is that EFL teachers find challenging difficulties to foster digital literacy of learners both inside and outside the classroom, in addition to other challenges such as learners' overdependence upon the teachers' explanation. Hence, the present research work focuses on the effectiveness and the importance of PjBL in maximizing learners 'digital literacy and soft competencies.

### **3. Aims of the Study**

Interestingly, the major objective of the present study is to underscore the effective implementation of PjBL to foster digital literacy by depicting the obstacles met. The study is of great importance at more than one level. Actually, the target objectives of this humble research are:

- ✚ To examine carefully the impact that PjBL plays in maximizing EFL learners' digital literacy.
- ✚ To shed light on the framework image of HQ PjBL in Algerian classrooms, and explore critically how PjBL environment and pedagogy enhances digital competencies.
- ✚ To check whether the expectations attached to the PjBL are realistic or not.
- ✚ To explore how the Project based approach is implemented to secondary 1<sup>st</sup> year secondary school learners and its effectiveness in enhancing learners' digital literacy.
- ✚ To investigate the difficulties Algerian EFL teachers, encounter when implementing PjBL and how it can be improved.
- ✚ To sensitize stakeholders to the significance of PjBL in enhancing digital literacy.

### **4. Research Questions and Hypotheses**

The present research attempts to address a host of educational pedagogical issues relevant to the reliability and validity of Project Based Learning and Pedagogy. Consequently, the major concern of the study is to address the following research questions:

- ✚ To what extent are Algerian teachers of English in Secondary Schools aware of the role of PjBL in enhancing learners' digital literacy and competencies?
- ✚ Does PjBL enhance learners' digital literacy and help in shaping modern teaching and learning? How?
- ✚ How can teachers and educators best support learners to develop their digital competencies?
- ✚ What does HQ PjBL look like in the Algerian secondary school classroom?
- ✚ What are the challenging difficulties Algerian EFL teachers' faces when fostering digital literacy of 1<sup>st</sup> year learners under PjBL?

## **Hypothesis**

In the light of the above-stated research questions, we hypothesize that:

- EFL learners would develop their digital literacy and digital competencies through PjBL thus, the more or the less EFL teachers implement HQ PjBL, the more or the less EFL learners develop their digital literacy. To put it differently, If EFL teachers engage their learners in a HQ PjBL Community, learners' digital literacy would be maximized remarkably.

## **5. Research Methodology and Tools (Means of Research)**

### **Research Design and Procedures**

Doubtlessly, in this research study a pragmatic research paradigm was deemed suitable, reliable and satisfactory. Actually it is adopted for it systematically embarks the choice to mix methods to underscore the effectiveness of PjBL in maximizing learners' DL, considering multiple views becomes necessary and vital to best answer the research questions.

Additionally, the adoption of the pragmatic paradigm permits effectively the adoption of mixed research methods, thus the approach was expected to prioritize the findings' validity, in an efficient trial to overcome and mitigate the limitations and weaknesses associated with one single method research, furthermore this philosophy ensures the flexibility to blend various research methods, addressing the research inquiries from various perspectives. Thus, in order to accomplish the research aims, test our hypothesis, and obtain the information for the subject a mixed methods research approach is adapted. It includes qualitative and quantitative research approaches. Rationally, the aim behind choosing a mixed methods approach is to systematically deduce a more comprehensive understanding. Interestingly, this research design is based on sequential explanatory design, therefore a combination of quantitative data and qualitative data is necessary. The main rationale is to provide a full comprehensive understanding of the impact of project based learning in maximizing learners' digital literacy. The researcher first gathers quantitative data in order to establish a well stated and clear foundations of the research topic, after that the researcher gathers qualitative data to delve deeply and explain rationally the quantitative data.

Remarkably, the researcher uses various research tools to gather numerical quantitative data as well as non-numerical qualitative data. consequently, a teachers' questionnaire, a learners' questionnaire, an experiment with learners, an in depth interview with experts and a systematic observation by observers where used to underscore the impact of PjBL in maximizing learners' digital literacy. The results will be henceforth tabulated, described and analyzed. All tools attempt to verify the valuable unparalleled role of Project Based Learning in enhancing learner's digital literacy.

### **Population of the Study**

It is vital to outline the population under study therefore in this research study, the target population comprised 80 EFL learners in secondary schools, 60 EFL teachers of English

language in Khenchela, and 04 Inspectors of English Language in Batna and Khenchela. All of them are indeed accessible population. Hence, this research project took place at Arab Messoud Secondar School Chechar in Khenchela as a setting, during the academic years 2020/2021, 2021/2022 and 2022/2023. Interestingly, the case study conducted was efficiently adequate, valid and appropriate to examine the impact of PjBL in enhancing learners' digital literacy. The researcher will see in the coming chapters how we would work for randomization.

## **6. Structure of the Thesis: Organization of the study**

Actually, the present research is divided into two main parts, a theoretical part and a practical part in addition to a general introduction and a general conclusion.

Doubtlessly, the theoretical part contains two chapters which deal with the theoretical aspects related to the issue under study. The first chapter, entitled Project Based Learning, provides a definition and description of PBL, a historical background of how scholars, educators and trends have approached its pedagogy with the most influential characteristics of high quality projects, merits, challenges and top hallmark recommendations to make project based approach high quality. Moreover, the second chapter provides a definition and a description of Learners' digital literacy and digital competence in general terms and then as they are targeted by specialists in the field of modern online teaching, and the instructional approaches to enhance the target skills and competencies. The premise behind such attempt is to discuss the factors that intertwine in shaping 21st century modern teaching. The researcher has a quiet hope that this chapter reveals to different stakeholders (educators, teachers, students, administrations, curriculum designers, and inspectors) a clear framework image on the EFL conductive environment in the 21<sup>st</sup> century.

In addition to that, the practical part describes the research methodology, the teachers' Questionnaire, the learners' questionnaire and experiment, the systematic classroom observation and the in depth interview with the inspectors of English Language in Batna and Khenchela. It sheds light on the study conducted on the selected group of EFL learners and EFL teachers as well as experts. The focus of this part is to highlight the effectiveness of PjBL in enhancing EFL Learners 'digital literacy and competencies, and to identify clearly all the factors that affect the use of PBL, analyze the teachers' answers to the questionnaire and the learners' answers to the questionnaire, scores of the pretest and posttest, observation and interview. Besides, the research includes a chapter which aims at propose an insightful perspective and pedagogical recommendations on the ultra-efficient implications of PBL in classroom practices. Thus this chapter comes to help teachers towards optimal education and to monitor them with useful framework of HQ PjBL.

## **7. Limitation of the Study**

1. Digital Literacy (DL) is a vast evolving field. It is challenging to identify all skills, examples and details. Due to the fact that the evolving scope of Digital Literacy, it can be (confusing to identify examples, they are ever evolving. Still, the focus is on skills and examples that are directly relevant in classroom context (compared to skills and examples in the Textbook SE).
2. The study is limited to secondary education (SE).
3. The concept of digital literacy of learners used to be narrow, regarded basic computing skills, therefore educators need lifelong digital skills to adapt up to date technologies.

## **Conclusion**

All in all, this research paper attempted to examine carefully the impact that PjBL plays in maximizing learners' digital literacy efficiently. Interestingly, It was critically agreed that many researchers have conducted splendid studies concerning PjBL and rethinking pedagogy

that combine it with digitalization of education, and yet PjBL gains widespread credence as a beneficial instructional educational approach. Based upon findings of this study, we conclude that the more or the less EFL teachers implement high quality PjBL, the more or the less EFL learners maximize their digital soft skills and gain effectively more insights. Therefore, we deduce that the expectations linked to PjBL are so realistic. Worthy noted that encyclopedic pedagogical depends on the superior quality of PjBL, thus EFL teachers and EFL learners must collaborate as team to face up critically the challenging problems met while implementing PjBL. It's high time we revolutionized the role of the current school and go down with its passiveness towards more active cooperative creative education. Objectively, High Quality PjBL (HQ PjBL) requires meticulous planning, open communication, and a cooperative cohesive team, besides clear well planned learning objective, interesting goals as well as well-defined roles streamline efforts, whereas formative progress tracking ensures firm timely adjustments. Flexibility, accountability and adaptability to challenges.

**Our Learners are our outstanding lifelong project, work on it insightfully**

**Chapter One:**

**Examining The**

**Effectiveness of**

**Project Based**

**Learning (PjBL)**

# **Chapter One: Examining the Effectiveness of Project Based Learning**

Introduction

Project Based Learning.....

Emergence of PjBL.....

Principals of PjBL.....

Elements of PjBL.....

Features of PjBL.....

Aspects of PjBL.....

Stages of PjBL.....

PjBL and Traditional Instructional Approaches.....

Teachers' Role in PjBL.....

Types of Projects.....

Merits of PjBL.....

HQ PjBL.....

Challenges to PjBL.....

PjBL in Algerian Context.....

PjBL in Secondary Education.....

Adaptation of the Coursebook.....

Examples of Adaptation of the Coursebook.....

Electronic PjBL.....

PjBL and Digital Literacy.....

The link between PjBL and Digital Literacy.....

Conclusion

## **Introduction**

### **Project Based Learning (PjBL)**

Undoubtedly, Project Based Learning is an effective instructional approach. First, it prepares and guarantee learners' personal, professional and academic success and growth. Inspiring them to leave their comfort zone, to meet real life challenges and to confront problems critically. As a dynamic learner based approach, it emphasizes active learning, cooperative learning as well as contextualized learning. Therefore, it energizes learners to develop critical competencies, creative capacities and logical mental abilities. Furthermore, it proves to be one of the most relevant strategies to support educators to implement 21st century education perfectly, thus it maximizes learners 21st century skills basically: communication, cooperation, collaboration, creativity, problem solving, critical thinking, creative thinking, motivation, perseverance, information literacy, media literacy, digital literacy, global awareness, social responsibility, civic literacy and self-direction. Evidently, honing in on 21st century education is a major concern of educators to ensuring that learners are prepared for university, career, and civic life, project based approach appears to meet this needs perfectly.

Project based learning is an educational approach that is learner centered pedagogy since it places learners at the center of the teaching learning processes. Learners are engaged in various tasks throughout the whole process of the project via various steps, wherein the main aim is to go beyond rote learning and to move away from traditional instructing methods (memorization-based learning).

Insightfully, John Dewey (1897), who is known as the father of modern pedagogy in the U.S.A, called objectively for "learning by doing» in his influential work "My Pedagogical Creed" (1897), emphasizing that teachers ought to engage learners in learning via experiencing real

activities or challenges, project based learning proves to be learning by doing since the main interest is on the process itself in addition to the final product.

Next, it meets all the learning styles and needs of learners. PjBL provides skill-based learning via practicing, it signifies a great emphasis on involving learners in active learning focusing on creativity, internal motivation and productivity. It takes them to real world problems and challenge them critically, helping them to work cooperatively to solve authentic difficulties.

Unfortunately, the implementation of project based approach can cause a contradictory schizophrenic situation, in one hand teachers have to meticulously plan and monitor the target project, in another hand, project based learning experts strongly disagree, they firmly emphasize that teachers must refrain from pre-planning projects, they point out that the merits of PjBL stem from learners' initiative, primarily driven by their interests, needs, styles, ideas and efforts.

According to Thomas (2000) “Project-Based Learning is a model that organizes learning around projects” (p. 1). Subsequently he advocates that projects as a challenging complex tasks are “based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations” (p. 1). Thus, PjBL is built around complex tasks centered on challenging questions or problems, engaging learners in activities mainly design, problem-solving, decision making, and investigation.

## **Emergence of PjBL**

Interestingly, various reasons were behind the emergence of PjBL. Primary, the need for education to adapt to ever changing society is the major aim behind the popularity of PjBL. It is a fruitful attempt to create critical efficient instructional practices whereby learners learn to live. Significantly, Project based approach (PBA) gains advocates and gathers momentum. first, both Confucius and Aristotle were early proponents of active learning and learning by doing. Besides Socrates who insightfully modeled learning via the “How”, promoting questioning, inquiry, and critical thinking skills, evidently all the mentioned elements are all basic strategies which are extremely relevant in today's PjBL and PjBP and classrooms. Fast-forward to John Dewey, 20th-century American educational theorist and philosopher who called for experiential cooperative learning. In addition to Maria Montessori who called for pioneered learning environments that foster capable, adaptive citizens and problem solvers via PjBL, and Jean Piaget, the Swiss developmental psychologist, who called for learning via experience and constructive knowledge as in PjBA.

Over the last 25 years, two necessary developments impacted the emergence of PjBL. First, the revolution in learning/ teaching theory facilitates the incorporation of PjBL. Research in psychology and neurosciences highlighted the cognitive, psychomotor and behavioural models of building knowledge, it resulted in the inextricably relationship between content knowledge, thinking process, doing, and contextualized learning and learning by doing (John Dewey, 1916), learning turns to be a social activity, taking place with the context of community, culture and real life situation. Second, teachers in the 21<sup>st</sup> century understood well that learners do not need only knowledge, but skills and competencies to navigate critically and safely a complex ever changing world. It is via PjBL that learners maximize civic responsibility and master various roles as global citizens (Bie). All this is also a result of the industrial culture, shaping methods of schools in the 19<sup>th</sup> and 20<sup>th</sup> centuries.

Objectively, examining the philosophical and pedagogical underlings of project based pedagogy (PjBP) is an extremely significant aspect in promoting high quality PjBL (HQ PjBL). Evidently, this instructional approach was first introduced in the twilight years of 1700s within European educational institutions, mainly in engineering schools. Extensively, during this period, learners were expected to apply the practical and theoretical content knowledge they had acquired to systematically solve complex problems rationally, the main aim of promoting PjBP is not only in presenting the final product but rather in the learning steps in the whole process, from lunching and planning the project work to assessing and feedback giving. Worthy mentioned that, by the 20th Century; an American well known pedagogue, a pupil, a colleague and a successor of John Dewey, William Heard Kilpatrick (November 20, 1871 – February 13, 1965); appeared to be a memorable influencer in the progressive education movement, expanded significantly PjBL into a philosophy of education. According to William Heard Kilpatrick education system marked a paradigm shift from traditional approaches to modern ones, from teacher centered approaches to learner centered approaches, consequently PjBL appeared to be a child-centered and based in progressive education. According to William, Learners in a PjBL environment are enjoying cooperative active experiential learning, rather than killing their creative critical thinking via rote and memorization.

## **Principles of PjBL**

Project based learning has interesting principles. Various scholars considered project based approach an effective pathway to engaged and motivating educational system. The instructional approach as a dynamic learner centered approach maximizes active learning by doing, critical skills, and problem solving abilities.

Remarkably, PjBL necessitates a well-structured education, wherein the learning experiences were built around authentic real life projects, energizing learners to solve complex challenges. there are various major principles of PjBL mainly: interdisciplinary, authentic education, process oriented learning, and autonomous education.

First, the major aim of PjBL is promoting successful holistic education, where learners integrate multiple subject matter and knowledge from different disciplines via projects. Second, the topics, themes and problems of projects are derived from real life experiences, therefore they are directly connected to real life contexts ensuring authenticity. In addition to that, the main aim of PjBL is not the final outcome or the final product but rather the process itself. From planning and design to presentation, all the steps involved in PjBL development are extremely important cultivating the 21<sup>st</sup> century skills. Furthermore, it maximizes learners' autonomy, offering them a positive control over the learning experience, maximizing flexibility, independency, and responsibility. Empowering learners to become active agents in their own learning, cultivating a lifelong learners, who are ready to adapt to future challenges critically.

## **Elements and Essentials of Project Based Learning**

Evidently, project based approach has essential elements. They present the guidelines that support better implementation of project based pedagogy. Coufalová (2006) outlined four

primary important elements that ought to be incorporated to achieve high quality Project based learning. The four main elements capture the main concept of PjBA. They are as follow:

- a) An enterprise.
- b) An enterprise of learners.
- c) An enterprise of which results learners took the responsibility.
- d) An enterprise which follows a concrete goal.

It is only by incorporating these four major essentials, teachers may achieve high quality and an effective PjBL that ensures active cooperative learning, problem-solving capacities, and maximizes 21<sup>st</sup> century competencies, bridging the huge gap between theoretical learning and practical learning as killer (1987) stated: “In summary, project-based learning can provide a rich experience, boost motivation, and create active engagement in the learning process, but it requires intentional planning using these key considerations” p2 , thus Project-based Learning Essential Elements Checklist is needed to guide teachers and educators, Doubtlessly, the Checklist for Essential Project Design Elements serves as an extremely vital tool to promptly assess the efficiency of project’s design, making sure that it incorporates all the major components for a rigorous and effective Project-Based Learning experience, teachers may use it before, during, and after making projects ensuring that PjBL Blends positively content mastery, meaningful outcomes, and personal connection with all audience. (See the appendix of samples of: Project-based Learning Essential Elements Checklist)

## **Features of PjBL**

Honestly, various features characterized PjBL from other instructional approaches. First, clear attainable learning objectives and achievable goals, productivity and adaptability, via well-defined plan. It improves communication, collaboration, creativity, and cooperation.

It acquires learners with a problem-solving mindset abilities, leadership skills, and persistence. while taking risk management to solve complex problems from real life situation ensures sustainable outcomes.

Evidently, PjBL is a dynamic learner centered approach to teaching and learning. It proves to maximize learner's 21st century skills and competencies mainly: creative thinking, flexibility, self-esteem, teamwork, responsibility, career motivation, critical thinking, problem-solving, technical skills, collaboration, soft skills, personal skills. It simply equips learners with all the vital capacities to face up all the challenging difficulties of real life situations. Insightfully, HQ PjBL emphasizes useful strategic methods as active productive learning, cooperative learning, and inductive learning. It adequately energizes learners to take risks and solve complex problems critically, answer complex questions, formulate rationale questions; ensuring full positive interdependence, scaffolding, besides individual flexibility and accountability, it leads learners to work in a zone of proximal development out of their comfort zones. Significantly, PjBL provides creative innovative education to all learners, it prepares them to explore the labor market efficiently, raising their competitiveness to the maximum, promoting the progress of the whole society (Crosling, Nair, & Vaithilingam, 2015). Various studies called for enhancing learners' innovation and creativity via maximizing their autonomous learning (Martín, Potočnik, & Fras, 2017). Project-based learning provides opportunities for learners' autonomy effectively.

Amazingly, the role of the teacher and learners changed completely from traditional approaches to recent ones, still they play significant roles in PjBL, monitors had marked a shift from a mere chalk and talk teachers; spray and pray lecture format, to instruct creative adaptive lessons. Objectively, the teacher's role is not imparting content based conceptual knowledge passively, via spoon feeding process however he ought to act as a facilitator, monitor, assessor, guide, initiator, and feedback source. (Brundiers & Wiek, 2013; Krajcik & Shin, 2014).

Unquestionably, outstanding empirical studies on HQ PjBL proved significant improvement on learners' outcomes (Pengyue, G. Nadira, S. Lysanne, S. Wilfried, A. 2020) such as in the affective outcomes, cognitive outcomes as well as behavioral outcomes.

## **Project Based Learning (PjBL)**

Project based learning has many advantages in making education a high quality process. It maximizes learner's abilities, skills and competencies. It improves learners soft personal skills, preparing them to solve real life challenges. (David, 2008). It is a teaching approach that effectively involves learners to prepare present projects related to various themes to invest/reinforce and use critically the new learned knowledge.

Remarkably, Harmer and Stokes (2014) declared that the main key features that PjBL emphasize are active learning, collaboration as well as problem solving. First, active learning promotes hands on learning and learning by doing instead of receiving learning passively. Second, group working (Frank & Barsilai, 2004), whereby learners are doing projects in small groups and group teams wherein they exchange ideas, discuss perspectives and debate different issues increasing self-esteem via creating a sense of relevance in the learning experiences (Thomas, 2000)

Many famous researchers identified the core component of PjBL, which is learning by doing, the process of acquiring knowledge via practical experience proves to be efficient ( Danford 2006, Posch et al. 2006)

## **Stages of Implementing PjBL**

To implement PjBL, teachers and learners need to follow various stages. The aim behind PjBL is developing learners' knowledge and skills to solve complex problems, "Project based learning (PBL) provides opportunities for students to build these qualities, as well as more deeply learn traditional academic content and understand how it applies to the real world" (Larmer,2015). Educators did not agree on specific stages, still there are basic steps through which PjBP can be planned and implemented rationally to meet target learning objectives, mainly project planning, project designing, project presentation, as well as project evaluation.

### **Lunching the Project, Planning and Designing Stage:**

- ✓ Brainstorming themes and topics of the unit.
- ✓ Defining the target debatable/ problematic issue.
- ✓ Choosing how to approach the project (Individually, in pairs, in groups).
- ✓ Deciding on the type of project/ Accumulate the materials necessary for the project.
- ✓ Collecting the relevant data needed.
- ✓ Identifying the authentic tools, strategies; and the most appropriate authentic sources.
- ✓ Skimming, Scanning, and Synthesizing all information.
- ✓ Accumulating the background information desired for the designs.
- ✓ Evaluating the findings of research.

### **Formative Assessment of the Project Work, Discussing the process:**

- ✓ Discussing the project with the teacher.
- ✓ Presenting data to the teacher before finalizing the work.
- ✓ Note taking of the remarks given by the monitor.
- ✓ Putting remarks and guidelines of the teacher into practice, modifying where necessary.

- ✓ Creating the final project (product, presentation, video).

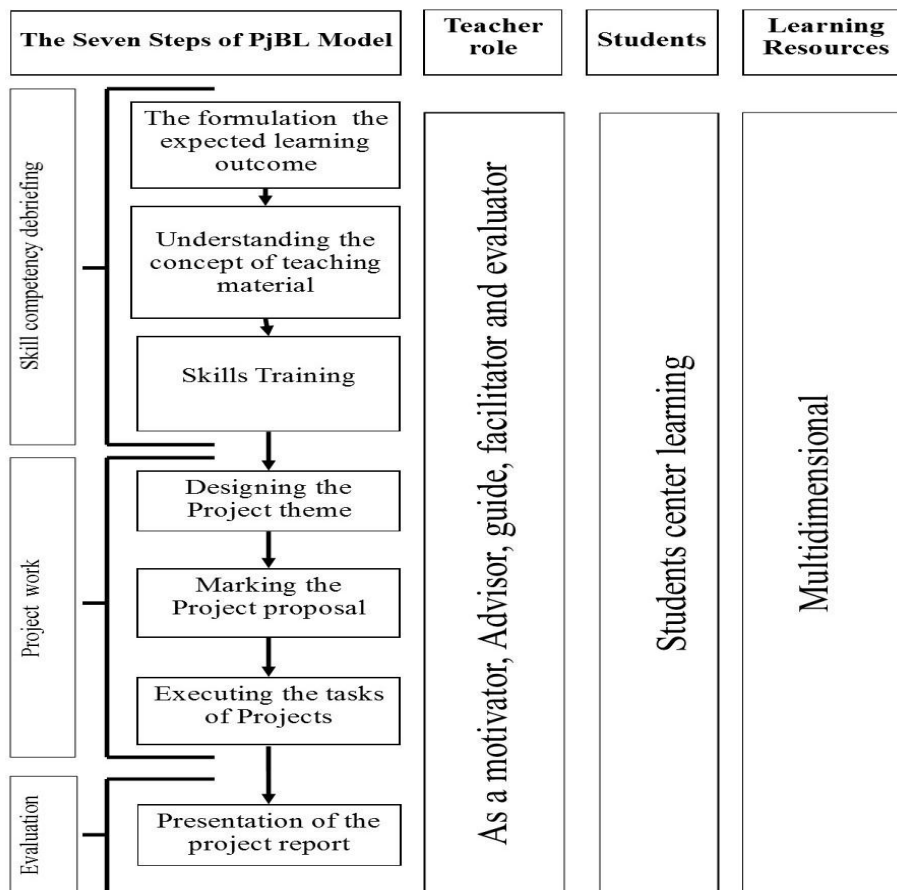
### **Presentation Day:**

- ✓ Agreeing on the order of project presentations.
- ✓ Presenting the project to the audience.
- ✓ listening and interacting with other projects.

### **Summative Evaluation of the Project:**

- ✓ **Note taking of the given remarks to your project by teacher or peers.**
- ✓ Applying the checklist of good projects (self-assessment).
- ✓ Reflection on your project and others projects.

According to Nizwardi Jalinus (2017), PjBL plays a vital significant role in fostering learners' skills and competencies, mainly the productive competence including basically: Accountability, flexibility and productivity. Therefore, the implementations of PjBP necessitates regarding seven basic steps. The model was presented in a figure by Nizwardi.



**Figure n°: The Seven Steps of PjBl model (Nizwardi, 2017)**

As shown in the Figure above, according to Nizwardi (2017), there are seven basic steps of implementing PjBL effectively. Interestingly, this model was designed rationally by Nizwardi. And validated carefully by expert judgment with Aiken coefficient 0,796, they agreed on it. As it is mentioned, the seven steps were:

1. The formulating the expected learning outcome
2. Understanding the concept of the teaching materials
3. Skills training
4. Designing the project theme
5. Making the project proposal

6. Executing the tasks of projects and
7. Presentation of the project report (Nizwardi, 2017, p.3)

Nizwardi (2017) stated that the successful implementation PjBP model regarding the above mentioned seven steps is so vital process, it fosters learners 'fundamental as well as productive competence on vocational learning. In this regard, PjBl has become evidently an ideal pedagogy to guarantee learners' growth and future professional career.

Furthermore, Diffily & Sassman (2002) stated that there are seven steps of PjBL

As follow:

1. Directing learners' involvement in learning based on problem solving.
2. Linking learning material with environmental real life situation.
3. Research-based on questioning.
4. Involving various learning materials, data and resources.
5. Integrating knowledge and skills.
6. Specifying time stages, doing the project.
7. Ending with presenting the manufactured product.

Evidently all the steps regarded the basic features and characteristics of PjBL, the process starts with problematic issue to be solved ending with final outcome, via the whole process learners develop interesting skills and competencies, which are as important as the final outcome.

## **Traditional Teaching Approaches Vers PjBL**

Choosing the appropriate teaching approaches plays a significant role in ensuring high quality education. Therefore, it is necessary to compare the major traditional instructional approaches to PjBL. Evidently, one of the basic challenging problems in the educational process is the selection of the suitable approach to all learners that enhances the critical/creative cognitive skills (Senthamarai, 2018; Tavoosy & Jelveh, 2019).

Education is the main concern of preparing coming generation to meet life challenges critically. Consequently, “the one size fits all” of traditional instructional approaches is unworkable. There is a need to meet the needs of learners with differences in interest, styles of learning, attitudes, perspectives, and needs. Evidently PjBP proves to be catching the attention of policy makers as well as educators worldwide. Unfortunately, TA method is a one-way interaction, the teacher passively instructs learners, no interaction between learners themselves, the instructor delivers knowledge passively (Gholami et al., 2016). Later on after the session, the teacher may provide learners with handouts or notes and could sometimes assign tasks as homework (Gregorius, 2017) worthy noted that no feedback is given for learners (Almanasef et al., 2020)

Educators are in need of instructional pedagogy that combines both theoretical mere knowledge and skills, competencies and experiences, John Dewey (1938) called for “learning by doing”, “learning by experience”. Unfortunately, most traditional approaches called for passive learning, memorizations and drills, and yet teachers should act as monitors or as a guider not as knowledge transfer (Molbaek, 2018). No doing is taking place. Interestingly PjBP is a child centered, the learner became the center of leaning process engaging him creatively in constructing his knowledge. (Lenz et al., 2015)

Doubtlessly PjBA fosters learners' critical thinking, creative thinking as well as problem solving skills in real context. Another special feature that distinguishes it from traditional approaches is that it is inquiry-based method of cooperative learning, aiming for solving real life challenges rationally in conductive learning environment, via project work of various interesting themes, focusing on the learning process itself rather than the final outcome or product. To sum up, "PjBP integrates effectively knowing and doing" maximizing learners' agency and growth. (Blumenfeld et al.,1991)

Unquestionably, PjBA guarantee learners' cooperative, long-term multi-disciplinary education, active learning which is based on real life problems and challenges, the primary significant aim is to successfully derive learners to activate a myriad of 21<sup>st</sup> century competencies basically critical thinking, creative thinking, problem solving, flexibility, teamwork, communication, and peer/teacher engagement. During the project presentation, learners would present their final product or work to the target audience, be it a teacher, classmates, or community, offering a vital solution to community issues. (Tamim & Grant,2013).

Basically PjBL differs from traditional instructional approaches (TA). First, it is long term learning process, however TA are short term learning. Second, PjBA ensures active learning (Garmston & Wellman, 1994; Ishii, 2003; Ornstein & Hunkins, 2004) , and yet TA called for passive learning. PjBL is a learners centred approach but TA are teacher centred approach. Furthermore, PjBP is a multidisciplinary pedagogy that is based on problem solving (Ernest,1996) but TA are single subject learning. Moreover, PjBL is a process based in planing, instructing, and presentation and TA are based on rote memorizations and drills. In short, TA fosters learners' fundamental skills and competencies but PjBL maximizes learners' fundamental skills, 21<sup>st</sup> century skills and soft skills (Bell, 2010).

Notably, Incorporating PjBA in recent educational institutions has become significant measure to ensure excellence high quality encyclopedic education, wherein the impact of instructional approach is to meet efficiently learner's needs, preferences and interests, guaranteeing their growth. consequently, it's time policy makers as well as educators implement HQPjBA framework taking into consideration stages, steps and features of PjBL, providing professional development training for all monitors to facilitate cooperative learning, Indeed, the implementation of HQ PjBA needs careful thought, it necessitates the allocation of appropriate time and authentic resources, in addition to efforts by all the educational staff.

To sum up, preparing learners; who are able to face up current world 's challenges rationally, needs to adopt modern instructional strategies mainly inquiry-based learning, problem-based learning and PjBL. The traditional instructional approaches are no viable now. Teaching excellence promotes learners' growth and necessitates instructional approaches that are child centered. Holistic learning is significantly documented in PjBP (Barak, 2012).

### **Teachers' Role in PjBL**

Teachers have a crucial and important role in instructing learners via PjBL. A teacher modeling lifelong learning, he acts as facilitator, content expert, coach, mentor, collaborator, assessor, resource provider, motivator, and feedback source, he provides feedback and support whenever needed, also he defines the objectives of the project, help identify resources and assess the work done (Lamar & Mergendoller, 2010).

Teaching is a noble responsible demanding profession. After parents, teachers ought to integrate learners into the society, to build and maximize their knowledge, skills, competences, attitudes, interests, and talents. A teacher is a manager inside the classroom, organizer of knowledge, controller and prompter. A teacher is investigator, resource, participant, assessor, and feedback provider.

Worthy noted that *Project Based Learning Handbook* mentioned teacher's role as:

“at the heart of successful PjBL is teacher's ability to support and direct students. This requires instructional organizational, interpersonal and communication skills, as well as the ability to define the agenda for the class and push a project through to a successful conclusion” (Bie), thus a teacher should be with a flexible instructional approach with innovative, creative new trends and methods, PjBL appears to meet all the above mentioned roles, since it is learner-centered instructional approach with democratic authoritative style.

Evidently PjBL places the learner at the center of their own educational journey and its main learning objective is to successfully empower them to solve real life problems taking ownership of their learning. Consistently, a teacher must maximize learners' 21<sup>st</sup> century skills and competencies mainly Via creating a cooperative conducive productive environment, encouraging active learning, motivation, communication, participation, critical thinking, creative thinking and collaboration among learners. Insightfully, the teacher has to designs humanistic activities and critical discussions that stimulate learners to explore, analyze, and apply knowledge. Furthermore, teachers need to collaborate warmly with learners to agree on effective themes and learning objectives and goals, that are interesting, meaningful as well as achievable. Taking into consideration both academic objectives and the learners' personal needs, level, interests, aspirations, and motivations. In addition to planning, and instructing, teachers fosters learners' information literacy, media literacy, digital literacy, they curate and provide efficient necessary resources, such as books, articles, offline/online materials, and multimedia content. They remarkably enable all learners to explore subjects in depth (deep knowledge) and from various perspectives. Besides, Other fundamental roles include providing ongoing formative positive feedback, self-assessment, peer evaluation, flexibility and reflection. Carefully, teachers guide learners in understanding their areas of strengths and areas of weaknesses for bridging the gap of improvement. Creating a cooperative safe and inclusive

learning environment is another role of teachers, where learners feel motivated, eager to solve complex challenges and comfortable expressing their attitudes, ideas, asking questions, and taking intellectual risks.

A vital role of teachers is to make high quality education, via creating a cooperative supportive, dynamic, and engaging productive learning environment that critically empowers learners to actively participate in their own learning, creating flexible productive independent, critical thinkers.

Systematically, teachers promote Scaffolding Learning, they provide formative positive guidance and support to help learners solve complex problems or access advanced information, wherein learners synthesize complex concepts into digestible parts, ensuring that learners can gradually build up their understanding, and construct knowledge. So teachers help learners enhance fundamental skills as well as research skills, involving enabling them to navigate various sources of information literacy, discerning credible resources, and synthesizing information from multiple perspectives.

They promote efficiently inquiry based learning, wherein they encourage learners to ask relevant questions, seek full answers, and explore interesting recent topics. Doubtlessly, this project based learning necessitates inquiry-based approach which aligns with the encyclopedic nature of education by maximizing a spirit of exploration.

In essence, towards high quality education, teachers play significant roles as navigators, mentors, and facilitators in the journey of making education encyclopedic. Notably, they provide unlimited guidance, structure, and endless inspiration that enable learners to engage deeply with a wide array of subjects, promoting a well-rounded and comprehensive education.

## Types of PjBL

By the twilight years of the 20th Century, William Heard Kilpatrick developed the project method to be a popular valuable philosophy of education. Worthy mentioned that he (1871-1965) was a well-known prominent educator in the early 20th century, a famous colleague of John Dewey (The Father of Educational Sciences in America) and a proponent of his' educational model. He rationally expanded the work of Dewey especially experiential learning by doing, wherein Kilpatrick identified four major types of projects (Gutek, Gerald 2009). Notably, Projects are highly linked to the themes of the designed unit, whatever the way of presenting it, it must be linked to the general theme of unit (e.g. to nature, to business, to education ), thus projects are categorized accordingly, in this context, William Kilpatrick (1918) identified four main types of project work : first projects based on **construction** (mainly writing a role play, collection of stories, slogans, lists, ...), second projects based on entertainment and **enjoyment** (as preparing a ceremony, art exhibition, gallery walk, a concert, a gallery art exhibition, ..), projects based on **problem solving** (such as, debates, Socratic questioning concerning complex social, environmental or ethical problem like corruption, advertising, ethics...), and projects based on a **target skill** (recycling, summarizing, Pictionary....) it includes sustained inquiry wherein learners need to asking themselves driving questions, such as “What do we know?” and “What do we need to know?” (Larmer, Mergendoller, & Boss 2015). Similarly, all the types should be centered on the learner, teachers had better not use a rigid lesson plan that blindly directs learners down a specific path of learning objectives outcomes, it had better allows in-depth investigation of a specific theme (Grant, 2002).

## **Merits of Project Based Learning (PjBL)**

Numerous studies have agreed on the effectiveness of Project based approach in various educational settings (Holm, 2011; Baş, 2011; Yalçın, Turgut, & Büyükkasap, 2009; Nassir, 2014; Sylvester, 2007) . PjBL has many advantages in making education a high quality process. It maximizes learner's abilities, skills and competencies. It improves learners soft personal skills, preparing them to solve real life challenges. (David, 2008).

PjBL Offers learners countless opportunities to deeply explore the realm of active cooperative learning, maximizing efficiently cognitive, affective, and psychomotor skills, while also nurturing their emotional, spiritual, and social intelligence (Synteta & Schneider, 2002), among other aspects, it provides experiential education and learning by doing. David (2008) stated clearly that:

“The core idea of Project Based Learning is that real-world problems capture students’ interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context. The teacher plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, coaching both knowledge development and social skills, and carefully assessing what students have learned from the experience” (p 80-82)

In other words, PjBL develops learners' critical, creative and cognitive skills to build active agents who solve real life challenges creatively. It also enhances interactive education (Blumentfeld et al., 1991), worthy noted that PjBL when combined with technology, it can be

even more powerful and effective for several reasons (Solomon, 2003) therefore technology proves to be now a major tool in PjBL (Land, et al., 2000).

Actually, the more or the less teachers implement project based learning, the more or the less learners achieve academic success (Koch & Chlosta, 2006), since professional success is related to the improvement in abilities and competencies, helping in equipping learners to prepare for entering the world of work, so it meets the needs, learning styles, interests, and preferences of learners (Gomes et al, 2017).

As PjBL is a strategy derived from a constructivist learning, it enhances learners' flexibility, intrapersonal skills and interpersonal ones. Wherein learners construct together their own knowledge. (Doppelt, 2003), interestingly, constructivist learning acknowledges the effectiveness of reflection, decision making, and metacognition (Wilson, 1996). Learners can critically think and consider their own learning process, assess their level and check understandings, as well as identify areas of improvement, strength and weaknesses. It maximizes learners' metacognitive awareness, independency and self-directed skills, becoming lifelong learners.

PjBL prepares lifelong learners. learning goes beyond being inside the classroom settings (Gaer, 1998). Learners fosters their 21<sup>st</sup> century skills and competencies via the whole process, mainly adaptability and flexibility as major abilities to adapt to the rapidly changing world, empowering them to remain relevant in their personal and professional lives. As a result, PjBL is a life skills oriented education. Gangwar (2017) noted clearly that it enhances learners' content knowledge, he stated that PjBL improves critical thinking and cognitive mental abilities.

PjBL enhances collaboration and cooperation. Both are important crucial aspects of constructivism. It encourages learners to work in groups together in the whole process.

Choosing an interesting theme, sharing ideas, planning together and engaging in effective discussions and useful debates. Collaboration develops communicative skills, argumentative abilities, empathy, considering various perspectives and social skills. Only via cooperative learning, the classroom atmosphere turns to be supportive (Myers & Botti, 2000) , inclusive and motivating benefiting all learners.

PjBL is active cooperative instructional approach as a result it fosters cooperation skills, communication skills and personal skills. Learners will develop abilities to solve complex authentic problems (Ann et al, 2022). According to Thomas (2000), it fosters creative thinking and productivity, in addition to that it energizes learners to be a decision makers (Miller and Krajik, 2019)

All in all, PjBL makes education a high quality process. It promotes deeper understanding, problem solving, critical thinking, creative thinking, collaboration and cooperation, metacognitive abilities. And it enables learners to be active agent, motivation, independent, reflective, productive, and adaptable to ever changing world, so PjBL implementation in the educational settings has been proven to be very useful and valuable. Finally, PjBL benefits teachers and learners ( Simons and Baeten, 2016).

### **High Quality PjBL Framework (HQ PjBL)**

High quality project based learning is based on specific framework. Evidently, various frameworks, models as well as guidelines for HQ PjBL have been designed rationally to guarantee maximum effectiveness of this instructional approach.

In fact, PjBL can be implemented differently from a classroom to classrooms, sometimes in the same group, learners present projects in various ways, still there are basic foundational criteria that ensure effective PjBL framework. thus, the primary aim behind HQ PjBL framework is to examine deeply learners' experience in project work, to provide

educators, teachers and monitors everywhere with a unified basis for effective implementation of PjBP, and to stimulate reflection on how the quality of projects can be enhanced to maximum. (Larmer et al., 2015)

Larmer (2015), said clearly that: “The HQPBL Framework described below reflects the PBL knowledge and experiences of these individuals as well as a review of relevant educational and psychological research and theory...The High Quality Project Based Learning Framework appearing below describes six criteria that must be at least minimally present for a project to be judged “high quality.” The better the implementation of these criteria, the higher quality the project. Projects that are the most memorable, and that have the greatest impact on student learning and development, will be those that fully realize each criterion.” P1, therefore HQ PjBL includes six main criteria, the more or the less the criteria are regarded carefully by monitors and learners, the more or the less the quality of PjBL is. Interestingly, the criteria are:

1. **Intellectual Challenge and Accomplishment:** PjBL should propose challenging questions, learners need to be problem solvers by the final outcome, this enable them to be able to face up real life challenges critically, Cognitive Stimulation of learners’ Achievement is the aim behind such instructional method. Learning should be meaningful.
2. **Authenticity:** Problems, topics, themes, issues, tools, resources and strategies should be real, authentic and related to real-life situations.
3. **Public Product:** the final outcome is important too, Project works are not limited only to the monitor as audience, but had better be addressed to public, community, large group, other classes, school stuff, parents, experts, via virtual platforms or even via social networks as example.
4. **Collaboration:** the core component of PjBL is ensuring cooperative collaborative learning, wherein learners work in group teams, fostering the

interpersonal competencies, communicative competencies and intercultural competencies.

5. **Project Management:** managing time, resources, roles, tasks and all features of project work, maximizing learners' flexibility.
6. **Reflection:** reflective critical thinking starts from the beginning of the process till the end of the projects, fostering cognitive high abilities, to reflect is to learn twice. (Larmer et al, 2015)

### **Challenges Faced while Promoting PjBL**

Unfortunately, teachers face up challenging problems while promoting PjBL. Thus it is extremely necessary to explore the challenges met while implementing PjBP in classrooms. Basically, the well-defined problems were related to deciding about significant theme, overcrowded classes, interesting content, time/ group management, evaluation and assessment, and lack of authentic materials and facilities. Some are related to teachers, learners and school.

Various studies highlighted problems faced by teachers while implementing PjBA. First, Thomas (2000) declared that various observation to classroom context argued that only very few number of teachers experienced some serious challenges difficulties in promoting the pedagogy of PjBL. Still, both Habok and Nagy (2016) stated that PjBL has serious drawbacks related to time consuming, time management, and activities that requires carefull attention to details. According to Aldabbus (2018) PjBL has shown a profound effectiveness in ensuring deep educational experiences therefore most teachers found it challenging to manage the learning process. Moreover, Johnson & Johnson (1989) mentioned clearly that intrapersonal learners who prefer to work individually, and who are unwilling to work in group teams suffer while working in collaborative cooperative environment that PjBL is demanding. In addition,

Ladewski, et al., (1991) said that ‘‘the implementation of PBL can conflict with deep-seated beliefs on the part of a teacher’’, unfortunately some teachers would resist recent the dynamic of PjBL as learner centered approach, some teachers prefer their roles that traditional approaches stated. Likewise, PjBL often is time consuming especially in overcrowded large classrooms or in classrooms with variety of levels, both teachers and team group are finding difficulties in managing projects, Teachers suffer to manage time in monitoring, assessing and scaffolding learners ‘activities. (Marx et al., (1997). Within the same context, Promoting PjBL consumes more time if compared to other instructional approaches this would surely delay the processes of presenting and covering the lessons scheduled (Dahlgren et al., 1998).

Therefore, Heines (1989) mentioned that the process of promoting PjBP is demanding, especially in terms of designing, planning, presentation, evaluation and assessment, he added that teachers therefore must think twice about both the merits and drawbacks of PjBL. He said: ‘‘‘‘teachers should reconsider the potential benefits that project work may cover with the potential problems that are associated with them’’, as PjBA has various steps, features and phases, one should consider its advantages and disadvantages rationally. Doubtlessly, it is more than just ‘‘doing simple projects’’ as much as it is more than a mere ‘‘real-life’’ experiential activity, it goes beyond this simplicity (Markham, 2011) More than that, newly appointed teachers faced classroom management problems, therefore implementing PjBL will increase their difficulties in controlling the class, they were reluctant and unconfident enough to implement PjBL as Project presentation is linked with noisiness generally. Besides, some learners who are high achievers dominated the team, consequently low achievers refuse to cooperate with them, and yet Hmelo-Silver & Barrows said that ‘teachers are able to set students up for success by helping them build a solid foundation for these skills through the use of scaffolds’’ (2006 p. 24), PjBL is linked with teachers ‘role and learners’ role, any unusual change would affect the quality of PjBL. The availability of resources plays a vital

role in ensuring efficient promotion of projects, schools do not offer the necessary technologies and materials to effectively implement PjBP therefore school factors were the main barrier (Blumenfeld, et al. (1994)., Pereira, et al (2017). According to Cintag et al, (2017) some teachers lack experience and professional development concerning the efficient implementation of PjBL, they face difficulties while from planning to presentations. Hallermann, S., Larmer, J., & Mergendoller (2011) mentioned that newly appointed teacher may face difficulties related to project management, class control, and grouping. In short, challenging obstacles and various difficulties are encountered with mainly agreeing on authentic real life problem that interests all learners of large class, besides, confronting lack of content knowledge is another difficulty. In addition to lack of reliable authentic research resources. Some learners show uneasiness to connect with peers or mentors. furthermore, some teachers and learners show serious unpredicted difficulty in adapting to non-traditional instructional pedagogies. A serious challenge appears within the absence of professional development courses related to HQ PjBL, resulted in lack of well-stated implementation guidelines, learning outcomes, experiences and evaluation procedures. Teacher find difficulties in grouping some learners, finding a clear criteria of division is challenging, as long as a learner teamed up with another who has the same weaknesses or misconceptions, the benefits from cooperation seems absent.

All in all, Gillies and Boyle (2010) declared that teachers would gain significant experience via the implementation of PjBL, however they encountered numerous challenging difficulties as well. It is advisable that teacher use PjBA as supplementary instructional method as long as it affects the accomplishment of the learning objectives and goals. (Harmer, Stokes, 2014).

## **PjBL in Algerian Context**

Making a project is an accumulative process which ends with a product to be presented to an audience. Throughout the school year, learners are expected to work on different projects based on different themes so as to enhance their competencies including that the ability to interpret oral and written information, interact with their peers and classmates and produce a refined work for evaluation and feedback. Therefore, teachers usually consider such projects as a way to assess their learners' skills and competencies and hence they plan carefully such a process.

Starting with planning and selecting the project in liaison with the theme of each unit presented, they try to make learners work on a particular project (already predefined by the syllabus provided for example: Make Peace Projects) but with much flexibility and much consideration of their different learning styles and preferences. Hence, they allow learners to make their own initiatives and suggest their final format of the work. At this stage too, they make it very clear that it is a collaborative work so they assign learners into different heterogeneous groups in order to get more advanced learners assist those low achievers. Sometimes, they allow learners themselves choose their partners. Yet, it often ends in unbalanced groups with higher achievers or low achievers only working together. they also direct learners' attention towards time allotted to submit their final work and criteria of evaluation to take into consideration including accuracy, linguistic competence, communicative competence, fluency...

The Second Stage starts when learners finish their work and present them in front of their classmates. they give them space to use different available resources such as overhead projectors, their mobile phones or simply their own papers to present the work. they encourage learners to act their projects and they advise them to speak with much confidence and to get

much self-esteem while doing so. Sometimes, learners feel reluctant to get part in those presentations because of shyness and discomfort in public. At this stage, teachers stand at the back of the class supervising and intervening occasionally in order to allow their learners to be autonomous and self-reliant.

The final stage gives learners a chance to receive feedback either from their classmates or from the teacher. After the presentation, teachers thank the learners for the efforts they made throughout their work and they permit their classmates to ask questions or to comment the work. Learners receive peer feedback and then they provide teacher's own remarks and recommendations in regard with the outlined criteria of evaluation for example teachers ask learners to work on their fluency, to consider their accuracy too ... they usually provide grades attributed to the set criteria. Feeding back learners and feeding them forward make the upcoming projects more successful.

## **PjBL in Algerian Course Books (Secondary Education)**

### **PjBL in 1<sup>st</sup> Year SE Course Book “AT The Crossword”**

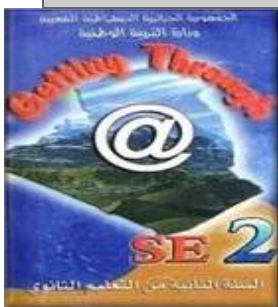


Remarkably, “At The Crossword” (SE1) is the Algerian book of English Language Learning, it is carefully designed for all streams (Both literary and scientific) secondary education first year learners, interestingly, it adheres to the relevant Algerian Ministry of National Education Curriculum (AMNC) as laid down in January 2005. As a short description, the book is divided to five major units, the distribution of units is designed for a basis of 20 hours teaching for each and every unit. Evidently, the primary concern is on project works, consequently each unit includes a

specific section for project workshop, in addition to well defined hallmark guidelines for ensuring the realization of a project work. Since PjBL is a process oriented instructional approach, the Project Workshop section is rationally positioned at the end of each unit, focusing on learners' final outcome after a meaningful process. monitors assign projects to the learners by the beginning of each unit, allowing them to work as a group team, in pairs or even individually especially in small number classes, here is the list of projects in “At The Crossword”. (For paralinguistic materials and book map see appendices):

### **PjBL in 2<sup>nd</sup> Year SE Course Book “Getting Through”**

<b>Unit Number</b>	<b>Title of the Unit</b>	<b>Project Number</b>	<b>Title of the Project</b>
<b>01</b>	Getting Through	01	<b>Making a Job Application Booklet or Making An Internet User’s Guide For Beginners</b>
<b>02</b>	Once Upon A Time	02	<b>Writing A Book Review</b>
<b>03</b>	Our Findings Show	03	<b>Conducting A Survey</b>
<b>04</b>	Eureka!	04	<b>Making The Profile of an Invention</b>
<b>05</b>	Back To Nature	05	<b>Designing A Consumer’s Guide</b>



Systematically, “Getting Through” is an Algerian course book of English language, it is designed for learners in all streams (Literary and scientific) second year of Secondary Education. It evidently complies with the relevant Ministry of National Education Curriculum (MNEC) as laid down in December 2005. The course book contains 8 units, **Putting Things Together** is the section related to project work. The guidelines structure the project work adequately, thus learners

could be able to construct knowledge efficiently. Here is the titles of units and projects in the course book (for paralinguistic materials and book map see appendices):

Number of Unit	Title of Unit	Number of Project	Title of Project
01	Signs Of The Time	01	Writing a Profile about Lifestyles
02	Make Peace	02	Writing a Statement Of Achievement
03	Waste Not, Want Not	03	Making A Conservation Plan
04	Budding Scientist	04	Writing Reports on Scientific Experiments or An ABC of Dreams
05	News and Tales	05	Writing A Collection Of Stories
06	No Man Is An Island	06	Making A Survey
07	Science Or Fiction	07 08	Writing Miscellanies or Making a Repertory
08	Business is Business	08	Writing a Business Portfolio

### PjBL in 3<sup>rd</sup> Year SE Course Book “New Prospects”



“New Prospects” is the Algerian course book of English language, it devoted for 3<sup>rd</sup> year learners in Secondary education, it complies with the syllabus laid out by the Algerian Ministry of National Educational in March 2006. Actually, it includes six units, and six projects, , themes are (for paralinguistic materials and book map see appendices):

Number of Unit	Title of Unit	Number of Project	Title of Project
01	Exploring the Past	01	Making The Profile of an Ancient Civilization
02	Ill-Gotten Gains Never Prosper	02	Writing a Charter of Ethics
03	Schools Different and Alike	03	Designing an Educational Prospects

<b>04</b>	Safety First	04	<b>Conducting a Survey on the Impact of Advertising</b>
<b>05</b>	Are We Alone	05	<b>Designing an Astronomy Booklet</b>
<b>06</b>	We Are a Family	06	<b>Writing a Booklet of Tips for Coping with Student's Emotions</b>

## **Adaptation of the Course Book/ Adaptation of PjBL**

Evidently EFL teachers can adapt in the course book and in PjBL. The main role of adaptation, is to ensure an effective valuable fit between both the course book materials and learners' interests, styles of learning and needs. According to Ur (1991), Course book are very effective for teachers, since it equips them with a significant level of support and guidance on efficient language teaching (Ur, 1991, p.184). it perfectly saves time especially for designing lesson plans and planning lesson procedures (Graves, 2000, p174). In addition to that textbooks offers teachers a warm up start to instruct the lesson, in this context, Jeremy Harmer (2001, p.8) said clearly that the course books are '...proposals for action, not instructions for use' consequently he strongly refuses that teachers should follow course books blindly, acting as slaves of the course book.

And yet, course books have some disadvantages. First, they limit the amount of creative thinking and productivity (Taylor, 2005, p 154) since some topics are boring or traditional, and some are culturally removed. Moreover, the language and materials used in the course book are not authentic, most of the dialogues are not realistic, they badly written within a limited list of headwords only to exercise specific language points or function (Richards, 2001, pg.255). according to Tanner & Green (1998, pg.121), an evaluation of the course book is highly recommended for teachers, especially deciding about the themes, are they interesting to learners or boring. Hidi (1990) declared that the more or the less themes are interesting the more or the less learners focus in class, the more or the less they likely to engage in disruptive behavior.

Various studies have recently pay increasing attention not only to the adaptation of textbooks but also to other learning materials in language teaching.

After evaluating the course books, teachers need to adapt the irrelevant boring parts creatively. Graves (2000, p.188) explained that adaptation of the course book may systematically occur at three basic levels – *the Activity level, the Unit level as well as the Syllabus level*. This includes reordering some parts, or activities, adding engaging supplementary materials, or even editing some names, photos that are relevant to the context and appropriate to learners' culture and perspectives (Wilson, 2007). Doubtlessly, various resources are available for the adaptation of course book activities, in this regard, Maley equipped teachers with a comprehensive long list of how a course book can be successfully manipulated (Maley, 1998, pp.281-283) in addition to Ur's (1991) how to adapt activities efficiently, besides a guide on how teachers and learners engage in adaptation by McGrath and Tomlinson & Masuhara (McGrath,2013, p. 63; Tomlinson & Masuhara, 2018, p. 105).

Worthy noted that the adapted techniques by scholars suggested where to add, to omit, to modify or to substitute. (Tomlinson and Masuhara 2004, Richards 2017, McGrath 2013, Maley 2011, Harmer 2007, McGrath 2013). Tomlinson (1998, p. 150), stated that making the textbook content suitable for all learners needs careful consideration, consequently, needed changes should occur; via reduction, addition, deletion, modification or supplementation. Interestingly, other strategies were simplifying and extending, the more frequent strategy was modifying and the least was deleting and subtracting. (Ur, 1991).

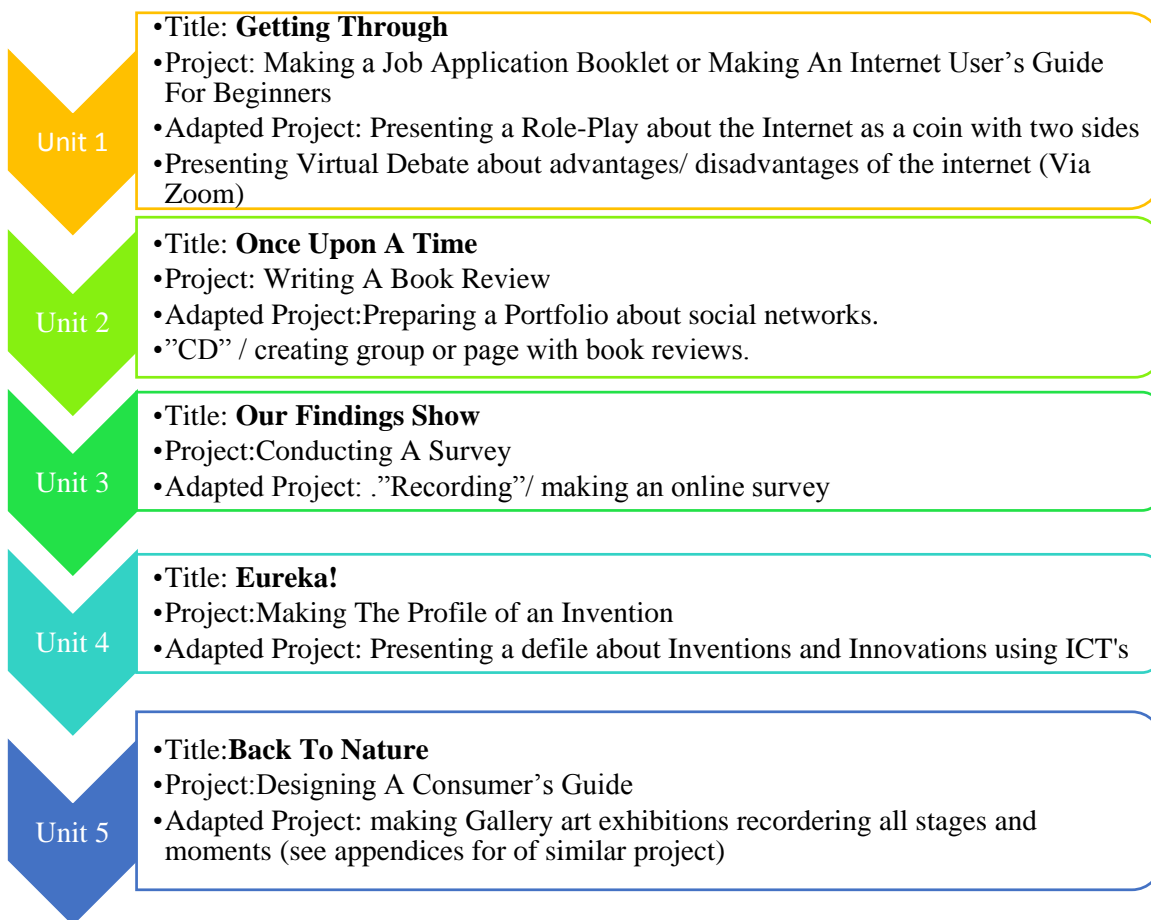
### **Towards Adapting Algerian Course Books' Projects (Examples)**

Various recent studies called for course book adaptation (Rubdy & Saraceni, 2001, McGrath, 2004, Tomlinson, 2004, Graves, 2003, Zohrabi & Abedini, 2001). Interestingly, Graves (2003, p.

230) declared clearly that, any “course book must be adapted to your particular group of learners.”

It is highly necessary to mention that some themes and projects are boring, others are not interesting to learners, thus teachers need to take learners needs and interests into consideration when planning for project work. It is recommended that monitors had better not follow the project in the course book blindly, they need to adapt themes and projects in newly motivating and engaging forms. (recommended sheets revised by inspectors are included in the appendices)

### Adapting Algerian 1<sup>st</sup> year SE Projects: (Examples and Ideas)



### Adapting 2<sup>nd</sup> year SE Projects: (Examples and Ideas)

Unit 1

- Title: **Signs Of The Time**
- Project: Writing a Profile about Lifestyles
- Adapted Project: Video comparing between lifestyles in the past and now. (See Appendices photos)

Unit 2

- Title: **Make Peace**
- Project: Writing a Statement Of Achievement
- Adapted Project: Movie presentation of a place before and after war
- PPT about Nobel Peace Prize Winners
- Recordings about Nobel Peace Prize Algerian Candidates

Unit 3

- Title: **Waste Not, Want Not**
- Project: Making A Conservation Plan
- Adapted Project: gallery talk exhibition about nature (See appendices photos)

Unit 4

- Title: **Budding Scientists**
- Project: Writing Reports on Scientific Experiments or An ABC of Dreams
- Adapted Project: Scientific Experiments / community project

Unit 5

- Title: **News and Tales**
- Project: Writing A Collection Of Stories
- Adapted Project: Creating a group for guest speaker series (Storytelling)

Unit 6

- Title: **No Man Is An Island**
- Project: Making A Survey
- Adapted Project: Guest Speaker Series via virtual platform

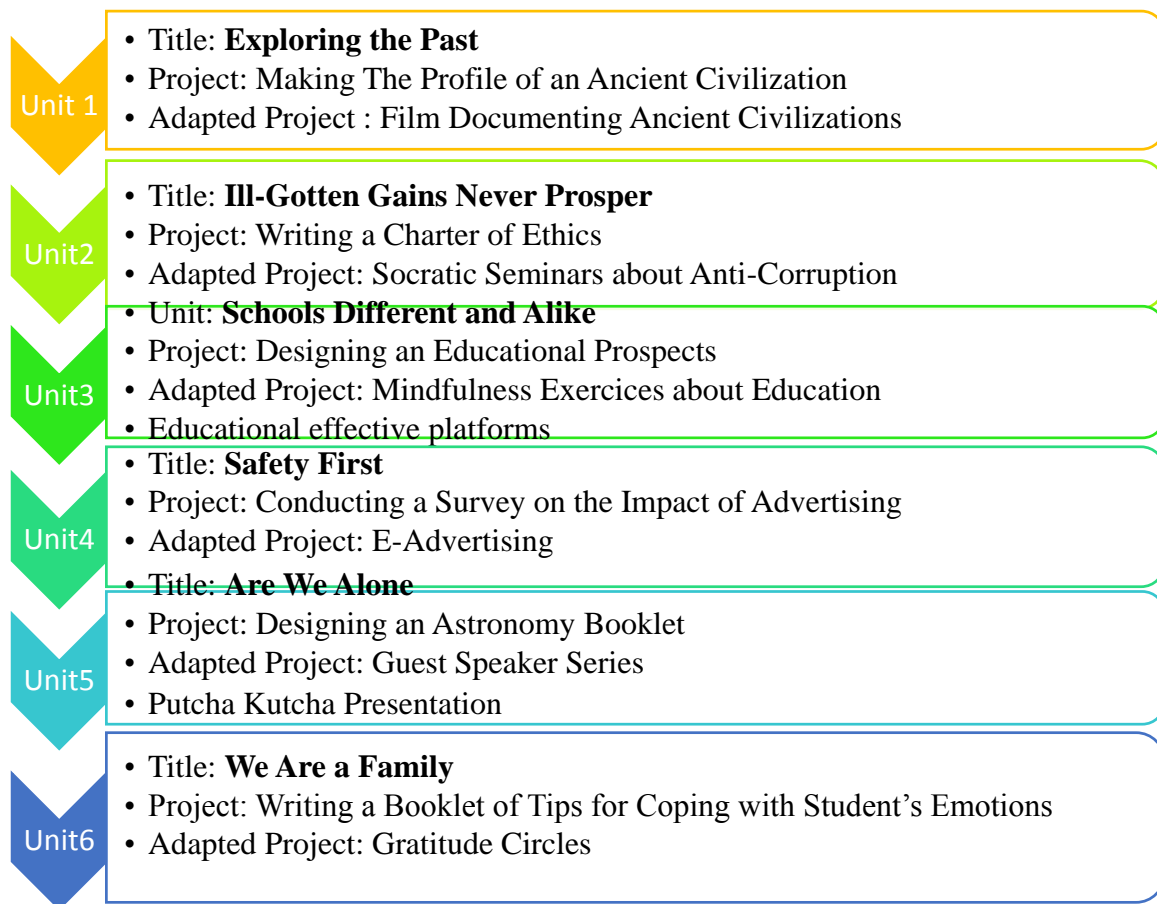
Unit 7

- Title: **Science Or Fiction**
- Project: Writing Miscellanies or Making a Repertory
- Adapted Project: Gratitude Circles.

Unit 8

- Title: **Business is Business**
- Project: Writing a Business Portfolio
- Adapted Project: e-portfolio about the theme./ Mindfulness Exercises

## Adapting 3rd year SE Projects: (Examples and Ideas):



Other interesting adaptation can be for example: gallery art exhibition, gallery talk presentations, Socratic debates, book clubs, board games, storytelling sessions, role playing, putsch kutch presentations, album cover, recording short movie, newscasts, merits badges, mindfulness exercises, puzzles. The theme is highly linked to the unit, and the activity should be humanistic, engaging and motivating.

In short, ensuring high quality PjBL is depending on learners' age, interests, styles, needs, culture, and perspectives. Considering this, PjBL will maximize learners' skills and competencies, it will guarantee learners' personal growth, agency, flexibility, and adaptability.

## **Electronic Project Based Learning (E-PjBL)**

Online learning system had transformed radically the current world. The shift is from face to face education to electronic education. Especially within the impact of the pandemic Covid 19. Consequently, an urgent need for electronic approaches to teaching and learning appears. Electronic project based learning came to meet the need for blended learning. It is one of the most significant instructional approaches. Interestingly, it is vital to test the effectiveness of E-PjBL for learners. (Susi, 2021).

Interestingly, various scholars examined carefully the importance of electronic project based learning in post Covid 19, that includes hands on as well as practical projects via electronic resources or components. Worthy noted that electronic project learning helps learners foster 21<sup>st</sup> century skills via active learning, problem solving and debating real life scenarios. (Bell, 2010), (Papert, 1980).

It is significant step to know the types of E-PjBL. They involve designing, building, and sharing contents via digital platforms, troubleshooting, programming and incorporating various technologies. The difference between PjBL and E-PjBL lies in providing learners with opportunities to apply theoretical knowledge via ICT's, maximizing creativity, critical thinking and creative thinking via E-PjBL, learners can increase proficiency in reading, writing as well as numerical abilities, they can make reasoned judgements or decisions. In addition to ensuring effective verbal, nonverbal and written communication skills and abilities. Besides, developing learners' information literacy and digital literacy, including skills to find, use and judge information via navigating online/offline platforms. E-PjBL fosters self-direction abilities, mainly time management, and active learning.

## **PjBL and Digital literacy**

Notably, teaching/learning processes underwent a massive significant transformation both during and after the COVID-19 period, wherein education needed a completely rethinking pedagogy leading to a constant reshaping of global instructional methods (Kearney, 2020), that maximize learners' digital skills through the incorporation of emerging up to date technologies (An & Mindrila, 2020). Thus it is important to shed the light on the relation between PjBL as well as digital literacy (DL), worthy mentioned that DL encompasses not only the ability to use digital resources, tools and devices but also the communicative, cognitive as well as social skills required to effectively navigate the digital world (Gilster, 1997). In fact, various researchers, educators and trends have conducted rich recent studies about the link between PjBL and digital literacy. Systematically, PjBL has been designed to promote active learning since it ensures learner centered approach wherein learners take the responsibility and accountability of their own learning. Whereby, the teacher role changed completely from that in traditional approaches, he is no more the authoritarian autocratic, sage on the stage, however a democratic facilitator and a guide on the side, interacting in a process of infantilization (Harmer, 2001); Yudha et al.'s (2020) research stated that PjBL fosters learner's digital abilities, indicating that promoting Project-based learning model leads to maximize mental cognitive curiosity and therefore enhances positively learners' mathematical literacy skills. Another research study done by Abidin et al., (2021) proves that PjBL enhances learners 'mathematical reasoning abilities as well as numerical digital literacy. More than that, PjBL enhances proficiency in utilizing information, media, and recent technologies such as digital literacy (Rais, 2010; Lai & Viering, 2012; Annahita, Hillary, & Dawn, 2016). it is via HQ PjBL that learners will maximize their lifelong learning skills which in turn are in line with High quality digital literacy skills basically encouraging selective, critical, and analytical attitudes in sorting and selecting

learning media according to learners learning interests and needs.

### **The Relation Between PjBL and DL**

Actually PjBL have a strong link with digital literacy. Worthy noted that the two concepts are vital and crucial aspects in modern fast paced world. It develops learners' digital soft skills and abilities, it fosters learners' critical thinking, communication, and problem solving. In other hand digital literacy improves learners' collaboration, creativity, and soft capacities enabling them to share ideas and provide feedback.

It is via PjBL that EFL learners use ICT's inside and outside schools. They use digital tools to search for information, plan ideally their topic, organize presentations, communicate with peers and other teachers for more ideas, and use artificial intelligence applications for extraordinary ideas, print projects, record videos and audios.

All in all, the relation between Pjbl and DL is intertwined and interrelated. EFL learners need both to guarantee their success in academic and professional career. They impact each other positively. For high quality education syllabus designed need to incorporate both project based approach and ICT's efficiently, providing professional development training for EFL teachers as well as EFL learners.

### **Conclusion**

To conclude PjBL is of utmost importance. It gains widespread credence among educators, as the best instructional approach for enhancing learner's skills and competencies, and for successful attainment of both fundamental, personal, and high level abilities. It promotes a dynamic productive learning environment, such cooperative environment tailor instructional methods to personalized learning styles, moreover it emphasizes creative and critical thinking besides real-world application of knowledge to solve real life problems rationally. Interestingly, PjBL empowers learners to actively engage with the multiple authentic materials, ensuring a

deeper understanding and promoting lifelong learning profile. Actually, learners will rationally explore their perspectives, ideas, attitudes and opinions with peers, exercise voice and choice, debates, taking careful decisions via achieving project outcomes. All in all, promoting HQ PjBL in modern schools and universities is a beneficial reform in education. Still we need a rethinking pedagogy to overcome the challenges met by monitors while implementing HQ PjBL. In short, HQ PjBL is a catalyst for learner's growth, societal progress, as well as a brighter future, since it successfully equips individuals with the fundamental, professional and 21<sup>st</sup> century skills and competencies, knowledge, and rationale mindset needed to excel in a rapidly evolving world, ensuring lifelong problem solvers.

**Chapter Two:**

**Unearthing The**

**Effectiveness of**

**Digital Literacy (DL)**

## **Chapter Two: Unearthing the Effectiveness of Digital Literacy**

Introduction

Digital Literacy Concept Definition.....

Literature Review.....

Digital Literacy Studies.....

The Shift Towards Digital Age.....

Digital Skills.....

Examples of Digital Literacy.....

Navigating the Digital Landscape.....

Needed Digital Skills.....

Digitalization and Blended Learning.....

Assessment of Digital Literacy.....

Conclusion

## **Introduction**

This qualitative research aims to generate theory that examine, explore and expand knowledge in digital literacy in Algerian Secondary education. It helps EFL teachers to investigate their exact needs in both training and professional development. The results highly empower EFL teachers to face up their challenges towards a digital shift in education as well as to accompany EFL learners to maximize their digital literacy skills in education.

Finding different definitions of digital literacy, the researcher explored various models of digitalization of education. Therefore, the significance of this research is that it examines the impact of project based approach in maximizing learners' digital skills in Algerian Secondary education, it reflects EFL teachers' and learners' perceptions towards the topic, and it informs educators about a high quality framework to enhance the necessary digital media skills for both Algerian Professional Development training of teachers and for the curriculum devoted for EFL learners in Secondary schools.

### **Digital Literacy: Concept Definition**

Actually, the definition of digital literacy had been approached differently, thus it can be so difficult to pinpoint due to the existence of multiple definitions and interpretations from various literature sources. Generally, the term encompasses a broad a range of skills, abilities, knowledge, and attitudes required to critically and responsibly go digital, navigate and use modern technologies, mainly the internet, tablets, computers, smart mobile devices, and various software applications. Digital skills and abilities can be stated from basic computer literacy (such as using the device, a keyboard and mouse) to more advanced skills such as coding and online security, other skills can be searching for information online or offline via digital device(s), critically evaluating and reacting with content, communicating and collaborating with peers using digital resources, as well as using technology to create, comment, and share

content including understanding digital security and privacy, in other words it can be basic computer literacy, information literacy, media literacy, and critical thinking. First, basic computer literacy involves the primary ability to use digital devices and software, navigate the internet, and use basic digital tools such as email services, word processing and social media. Second, Information literacy includes the ability to identify, find, locate, comment, and evaluate information from multiple sources, as in online databases, applications and websites. And yet, Media literacy refers to the ability to critically and safely evaluate media contents and understand how they shape people's perceptions of the world. Critical thinking however, reflects the ability to analyze, evaluate or criticize information, arguments, and evidence. No one can deny that in today's digital era, digital literacy turns increasingly to be an extremely significant key to guarantee personal, educational, and professional success, as almost all aspects of daily current life and work rely basically on technology and the internet. The main focus of this research is on literacy and how it is perceived in an ever-growing digitally influenced world where digital technology is becoming more prevalent. The premise is based on the belief that as the use of digital technological tools and platforms continue to expand, therefore the definition of "literacy" needs to be reconsidered and reexamined carefully. Several current scholars are directing their attention towards examining literacy practices in digital realm.

Interestingly, in the last two decades, there have been numerous attempts to broaden the concept of literacy beyond its traditional initial usage associated with writing. Margaret Meek Spencer (1986), a prominent British researcher in this field, first introduced the term of "emergent literacies" as early as 1986 when describing how young children engage with media during play, children's based play. Notably, in the years following the introduction of Spencer's "emergent literacies," several authors and studies, including Bazalgette (1988), Buckingham (1993), and Tyner (1998), have contributed to the gradual development of the concept of

"multiple" literacies. Through in-depth discussions, various forms of literacy were introduced by experts in the field, such as visual literacy, television literacy, cine-literacy, and information literacy. They have been explored and examined carefully. Moore and Dwyer (1994) have explored the concept of visual literacy, while Buckingham (1993) has focused on television literacy. The British Film Institute (2000) has introduced the idea of cine literacy, and information literacy by Bruce (1997).

## Digital Literacy in Education

Several interesting debates concerning digital literacy in education focus on what skills to be developed by learners, as well as what they need to know about technology to ensure an effective critical use of ICT's. doubtlessly, in the field of information technology in education several approaches are adopted to foster learners' digital literacy. Nowadays digital literacy turns to be an essential key factor in education, business, employment, and social life as a vital aspect in understanding current world. Thus, it is highly important to define the exact meaning of digital literacy in education, in addition to identifying a high quality framework and tools for digital literacy.

According to Van Joolingen (2004'): "ICT literacy is the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others in order to participate effectively in society.", the definition links digital literacy to the appropriate access, use, integration and evaluation of information technologically.

It is extremely essential to come to agreed understanding of the term digital literacy. First, Paul Gilster defined digital literacy as:

“the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. The concept of literacy goes beyond simply being

able to read; it has always meant the ability to read with meaning, and to understand. It is the fundamental act of cognition. Digital literacy likewise extends the boundaries of definition. It is cognition of what you see on the computer screen when you use the networked medium. It places demands upon you that were always present, though less visible, in the analog media of newspaper and TV. At the same time, it conjures up a new set of challenges that require you to approach networked computers without preconceptions. Not only must you acquire the skill of finding things, you must also acquire the ability to use these things in your life". (Gilster, 1997, p1-2) in short, recent age is increasingly mediated by digital technologies.

## **Literature Review**

The primary concern of literature review is to consolidate the rationale for the research via examining and summarizing the main findings, key concepts, current theories, and practical methodologies of previous studies in order to identify clearly the research gaps, inconsistencies, and controversies in the target field, as well as to highlight areas where further research is needed. This work is conducted as a preliminary step in the research process to identify the state of current knowledge in the area of project based learning and digitalization.

This literature review aims to successfully map out significant findings in the area of the role of project based approach in maximizing learners' digital literacy, The areas of literature identified as relevant concerned a historical overview of project based learning, digitalization of education as well as digital literacy. The literature review also sets the conceptual framework into which to insert this study. It draws from project based approach, and from the recent shift towards a digital education.

Today's world is deeply permeated by modern digital technology and it is unmistakably clear how much it impacts people's daily lives. As the use of digital tools increases day after

day, the exact meaning of digital literacy needs re-examination. Traditional digital literacy studies have largely approached digital literacy skills as embedded within learners' cognitive mental processes, with little or even no attention to the effect of social environmental context (Railean, 2017). And yet, new digital literacy studies have been more interested in how digital literacy is contextually maximized and deployed at the collective collaborative environment, therefore they resist the claim that it resides primarily within the individual cognitive process (K. A. Mills, 2010).

### **The Shift Towards Digital Age**

With a worldwide shift towards a digital media age, education has marked a revolutionary shift towards the use of ICT's in teaching and learning processes, thus it becomes a must to equip learners with 21<sup>st</sup> century skills such as digital media skills as well as to train them to use digital resources effectively and rationally. Technological tools mainly the internet, computers, as well as interactive whiteboards, and various other digital resources have become extremely valuable for both teaching and learning processes. Worthy noted that, decision-policy makers and educators face challenging challenges towards the successful efficient implementation of recent ICT in education due to a significant gap between the availability of ICT's and its practical high quality framework implementation. Therefore, a crucial inquiry that arises is identifying the primary factors that impact the effective adoption of ICT in education especially in contemporary times where technology had revolutionized everyday aspect, as it is said 'Today, real borders do not lie between nations but lie between those who can access ICT and those who cannot'. Shaffer (2001, p.2), in other words, the current borders that separate people are not only defined by geographical positions or national boundaries, but also by access to Information and Communication Technology (ICT). consequently, the digital divide has become a completely new form of inequality, highlighting the importance of bridging the gap between the technology haves and have-nots. In addition to that, according to Noor-Ul-Amin

(2013), Information Communication and Technology has turned to be a crucial asset for enhancing the educational environment, serving as a main strategic resource for teaching and learning and as an essential tool for ensuring high quality education. (Noor-Ul-Amin, 2013).

According to Smolin and Lawless (2007), it is extremely essential for teachers to possess confidence and a positive mindset in order to effectively teach. As a result, it is recommended highly that pre-service teacher education programs should prioritize the promotion of a technology-based curriculum and technology practice in a strategic efficient manner.

### **Digital Literacy**

Today's world is a world that relies a lot on digitization and the internet in various fields, especially education. So the separation of education from modern digital technologies seems impossible. (Deady, 2017) Interestingly, Digital literacy skills can be referred to the set of skills and competencies that allow easy access to digital content or information, it can have viewed by taking part in communication delivered digitally via computers or other digital devices,

“The concept of literacy includes visual, electronic, and digital forms of expression and communication. Modern literacy has broadened in scope, as it is tied to technology and culture, and the ability to become and remain literate requires a long-term commitment.”

(Cordes, 2009).

further skills are computing skills mainly using word processing, creating presentations, text manipulation, multimedia, creating effective web-searching skills, using visual mapping, understanding spreadsheets and databases as well as making judgements concerning online content.

### **Examples of DL**

Interestingly, there are various examples of digital literacy skills, from easy simple tasks to different complex ones. Examples are directly linked to DL definition, in this context, DL stands for the ability to effectively use digital technologies to find, communicate, create, comment, access, evaluate information. Therefore, example of DL is highly linked to these abilities. Objectively, providing examples of DL at the level of Secondary education seems necessary. Learners can learn the **Basic computer skills**, the extremely essential skills to use digital tools mainly operating a computer, using a keyboard, installing applications, word processing. In addition to **Web/Internet Browsing Skills**, including abilities to use internet navigation and using search engines appropriately; such as blogging and understanding website URLs critically. Furthermore, **communicating effectively (Communication Skills)**, this encompasses skills related to using digital resources and digital platforms for communication or learning, good examples like using e-mail services, and digital platforms for communication or learning, chat applications. Besides, **Evaluating Information Skills**, including abilities to assess the reliability, credibility and accuracy of information found in digital tools. Also, **Safety/Privacy and Personal Security Skills**, to protect personal accounts and information and navigating safety, in other words, cybersecurity and protection, being a digital content creation, is another examples of DL skills, creating, editing and modifying a specific digital content process to be an essential skill to navigate appropriately, e.g. creating power point presentation, word processing, photos hopping, and video montage. other skills include **Social Media Management** and **Online Research, Coding and Programing**, are further skills that includes the ability to develop various applications. Any interaction with technology requires certain level of DL.

And yet, these are only few examples of digital literacy skills, worthy noted that technology is rapidly evolving in a massive way, thus learners ought to navigate responsibility the digital landscape. The aim is to stay digitally literate in an ever changing world.

It is clear that it is difficult to identify all examples of DL since they are ever evolving rapidly. Here are some **Examples** relevant to **Classroom Context** with **Appendices from Textbooks of English Language in Algerian SE** (See Appendices):

1. The ability to switch on/off a computer, tablet...
2. The ability to use e-mail, create an account.
3. The ability to communicate efficiently.
4. The ability to perform online searches.
5. The ability to name/identify components of a computer.
6. Word processing/ use visual and graphics to present contents.
7. Send and receive e-mails.
8. Be able to navigate applications.

All in all, there are different examples of DL, learners need DL to meet educational needs and satisfy learning interests. Also they need DL to prepare for future trends and to ensure career opportunities.

## **Navigating the Digital Landscape**

Globally, it becomes very important to develop digital skills for both teachers and learners, and yet there is a lack of research about learners and teacher's uptake of Information and communication technologies (ICT's) in recent educational schools and institutions. Expectedly, modern technologies turn to be a crucial aspect of global educational policy, therefore enhancing learners 21<sup>st</sup> century skills turn to be fundamental aspect to meet the abnormally critical demands of modern education and the increasingly digital electronic era.

Fortunately, various studies highlighted carefully the importance of maximizing learners 'digital soft skills and literacies mainly Ferrari (2013). He examined critically the basic areas of

digitalization and digital literacy as follow: information, communication, content creation, safety as well as problem solving.

Salomon (2016) declared that recent incorporation of ICT's and integration of computers in educational settings as in classrooms, colleges, homes, and workplaces has been anticipated to bring about significant changes in the field of education.

### **Digital Skills Needed**

There is an increasing need for a digitally competent learner, thus there are various digital skills to be learned, digital skills are set of technological abilities and capacities in using and interacting with digital tools and resources in order to react, create, or design specific task. Actually they create huge opportunities for learners' career mainly: basic computing skills, data visualization, data analysis, searching engine use, online course learning skills, coding and web development, and others (cyber security, cloud services, robotics, networking, graphic design, email services, social media management, online courses).

Importantly, it is never too late to maximize digital skills. Additionally, skills can be basic, intermediate and advanced skills. Learners need them to overcome the digital skills gap. Interestingly, various studies examined carefully the digital skills gap both before and after the pandemic Covid 19 .

### **Digitalization of Education and Blended Learning**

Doubtlessly, the Coronavirus pandemic has massively exacerbated digital soft skills, now digital inclusion is no longer a choice to opt for but an urgent need to be maximized. As a result, a significant amount of teaching is done in a variety of digital platforms such as Google Classroom.several researchers examined deeply how best to impart digital soft skills to

University students, as (colwell, Hunt-Baroon, & Reinking, 2013). Digitalization of education should consider both face to face education and Blended Education, examples can be live sessions, group discussions, or interactive online activities. Interestingly, one vital integral part of modern education is digitalization (Bibi & Nawaz, 2020). It is set of a wide range of computers' software as well as hardware, in a time of blended learning become an interesting mode that necessitates digital technology. Some scholars such as Joy and Garcia (2000), Waycot (2010), declared that technology based education is used for entertainment purposes but not for educational purposes. Interestingly, Benson and Kolsher (2015) stated that the adoption of blended education (BL) does not always foster learners' competencies.

Remarkably, fostering students' digital soft skills gains widespread credence among educators in the 21st century. Thus it is very important to examine students' attitudes and opinions towards digital education. As well as to highlight the impact of modern instructional approach in maximizing learners 'digital literacy skills. Recently, due to the technological development of ICT's, and the shift towards digitalization of education, educators deduced that for High Quality Education (HQE), the accessibility of the digital tools and resources (e.g. smartphones, interactive boards, tablets, wifi, Ipads, connection, etc.) learners can attend lectures and seminars online via virtual classroom in various platforms such as Google Classroom and Moodle. However this is not enough. Proper professional development training for teachers comes first. In addition to ensuring parents webinars concerning the safe use of digital tools, and improving learners' knowledge and digital literacy to navigate critically in a digital world. Blended learning proves to foster flexibility, because it offers the use of different types and styles of educational tasks, it improves confidence and active learning, furthermore, it gives teachers more time for discussion, interaction, evaluation and feedback, Moreover, it is more engaging, activities provide a motivating pace to sessions. However, a framework for maximizing digital skills is urgently needed. It is a tool that can be used to evaluate digital

capability, reflect on students' needs and provide them with useful resources. The framework should be available to all educational professional staff. Importantly, digital skills include digital proficiency and productivity, communication, problem solving and innovation, information and media literacies.

Various scholars highlighted the effectiveness of blended education. First, An & Mindrila, (2020) declared that it is very interesting to develop students' digital soft skills and competencies via ICT's and Digitalization of education. Consequently, Algerian educational system went digital too thus EFL teachers and learners have to go digital as well. Second, Vidal (2020) stated clearly that teachers, syllabus designers, policy makers and educational professional leaders ought to implement blended education in modern universities through electronic active learning as well as online learning. Furthermore Chun and Lee (2016) declared that digital soft skills turn to be an urgent prerequisite for their progress and success. "It is quite clear that to be digitally literate, a very basic requirement is possessing the skills to use digital technology" (Chun & Lee, 2016, p. 62).

Blended education gains huge popularity and widespread credence in educational sciences. In fact, it is the recent combination between traditional classroom instructional methods, face to face classes and electronic digitalized education to all learners. Worthy noted that Colis and Moonen (2001) thought that blended education offers continuous educational process that is not limited to time and space, In addition to that, Garrison & Vaughan (2008) added : " blended education is a thoughtful fusion of face-to-face and online learning experiences" also, Blended education "is part of the ongoing convergence of two archetypal learning environments" (Bonk & Graham, 2006, p. 2). As a consequence, blended education combines efficiently the two types of education, face to face education and virtual technology based education. Graham (2006) described blended learning by saying that, it is the system that

combines face-to-face instruction with computer-mediated instruction. Graham (2003) mentioned that :

“Blended-learning combines face-to-face with distance delivery systems. ... the internet is involved, but it's more than showing a page from a website on the classroom screen. And it all comes back to teaching methodologies— pedagogies that change according to the unique needs of learners. Those who use blended learning environments are trying to maximize the benefits of both face-to-face and online methods— using the web for what it does best, and using class time for what it does best » (p. 227).

Many researchers declared that blended education necessitates the combination of the field of education with the field of educational technology. (Chew, Jones and Turner, 2008). Thorne, (2003) believed that blended education has so many advantages on students. First, it enhances their 21<sup>st</sup> century skills and competencies such as: confidence, communication, media skills, self-motivation, self-direction, productivity, creation, evaluation, flexibility, critical thinking, creative thinking, accountability, autonomy, interdependency and others, through various digital websites and platforms students may accelerate their interactivity and cooperation together, they can opt for different options mainly, to share specific educational contents, to discuss recent issues, or even to evaluate products, blended education offers students rich opportunities to work virtually. According to So & Brush (2008) Blended education enhances learners' cooperation and collaboration, via online learning through website, online application, and social networking (Kaeophanuek et al., 2018). it suits all learning styles since materials are varied, learners can visualize, listen, feel, and interact with various interesting materials. Thus, blended learning moves them creatively from theory into practice wherein they gain deeper understanding and became long-life learners. Furthermore, “Teaching in Blended Learning Environments is a well-structured and informative book that will empower many readers to change and re-conceptualize the pedagogical tools and practices

they employ when teaching college and university students” (French, 2015, p. 519). The teaching and learning processes have been massively challenged within Coronavirus pandemic. A complete rethinking pedagogy must be taken soon , wherein the main aim is to maximize students digital soft skills . in other words to develop the ability to use efficiently digital tools to create, write, access, manage, integrate, analyze, and synthesize soft information (Kaeophanuek et al., 2018). Fostering students soft skills and competencies is extremely essential to face-up recent challenges (Phuapan, Viriyavejakul, & Pimdee, 2016; Sharp, 2018). Digital websites and platforms can be Google Meet, Google Classroom, Zoom, or Kahoot and others . Bali said: “We can only begin to put the seeds of this critical literacy in our classes and hope students will transfer this beyond the classroom and into their increasingly digital identities and lives” (Bali, 2016, p. 4). That’s why scholars and educators ought to encourage the incorporation of blended education, not only for the advantages of students but for them too. (Payton and Hague, 2010).

Blended education proves to have many merits. First, students turn to go digital or as Prensky called them “digital natives”, they will develop their soft skills and competencies such as flexibility, communication, and creative critical thinking, additionally, they will and mitigate the challenging deficiencies encountered towards a digital shift in education, also, learners will develop their technical, cognitive and social- emotional abilities as Chelghoum stated (2017). It becomes a need to have to use digital platforms (Cucinotta, Vanelli, 2020).

Importantly, Google classroom is one of the platforms used in blended education, it is a Learning Management System (LMS) designed by Google services for educational staff, mainly teachers, and learners. (Zhang, 2016). It can be a website or application, it enables teachers to instruct easily students, share contents, react, comment, share videos, ask/answer questions, make evaluation and assignments, and assess learners. EFL teachers in the faculty of Letters and Foreign languages, in the Department of English language adopted Google

classroom and Moodle and Ibtikar as digital platforms in their teaching, EFL students at all levels learn effectively via Google Classroom (See photo n°1 in the Appendices), wherein all EFL teachers share all lessons, assignments and assessment tasks; and learners comment, discuss and download files (See photo°2), contents are downloaded to Google Classroom in various forms such as: photos, Pdfs, word document, videos, power point presentations. Etc (See Photo n°3). In addition to the use of Google Classroom, Teachers use various methods to implement blended learning mainly Gmail services, Facebook groups and messenger. (See appendices)

Finally, blended education proves to be a vital instructional process, it turns to be a bottleneck hampering EFL students' progress and career success. Various studies prove the probe into the effectiveness of an interactive digital platform aimed at improving students' digital soft skills. The findings of studies revealed that blended education contributed to the increase of students' competencies thus, scholars, educational staff and teachers ought to consider how learning ICT's work effectively, and Technology leaders too must coordinate with educators to provide efficient opportunities to successfully engage 21<sup>st</sup> century learners in 21<sup>st</sup> century world. to sum up, student's ought to master how they use professionally the different resources for electronic learning and blended electronic education, mainly: digital notebooks, online platforms, digital journals, digital dictionaries ...etc as teachers should encourage the use of applications mainly: Kahoot, Academia, Google meet, Edu creations, Socratic, Google Classroom, Schoology, Seesaw, and others.

## **Assessment of Learners' DL**

Significantly, technology has revolutionized rapidly the current fast moving world. It becomes intertwined with everyday routines. Thus, digital tools and resources has become available at our fingertips. In teaching and learning processes DL; the ability to use and integrate technology positively to collect, assess, evaluate and communicate information”, offers enormous merits, and yet without critical safe use and proper incorporation, they can become overwhelming, in other words if digital resources comprehended wrongly, they turn to be daunting and pose risks.

It is important to note that living in a digital age or “New Media Age” necessitates becoming a proficient navigator of digital tools and resources, as it is doubly important to note that there is limited consensus regarding what to teach and how to assess them appropriately. As a consequence, educators have advocated for a high quality framework for literacy development, that encompasses both conventional literacy skills alongside digital literacy skills. In addition, to their potential interaction.

All in all, the need of digital literacy assessment framework has prompted educators to address various gaps and deficiencies in the era of digitalization of education. Insightfully, Shopova's (2014) declared that fostering learners' DL skills is an extremely vital condition for successful performance and outcomes in their learning process. Many researchers used *Learners' self-reported efficacy*, via *Likert Scale Surveys* (e.g. Lau Yuen, 2014) in developing and validating of a perceived ICT literacy scale for secondary school learners, pedagogical and educational contributions, still this is not enough. Other forms of assessment include response formats (e.g. multiple choice items) are recommended.

# Chapter Four: Research Methodology and Design

## Introduction

1. Research Methodology
  - 1.1. Research Design
2. Research Approaches and methods
  - 2.1. Research Paradigm
    - 2.1.1. Ontology
    - 2.1.2. Epistemology
    - 2.1.3. Methodology
    - 2.1.4. Method
  - 2.2. Approaches to Educational Research
    - 2.2.1. Positivism and Post positivism
    - 2.2.2. Interpretivism
    - 2.2.3. Critical Theory, Feminism and Constructivism
    - 2.2.4. Pragmatism
3. Research Methods
  - 3.1. Quantitative Research Approach
  - 3.2. Qualitative Research Approach
  - 3.3. Mixed Methods Research Approach
4. Research Study Design
  - 4.1. Mixed Methods Designs
  - 4.2. Convergent Mixed Methods
  - 4.3. Explanatory sequential mixed methods
  - 4.4. Exploratory sequential mixed methods

#### 4.5. The Research Variables

- 4.5.1. Active Independent Variable
- 4.5.2. Dependent Variable
- 4.5.3. Extraneous Variables
- 4.5.4. Controlling Extraneous Variables
- 4.5.5. Controlling the Participant Variable
- 4.5.6. Controlling the Teacher Variable
- 4.5.7. Controlling the Sample Variable
- 4.5.8. Controlling the Age Variable
- 4.5.9. Controlling the Time Variable
- 4.5.10. Controlling the Training Variable

#### 4.6. The Research Settings and Participants

- 4.6.1. Research Setting
- 4.6.2. Case Study Settings
- 4.6.3. Population of the Study
- 4.6.4. Sample and Sampling Techniques
  - 4.6.4.1. Probability Sampling
  - 4.6.4.2. Non-Probability Sampling
  - 4.6.4.3. EFL Learners' Sample
  - 4.6.4.4. 1st Year SE Learners' Profile
  - 4.6.4.5. EFL Teachers' Sampling
  - 4.6.4.6. EFL Teachers' Profile

#### 4.7. Data Collection

- 4.7.1. Data Collection Tools
- 4.7.2. Sequential Explanatory Research Design

## **Conclusion**

### **Chapter: Research Methodology and Design**

#### **Introduction**

The primary concern of this research study is to scrutinize the impact of PjBL in maximizing learners' digital literacy. Consequently, this chapter is devoted to the description of the research design and procedures. It is concerning the methodology employed to carry out this study. A detailed account is devoted to explain the utilized approaches to collect data, the research instruments, sampling techniques as well as data analysis procedures.

Evidently, the field work aims to test, prove or refute the hypothesis of the study wherein the primary concern is to systematically solve the research problem. Thus this part introduces details concerning the research methodology and design. It highlights the research paradigm initially, the research method sequentially, the research design in addition to data analysis instruments.

Evidently, the primary concern of this chapter is to explore critically the field work. First, it depicts the research design, the procedures and the research tools, in relation to data collection purposes. Second, it purposefully describes the research settings, population, as well as the sampling method.

Interestingly, this study is based on a mixed methods research approach. It includes qualitative and quantitative research approaches. The aim behind choosing a mixed methods approach is to systematically deduce a more comprehensive understanding.

## **Research Methodology**

Doubtlessly, it is significant to provide clear definitions concerning the terminologies “Research”, “Research Methodology” and “Research Design”. First, various interesting definitions of research have been given by researchers in various fields.

Actually, in defining a “Research”, Walliman (2001) mentioned clearly that: “it is a term loosely used in everyday speech to describe a multitude of activities, such as collecting masses of information, delving into esoteric theories, and producing wonderful new products”(p. 6), consequently the term is linked to collecting data and information via process generally in academic fields. In the same context, according to Hancock & Algozzine (2006) The term is "about answering questions as we attempt to understand the world around us!", they added "research involves systematic actions that help the researcher add credibility to the questions and answers engaged in his or her research" (p. 3) thus the research attempts to solve a specific question through systematic actions and design. Furthermore, the Oxford Advanced Learners ‘Dictionary of Current English (1986:720) defined the concept “research” as “systematic investigation undertaken in order to discover new facts, get additional information” so it is a systematic process of data gathering to solve a specific question, as Booth et. all (2003, p. 10) said "In the broadest terms, we do research whenever we gather information to answer a question that solves a problem". In addition to that, Singh (2006, p. 1) declared that: "Research simply seeks the answer of certain questions which have not been answered so far and the answers depend upon human efforts. It may be illustrated by taking an example of the moon. Some years ago man did not know what exactly the moon is? Was this problem which had no solution? Man could only make some assumptions about it but the man now this time by his efforts, he went to the moon brought the soil of the moon and studied it" therefore, the aim behind a research is to answer new questions in a given field.

## **Research Design**

Significantly, a research design refers to the well-structured outline that identifies specifically the plan, steps, procedures, tools, methods, as well as techniques used in the research journey. Thus, it is a unique blueprint designed carefully for the research systematic process, a detailed guide to address the host questions of the research critically. Unquestionably, a well-designed research design is extremely valuable for guaranteeing the validity as well as the reliability of the final outcomes and results.

## **Research Approaches and Methods**

### **Research Paradigm**

It is evident that researchers need to identify clearly the research paradigm or philosophy adopted in this study. It is vital to classify critically where to situate the research work. The term originated in the late 15<sup>th</sup> century as a Latin word to mean “to show”. According to Morgan (2007) a paradigm refers to a given belief that impacts the findings of researchers. He identifies four essential elements of a research paradigm, wherein the basic difference between them is the generality level of the given belief system.

According to Kuhn (1970) a research paradigm is “the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed”, in the same context, according to Chalmers et al (2005) a research paradigm elements are: ontology, epistemology, logic, ethic, phenomenology, this necessitates answering the following questions chronologically: what is reality? (ontology), how we know? (epistemology), how we reason? (logic), how we should act? (ethic), and how we experience? (phenomenology).

Researchers ought to articulate critically all beliefs and assumptions related to the nature of knowledge and reality. Interestingly, it is doubly important to identify the main elements of research paradigms. Unquestionably, a paradigm means the way researchers understand and articulate the reality taking into consideration from basic elements: ontology, epistemology, methodology and methods.

## **Ontology**

According to Grix (2004, p.59):

“Ontology and epistemology are to research what footings are to a house they form the foundations of the whole edifice” he stated that ontology is a basic essential element to research paradigm, it mirrors clearly what researchers know about the topic and how to attain knowledge about it. In the same context, Richards (2003, pp.32-33) mentioned clearly that ontology is: “the nature of our beliefs about reality”; consequently, ontology reflects our knowledge about reality and how to approach this knowledge.

## **Epistemology**

According to Gall et al, (2003, p.13) the term epistemology is a basic element of research paradigm, it means “the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated” in the same context Patton (2002, p.134) identified that it refers to “the possibility and desirability of objectivity, subjectivity, causality, validity, generalizability” thus researchers need to understand phenomena in all its contexts.

## **Methodology**

Methodology refers to the detailed study in addition to the critical analysis of data. In this context, Grix (2004, p.32) said that “it is concerned with the discussion of how a particular

piece of research should be undertaken” it is via methodology that a research decides about which specific type of data is needed and which data collection tools are of primary importance.

Methods refer to means and tools of collecting and analyzing data, mainly questionnaires as well as open ended data, close ended interviews.

### **Approaches to Educational Research**

Worthy noted that research paradigms are defined as overarching clear frameworks and assumptions used by the researchers while conducting a research study. Assumptions effectively guide researchers to systematically conduct an outlined organized research process. The models include basically the researcher’s main beliefs, basic assumptions as well as essential methodologies. Interestingly, this will impact the researchers approaching manners of the research problems, gathering data, analysis as well as data interpretations. In conducting a research study, the overarching frameworks are referred to as a research paradigm such as: the positivist paradigm, interpretive paradigm, critical paradigm, pragmatic paradigm, constructivist paradigm, feminist paradigm and postmodernist paradigm. Fortunately, the paradigms are not mutually exclusive since researchers may blend various elements of various paradigms.

There are various research paradigms, they differ accordingly to the researchers’ basic philosophical perspectives. The well-known ones are: positivism, interpretivism, constructivism, pragmatism, critical theory, feminism, postmodernism, grounded theory and others. In fact, the main approaches to education research are: positivism, interpretivism, pragmatism as well as critical theory. Interestingly, in a research study, a researcher can rationally draw from various research paradigms to approach effectively the research questions. Doubtlessly, there are different research paradigms, this study will focus on three main paradigms: positivism, interpretivism and pragmatism.

## **Positivism and Postpositivism**

It is a basic branch of philosophy; it appears in the twilight years of the 19<sup>th</sup> century. This paradigm is based on realism, understanding the real natural world, and highlighting the cause effect relationship in each study. Objectivism forms the essential epistemology position of the positivist paradigm. It is essential for researchers in this paradigm to describe the target phenomena as it is exactly in real world, no affect or disturb is allowed, to describe the phenomena as it exist in real context objectively, no interference is allowed. The aim is to uncover and discover the laws governing natural objects (Hutchinson, 1988)

In this context Grix (2004) mentioned clearly that:

“The attractiveness of an approach seeking the precision, exactitude and power of prediction promised by the natural sciences is understandable. The human sciences can be messy, people unpredictable and factors leading to events hard to unravel. Positivism attempts to overcome this messiness by seeking rules and laws with which to render the social world understandable”. (pp. 81-82) thus it perfectly emphasizes observable and measurable phenomena, results are based basically on experimental designs and quantitative methods.

well, in addition to post-positivism emerged after the harsh criticism of positivist paradigm as an effective attempt to meet the weakness of positivism, it evidently emphasizes the researchers’ perspectives and philosophical stances. “Postpositivists reflect a deterministic philosophy about research in which causes probably determine effects or outcomes. Thus, the

problems studied by postpositivists reflect issues that need to identify and assess the causes that influence the outcomes, such as found in experiments” (Creswell, p.213)

In this context, Grix (2004, p.86) mentioned clearly that “straddles both the positivist and interpretivist paradigms”. According to various scholars (Grix, 2004; Richards, 2003; Gall et al., 2003) the positivism had been harshly criticized by interpretivism, the primary criticism was that the positivist paradigm scientific methods is more appropriate to natural sciences not to social individual phenomena.

### **Interpretivism**

Doubtlessly, the interpretivist paradigm appears as a response to the over dominance of the positivist paradigm as Grix declared (2004, p.82) since reality cannot exist out of human senses. Truth cannot be discovered; it is rather created. Grix (2004) declared that “researchers are inextricably part of the social reality being researched, i.e. they are not ‘detached’ from the subject they are studying” (p.83). Thus the aim is to provide understanding of the individual’s interpretations concerning the social phenomena, and how they interact with it, worthy to note that this paradigm collects mostly qualitative data from participants over an extended period of time. The interpretivist paradigm methods include: personal notes, observations, interviews, field notes. Actually, Grix (2004) mentioned that the interpretive paradigm was criticized due to the lack of objectivity. In short, this paradigm is interested in human behaviors and experiences. Results are based on qualitative methods (including interviews, content analysis.) Interestingly, the individual’s subjective is a primary concern of interpretivism.

### **Critical Theory, Feminism and Constructivism**

Doubtlessly, the primary aim of critical theory is to uncover challenges and ideologies, results are based on qualitative data. Other paradigms include feminism, a paradigm which

regards gender and oppose gender bias such as gender inequality. Data are based on quantitative and qualitative methods. Constructivism however, necessitates that knowledge is constructed by individuals themselves based on their own qualitative methods and case studies.

## **Pragmatism**

Unsurprisingly, many educators advocate the effective use of pragmatism such as John Dewey (1917, 1920, 1922, 1925, 1929, 1938), Feilzer (2010) and Morgan (2007), Rescher (2000), they viewed it as the most suitable philosophy for mixed methods research, in order to achieve the research objectives, it is vital to integrate the results from various methods. As Teddlie and Tashakkoui (2009) the pragmatic paradigm embraces the positivism paradigm, post positivism as well as constructivism paradigm. “Pragmatism as a worldview or philosophy arises out of actions, situations, and consequences rather than antecedent conditions (as in postpositivism). There is a concern with applications—what works—and solutions to problems. Instead of focusing on methods, researchers emphasize the research problem and use all approaches available to understand the problem” (p. 213)

Actually, pragmatic paradigm has perfectly been considered as the most appropriate paradigm in conducting a mixed methods research (Creswell and Plano Clark, 2011), in fact it combines various elements from both positivist paradigm and interpretivist paradigm, a mix of qualitative and Quantitative methods. Effectively, the pragmatism philosophy emphasizes solving real life problems in a flexible process. Truth needs no color, sometimes it is insufficient to follow one single methodological paradigm to meet the research aims “no one size fits all” thus it is better to use a variety methods and techniques from various research paradigms.

Consequently, it prioritizes methods that work best for achieving the aim of the research problem.

Unquestionably, in this research study a pragmatic research paradigm was deemed suitable, reliable and satisfactory. Since the pragmatism research paradigm would be more adequate and appropriate for this study. It is evidently adopted for it embarks the choice to mix methods to underscore the effectiveness of PhBL in maximizing learners' digital literacy, considering multiple views becomes necessary and vital to best answer the research questions. Additionally, the adoption of the pragmatic paradigm permits effectively the adoption of mixed research methods, thus the approach was expected to prioritize the findings' validity, in an efficient trial to overcome and mitigate the limitations and weaknesses associated with one single method research, furthermore this philosophy ensures the flexibility to blend various research methods, addressing the research inquiries from various perspectives.

## **2. Research Methods**

Identifying the research method is a basic vital procedure in conducting a research study. Worthy noted that a research method mirrors the adopted strategic methodology to systematically plan, conduct and analyze a particular research study. Interestingly, the choice of a research approach is not a haphazard option but a rational step that considers question, objectives as well as the nature of the study. In this context, Creswell (2009) stated that:

“Research methods involve the forms of data collection, analysis, and interpretation that researchers propose for their studies” (p. 216), that is research methods encompass the strategies and methodologies for conducting a given research study, which includes choices made from overarching principles to specific techniques for gathering and analyzing research data.

Creswell (2009) added:

“three types of designs are advanced: qualitative, quantitative, and mixed methods. Unquestionably, the three approaches are not as discrete as they first appear. Qualitative and quantitative approaches should not be viewed as polar opposites or dichotomies; instead, they represent different ends on a continuum” (p.22)

Consequently, there are various research approaches as: Quantitative Research method (based on numerical data), Qualitative Research method (based on non-numerical data) as well as mixed methods research combining both Quantitative and qualitative methods.

### **Quantitative Research Approach**

Rigorously, the primary concern of Quantitative research approach is gathering numerical data, the aims were basically to test a particular theory, quantify attitudes, perspectives and views. Evidently, it is based on structured data gathering methods such as: structured interview, systematic observation, and survey. Whereby numerical data will be analyzed via statistical software such as SPSS.

In this context Creswell John (2009) declared that:

“Quantitative research is a means for testing objective theories by examining the relationship among variables. These variables can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion” (p.215)

Therefore, the quantitative research approach measures and quantifies variables in an objective manner, via quantitative research researchers can examine the relationships and associations between research variables via statistical techniques. Creswell (2007) added:

“Quantitative research is a means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that

numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion (Creswell, 2008). Like qualitative researchers, those who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings”, additionally “The first advantage of this research approach is the use of statistical data as a tool for saving time and resources” (Bryman, 2001, p20). So, it provides generalizability, reliability, replicability and precise measurement. Results are indeed reliable and replicable.

Notably, in the current research study, the researcher opted for an experimental approach in order to underscore the impact of project based learning in enhancing learners’ digital literacy.

### **Qualitative Research Approach**

Doubtlessly Qualitative research approach proves to be valuable tool for researchers. It systematically offers a holistic, context rich, and exploratory approach since it is flexible and adaptive. To put it in John Creswell words:

“Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures; collecting data in the participants’ setting; analyzing the data inductively, building from particulars to general themes; and making interpretations of the meaning of the data. The final written report has a flexible writing structure » (p.215)

Therefore, it is exploratory based research, whereby the primary aim is to gain an in depth comprehensive understanding of the phenomenon under research. Qualitative research is based on non-numerical data and it is analyzed by non-statistical methods. Creswell (2009) added:

“Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure. Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation (adapted from Creswell, 2007)” as a result, via qualitative research, researcher’s capture the richness of human experiences, illustrations can be: open ended unstructured, or semi-structured conversations, interviews, content analysis and observation.

Consequently, this research study was additionally based on the qualitative research approach in order to explore deeply learners ‘experiences in promoting PjBL to enhance learners’ digital literacy.

### **Mixed Methods Research Approach**

Remarkably, there is a plethora of literature (Bryman, 2012; Creswell & Plano Clark, 2018; Johnson & Onwuegbuzie, 2004; Maxwell, 2016; Morgan, 2014; Tashakkori & Teddlie, 1998) concerning mixed-methods research. It systematically offers comprehensive in depth understandings; researchers can blend different approaches cross-validate results. Notably, it encompasses the collection, analysis, interpretation and presentation of data from various numerical and non-numerical sources. Besides, it improved research validity, credibility, flexibility and contextualized results. As defined by Creswell (2009):

“Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms of research. It involves philosophical assumptions, the use of

qualitative and quantitative approaches, and the mixing of both approaches in a study” (p.212) he added:

“Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research (Creswell & Plano Clark, 2007)” as a consequence, mixed methods research is an amalgamation of both qualitative research as well as quantitative research to get complementary data. Additionally, using data coming from a number of methods, or converging data from multiple sources ensures more credible findings which would strengthen research final outcomes, recommendations as well as implications. Worthy noted that, results from one single method can inform or develop the findings from another method. More than that, a mixed-method research design enhances and ensures the complementarity of research study itself. All in all, a mixed-method research design extends the breadth and range of an inquiry.

Ultimately, the current research study is situated within the framework of mixed methods research. It systematically examines the effectiveness of PjBL in maximizing learners’ digital literacy. As the primary concern of this study is to gain rich comprehensive in depth understanding of the complexities towards prioritizing both PjBL as well as digital literacy. Furthermore, mixed methods research allows for a more thorough investigation of the impact of project pedagogy in enhancing learners’ digital literacy. Evidently, this research study endeavor, the researcher adopted purposefully a mixed methods research approach, to address critically the research question, providing statistical rigor and ensuring generalizability.

### **3. Research Study Design**

Interestingly, it is vital to explain the research design adapted in this study. John Creswell (2018) identifies various designs. Worthy noted that he is a famous researcher in the educational field, he has authored a splendid book entitled *Research Design Qualitative, Quantitative and mixed methods Approaches*, wherein he highlighted the importance of understanding research designs. In this regards he mentioned that:

“The researcher not only selects a qualitative, quantitative, or mixed methods study to conduct; the inquirer also decides on a type of study within these three choices. Research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research study” (2018. p.60)

Therefore, he declared that a research design is a specific direction of inquiry to be taken by a researcher after choosing the research approaches. Designs are linked to the three approaches: the qualitative approach, the quantitative approach as well as the mixed methods approach. Notably, mixed methods research places a central importance on combining qualitative and quantitative data. Consequently, this study will opt for one of the mixed methods design.

### **Mixed Methods Designs**

By the beginning of the 1990's mixed methods research integrated systematically qualitative and quantitative data, researchers are allowed to combine and draw on the strengths of both methods for more comprehensive understanding of the topic under investigation, as a consequence mixed methods designs were classified into several types, the three primary designs were basically: Convergent mixed methods, Explanatory sequential mixed methods as well as Exploratory sequential mixed methods.

### **Convergent Mixed Methods**

The researcher can merge qualitative and quantitative data simultaneously, he collects data at the same time, after that he can converge findings and results are compared together to draw final conclusions, to put it in the words of Creswell (2018) :

“is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design, the investigator typically collects both forms of data at roughly the same time and then integrates the information in the interpretation of the overall results. Contradictions or incongruent findings are explained or further probed in this design” (Creswell, p.63)

Thus, qualitative and quantitative data are collected separately, the findings of the two methods are analyzed independently, and results are compared to draw conclusions systematically, the aim behind it is to validate and corporate findings from one method with the second.

### **Explanatory sequential mixed methods**

Creswell (2018) defined the explanatory sequential design as it:

“is one in which the researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research. It is considered explanatory because the initial quantitative data results are explained further with the qualitative data. It is considered sequential because the initial quantitative phase is followed by the qualitative phase. This type of design is popular in fields with a strong quantitative orientation (hence the project begins with quantitative research), but it presents challenges of identifying the quantitative results to further explore and the unequal sample sizes for each phase of the study” (Creswell, p.63)

Consequently, in this design the investigator starts with conducting quantitative research, analyzes the results, followed by conducting a qualitative research to confirm, explain or elaborate more insightful comprehension about the topic. The aim behind using it, is to help understanding the “why”, it explains and elaborate on quantitative results, answering the “why” it gives deeper insights into the quantitative findings.

### **Exploratory sequential mixed methods**

Simply it is a revers style of the explanatory design. In this design the investigator starts with conducting qualitative research, analyzes the results, followed by conducting a quantitative research to confirm, and explore information about the topic.

“is the reverse sequence from the explanatory sequential design. In the exploratory sequential approach, the researcher first begins with a qualitative research phase and explores the views of participants. The data are then analyzed, and the information used to build into a second, quantitative phase. The qualitative phase may be used to build an instrument that best fits the sample under study, to identify appropriate instruments to use in the follow-up quantitative phase, to develop an intervention for an experiment, to design an app or website, or to specify variables that need to go into a follow-up quantitative study” (Creswell, 2018. p. 63)

Empirically, this work shares a display of data that underscore critically the impact of PjBL in enhancing learners’ digital literacy. In this regard, the choice of the research design falls on the explanatory sequential mixed methods design, the primary aim is to deduce a more comprehensive understanding, providing a deeper insight into both qualitative and quantitative findings, data are collected, and results are combined to draw conclusions to validate and corporate findings.

All in all, the explanatory sequential mixed methods design validates the quantitative results critically, furthermore it maximizes the credibility of the findings, and it increases the

validity and reliability of the final outcomes. It proves to be a vital significant research design to delve deeply into the reasons behind a quantitative data.

## **Research Variables**

Unquestionably, variables are central vital factors and fundamental building blocks in the scientific research journey. Variables allow researchers to conduct, approach, measure, assess, and underscore the link and dynamics behind the phenomena under investigation. Frequently, variables may take on different values. Defining variables facilitate accurate valid explanation of the relationship between the variables. The more value, the more complex the analysis.

Actually, Kerlinger (1986) linked variables directly to a research problem as he declared “... an interrogative sentence or statement that asks: ‘What relation exists between two or more variables?’” (p. 16) therefore, it is very essential to examine research variables rationally. Interestingly a variable refers to a construct wherein the researcher is interested (Cohen et al., 2007). Thus any research journey starts with an inquiry question regarding the interaction between two or more variables. To put it in Mackey and Gass (2005) words “variables are features or qualities that change” (p.101). Significantly, variables in research study refer to crucial factors and elements that need conducting scientific studies. It is via variables, that researchers measure, observe, and analyze consistently various research phenomena. Objectively, investigating the interactions and relations that may occur between different variables is the core of scientific research.

Validly, there are various types of research variables, mainly: dependent variables, independent variables, control variables, confounding variables, extraneous variables, discrete variables, categorical variables and moderating variables, consequently it is extremely vital to

realize the research variable under investigation. Usually, the most fundamental variables are classifying as: dependent variable, active independent variable, and extraneous variables.

### **Active Independent Variable**

Evidently, active independent variables are called manipulated variables (Kerlinger, 1986), thus they refer to the factor manipulated carefully to underscore its impact on the dependent variable, interestingly researchers may modify, change or manipulate it to investigate and examine deeply its consequences on the dependent variable. Scientifically, it is denoted as (X) to mean the Causing Variable.

### **Dependent Variable**

Dependent variable is the outcome or criterion refer to as (Y) in scientific studies. Sometimes, a research study may have several dependent variables. It is the factor that are controlled, any changes may occur at the level of dependent variable are caused as a consequence of the manipulation of independent variable (X) on (Y). worthy noted that, effective control of variable ensures effective crucial research study, that's managing variables led researchers to draw well-informed findings and reliable conclusions.

### **Extraneous Variables**

Extraneous variables refer to variables that could influence the dependent variable. Nancy & Grove (2007) stated clearly that:

“Extraneous variables that are not recognized until the study is in process, or are recognized before the study is initiated but cannot be controlled, are referred to as confounding variables”

Consequently, extraneous variables are confounding variables, unfortunately, they have not been sufficiently taken into consideration, they may potentially interfere and influence the final

outcomes, findings and results of the research study, the measurement and link between variables.

Purposefully, the researcher in this study ought to account for the dependent variable, independent variable, as well as extraneous variable. The primary concern is to underscore the impact of project based learning in maximizing learners' digital literacy.

Vitally noted, in this research study entitled enhancing learners' digital literacy via project based learning, the dependent variable is digital literacy of learners, the independent variable is project based learning, the control variable may be ensuring the similar starting baseline digital literacy level as well as the instructional method. The extraneous variables that may impact learners' digital literacy are different. First, learners' self-motivation to prioritize the use of digital means. Second, learners' prior experience with ICT's. Third, learners' availability to digital means at home, and access to digital resources outside the classroom settings, and finally the impact of computing science module on learners.

### **Controlling Extraneous Variables**

Worthy noted that the extraneous variables can affect the validity of the research study, thus the researcher had better control all the variables that may threaten the validity and accuracy of the results. Interestingly, unintentional actions may mislead findings and uncontrolled extraneous variables affect the findings too. Consequently, the experimenter effects:

1. Maintaining positive encouraging experimental environment, speaking in a positive tone while conducting the experiment instructions.
2. Guiding participants politely to behave in a normal position.
3. Maintaining unbiased experimental settings by giving clear instructions to all participants.

4. Reducing the situational variables (appropriate laboratory, appropriate lighting, temperature, calm settings)
5. Allocating the same time of the test, in the same environment.
6. Reducing the level of stress, school noise and test anxiety of all participants.

All in all, extraneous variables result in the research study bias, and invalid outcomes concerning the relationship between the dependent variable and the independent variable.

### **Controlling the Participant Variable**

In fact, the two groups, the control one and the experiment one, were exactly equivalent in terms of the number of participants (40 learners in each group), both are 1<sup>st</sup> year learners in the scientific streams, additionally they are equivalent in terms of digital literacy findings before conducting the experiment. Rationally, the Independent Sample T Test was purposefully conducted to guarantee that there was No statistical significance difference between the digital literacy level of all participants in both groups in the pre experiment phase.

### **Controlling the Teacher Variable**

Worthy mentioned that both groups are taught by the same teacher (the researcher herself as EFL Teacher of English language in the Secondary School since 2013) during the whole school year 2022/2023. Teachers generally use various instructional styles, methods, and techniques thus controlling this variable is extremely valuable.

### **Controlling the Sample Variable**

The researcher is in charge of teaching all scientific classes of 1<sup>st</sup> year learners in the secondary school of Arab Messoud Chechar, representing both control and experimental groups, interestingly, the researchers opted for matching pairs technique, the primary objective is to avoid

inequivalent classes of only high achievers (excellent learners), or low achievers (not excellent learners) as a consequence the two groups are administrable equivalent.

### **Controlling the Age Variable**

Taking the administration lists of 2022/2023 school year into consideration, all participants are of the same age ranging from 15-17 years old, as a result all the participants in both experimental and control groups are equivalent in age.

### **Controlling the Time Variable**

As suggested by the ministry of national education (See appendices) all the participants in the 1<sup>st</sup> year scientific streams studied English language module three (03h) hours per a week, receiving one hour (01h) lesson in each session.

### **Controlling the Training Variable**

The researcher made sure that all learners had the necessary skills to conduct a project about a particular theme.

### **The Research Settings and Participants**

Providing a well-stated description of the settings of a research study is a significant aspect of the research project. It has a vital impact in enhancing the validity of the research. Therefore, researchers need to take into account the impact of settings on the research paper. In other words, in conducting a research study, researchers must provide an in depth examination of contextual environment, consequently the research setting has a valuable significant role in research project, research process, collected data and outcomes as well as the generalizability of the research findings.

### **Research Setting**

Research setting refers to contextualized framework to conduct a particular research project, it carefully encompasses a crucial aspects basically physical, social as well as temporal aspects. Remarkably, a research setting means the exact place where data are collected. It evidently describes a given place or context wherein a research conducts a specific project, regarding the physical, social and temporal aspects of the location.

### **Case Study Settings**

Researchers use case study setting in order to examine carefully a specific phenomenon in real context. In this regard Creswell ([2014](#), p. 241) provides a lucid, brief and comprehensive definition as follows:

“Case Studies are a qualitative design in which the researcher explores in depth a program, event, activity, process, or one or more individuals. The case(s) are bound by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time” (p.241)

As a result, in case studies the researcher can use a variety of research tools to provide an in depth comprehensive understanding about the phenomena.

It is clear than, that a research study is highly linked to time frame, place frame as well as activity frame via various data collection tools. In this regard, Johnson (1993) stated clearly that it is: “An examination of a case in its context” (p.7) to put it in Kumar (2011) words:

“A case could be an individual, a group, a community, an instance, an episode, an event, a subgroup of population, a town or a city. To be called a case study it is important to treat the total study population as one entity” (p.126)

So, it is highly important that the target population dealt with by the researcher as one entity.

### **Population of the Study**

It is vital to outline the population under study therefore in this research study, the target population comprised EFL learners in secondary schools, EFL teachers of English language in Khenchela, and Inspectors of English Language in Batna and Khenchela. All of them are indeed accessible population. Hence, this research project took place at Arab Messoud Secondary School Chechar in Khenchela as a setting, during the academic year 2022/2023. Interestingly, the case study conducted was efficiently adequate, valid and appropriate to examine the impact of project based learning in enhancing learners' digital literacy.

The population of EFL teachers used in this research study included EFL teachers of English language in the Secondary schools of Khenchela district number two who are inspected by the inspector Grabsi Abdelmajid. The researcher is belonging too to the same population. Teachers can effectively provide in depth perspectives about how Project based learning is implemented in Algerian Secondary Schools, how digital literacy is prioritizing by the Algerian ministry of national education, as well as how PjBL fosters learners' digital literacy.

Additionally, the population of EFL learners used in this research study included EFL learners, it involved eighty (80) learner, they are first year learners in the scientific stream in Arab Mesoud Secondary School whereby the researcher is their teacher of English language for the school year 2022/2023.

Interestingly, the overall total number of first year learners for the academic school year 2022-2023 is 130 learners in Arab Messoud Secondary schools who were divided by the administration staff over 06 groups, two in the literary stream and the rest for the scientific stream. Rationally, conducting the research project with the whole population seems impossible and difficult, the researcher selected a sample of eighty students (80) from a targeted population, the learners belong to the scientific stream.

In other words, the research study is conducted at Arab Messoud Secondary School in Chechar Khenchela, the school consists of 6 classes 1<sup>st</sup> year learners, 4 of which are scientific stream learners and 2 are literary stream learners. The reasons why the researcher choose the 1<sup>st</sup> year learners are:

1. The researcher cannot choose 3<sup>rd</sup> year learners because they do belong to various streams and the sampling will not be enough, and they are preparing for the Bac exam, they are demotivated to focus on projects a lot. In addition to that, different teachers are in charge of teaching them, the number of hours devoted for various streams is not the same.
2. The researcher cannot choose 2<sup>nd</sup> year learners because they are divided to many streams including (Foreign languages stream), (letter and philosophy stream), (Mathematics Stream) (Common Streams) and others thus the sampling in the experiment will not be enough. The number of learners will not be enough. In addition to that the teachers of English language are totally different, the number of hours, as well as the instructional contents and methods are different.
3. The researcher cannot choose 1<sup>st</sup> year literary stream classes because they are only two groups, the number of learners is not enough compared with the whole population of 1<sup>st</sup> year learners, additionally, two different teachers are in charge of teaching the two groups differently.
4. The researcher chooses 1<sup>st</sup> year learners as population of the experiment because there are 4 groups in the school, all the groups are taught by the same teacher (the researcher herself) the same hours, the same content and methods by the same teacher.

### **Sample and Sampling Techniques**

Actually, it is extremely valuable and critical to choose the sample of individuals as research participants. Sampling refers to the process of selecting a given number of individuals from a large population, however the choice of the sampling techniques is highly linked to the researcher primary objective, as well as to the available resources. In other words, sampling is the process wherein some elements are selected from a population for conducting a research project.

Doubtlessly, it is vital to identify the population. It is due to the fact that generalization of results will be well-defined. In other words, the sample had better be drawn from the population to ensure generalizability to the same population. The term population refers to all members meeting a given specification. A single member is referred to as element, when the researcher selects only a given number of elements, they are referred to as sample, if ever all the elements are selected it becomes census, a researcher had better use up to date list of the population. In this context, Singh (2006) stated clearly that population refers “to the characteristics of a specific group” (p.83) in addition to Parahoo (1997) who defined population as “the total number of units from which data can be collected” (p.218). From a methodological stand point, a researcher draws conclusion about a given population that share the same characteristics. Still, he finds it difficult to conduct a study on large population thus he resorts to select a sample that should be representative. Interestingly, there are two major sample techniques: probability sampling and non-probability sampling.

### **Probability Sampling**

A researcher may specify the probability of a participant from the sample. Worthy noted that probability sampling is called also random sampling, or representative sampling since it mirrors the random selection of elements from the whole populations. In this regard Creswell (2009) mentioned that:

“Random sampling is a procedure in quantitative research for selecting participants. It means that each individual has an equal probability of being selected from the population, ensuring that the sample will be representative of the population” (p.216)

Consequently, probability sampling uses random sampling whereby each and every element from the whole population can be selected for the sample, elements have an equal chance to be chosen by the researcher. However, when probability sampling is not possible, a researcher may use non probability sampling.

### **Non-Probability Sampling**

A researcher cannot estimate the probability of a participant from the sample, therefore non probability sampling basically refers to a sampling techniques based on subjective judgements rather than random selection. It does not rely on random selection; it is generally used when it is challenging to use probability sampling. Moreover, one method of nonprobability sampling is convenience sampling, whereby a researcher can choose elements that are readily available as well as accessible.

Interestingly, stratified sampling refers directly to the techniques whereby the population is divided purposefully into subgroups or lists, and then a random sample is taken from each of these subgroups or strata.

### **EFL Learners’ Sample**

Actually, the current research study included two groups. Both belonged to first year secondary school learners in the scientific stream. In fact, the administration of Arab Messoud Secondary School in Chechar randomly allocated two groups of 1<sup>st</sup> year students to the researcher. Worthy noted that the combination of the groups formed eighty (80) learners. The two groups are equal in numbers. Both includes the same number of high/low achievers divided equally by the administration staff. In this regard, Singh (2006) stated clearly that:

“In experimental research, one should select a sample that will permit at least 30 in each group” (p. 94) thus the sample of eighty learners is methodologically enough.

### **1<sup>st</sup> Year SE Learners’ Profile**

Learners are 1<sup>st</sup> year students, in the scientific stream. They had been studying English language for four years in the middle school, worthy noted that the teaching approach applied is the Competency Based Approach within Project based Learning, consequently learners are familiar with conducting projects in English language by the end of each unit. (See Appendices). Besides, learners are taught English language three hours per a week (03 hours a week), one hour in each session.

### **EFL Teachers’ Sampling**

The research population in the research project included EFL teachers. Forming a sixty EFL teacher in secondary schools in kenchela. A seminar meeting entitled (Project based approach and digital literacy) took place in 21<sup>st</sup> February 2023 starting from 08:30 am for all the teachers of district 02. (see appendices) wherein the researcher discussed with all teachers the effectiveness of project based learning in fostering learners’ digital literacy.

### **EFL Teachers’ Profile**

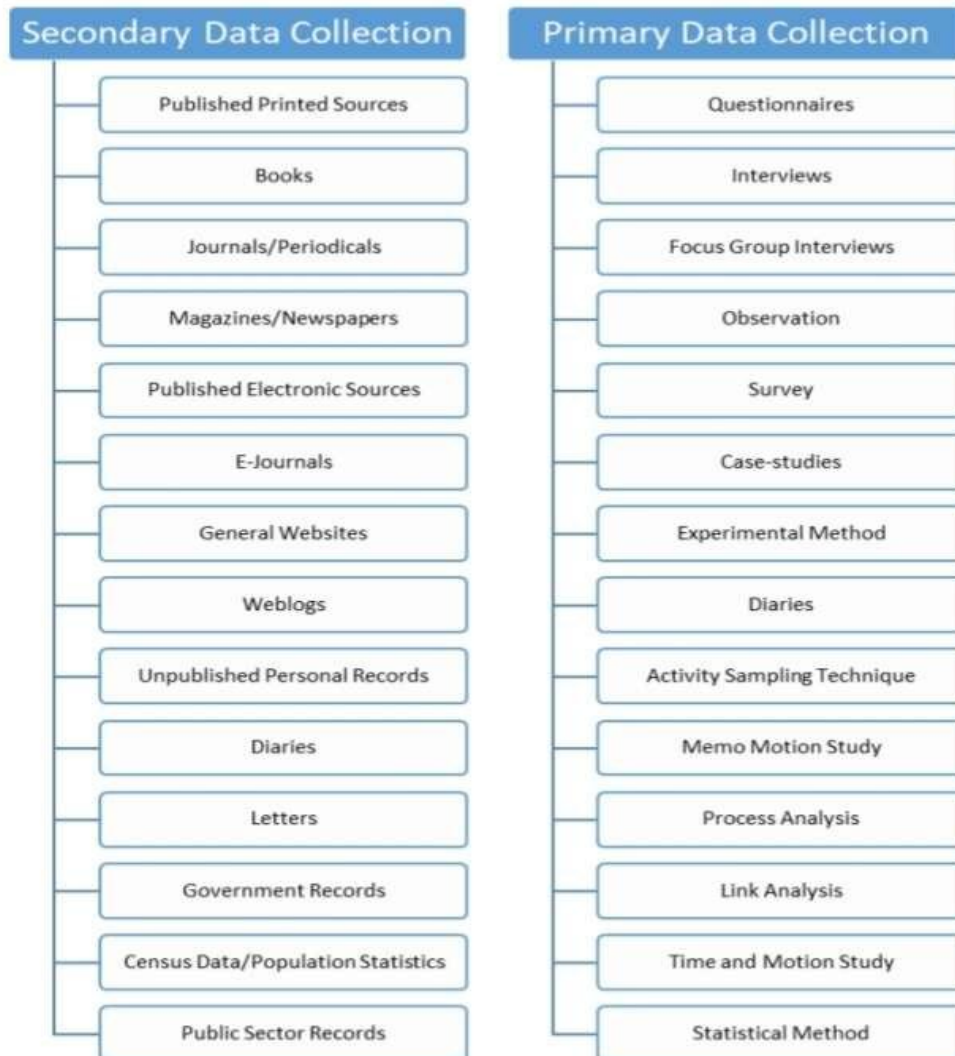
Actually, EFL teachers who participated in conducting the current research study hold various certificates basically: the master degree, as well as the degree of license. Some are expertise since they have been teaching more than 15 years ago, others are novice since they have been recently recruited. Additionally, the participants’ age ranged from 25 to 40 years old.

### **Data Collection**

Data collection is a main stage in conducting a research study. The aim is gaining insights concerning the research topic. Thus there are many types of data, methods and tools.

Interestingly, data can be qualitative or quantitative. Any research had better regard basic qualities in collecting data mainly: authenticity, reliability, validity, and objectivity of data. Actually, data collection methods entails two basic categories: primary data collection methods and secondary data collection methods. First, Primary data refers to the ongoing process by which the researcher himself/herself gather data, no researchers has access before to this data untill the real researcher published it. As illustration methods can be: questionnaires, interview, observation, and experiments. Second, secondary data collection methods, it refers to data gathered from already published sources, such as: books, journals, e-journals and letters. (Kabir, 2016)

The figure below summarizes the primary and the secondary data collection methods ( Taherdoost , 2021).



**Figure N° Data Collection Methods (Taherdoost, 2021)**

### **Data Collection Tools**

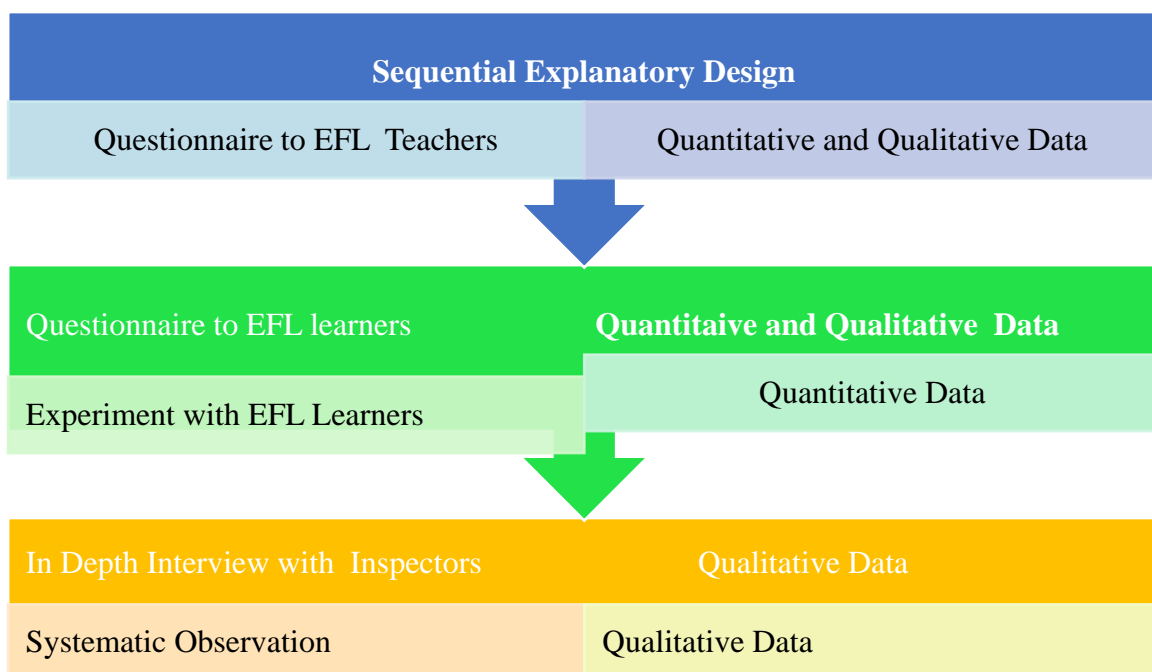
Purposefully, after reviewing the literature linked to the effectiveness of project based learning in enhancing learners’ digital literacy, it is vital to explore critically the empirical work. It is therefore extremely valuable to identify in details the research tools employed for data collection. This research study uses various data collection tools rationally, as a result data were collected via multiple data methods and tools. The paper uses pre and post digital literacy test, questionnaires, systematic observation, and in depth interview. The tools support each other to

ensure full set of final outcomes. Worthy noted that various ethical considerations must be regarded by the researcher (See appendices for ethical approval documentations)

The tools used in this humble work, are a questionnaire to sixty EFL teachers in Secondary schools of Khenchela district two, a questionnaire to eighty EFL learners in Arab Messoud Secondary school, an experiment with eighty first year EFL learners in the scientific stream in Arab Messoud Secondary School Chechar/ khenchelaas as well as an observation of the classroom settings and activities, in addition to an interview with EFL inspectors in khenchela and Batna as experts.

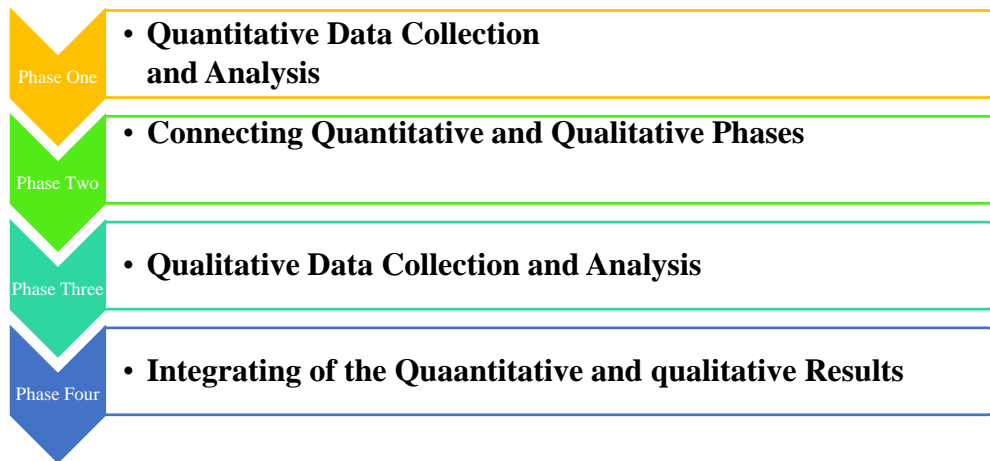
### Sequential Explanatory Research Design

Interestingly, this research design is based on sequential explanatory design, as a result a combination of quantitative data and qualitative data is necessary. The main aim is to provide a comprehensive understanding of the impact of project based learning in maximizing learners’ digital literacy. The researcher first gather quantitative data in order to establish a well stated and clear foundations of the research topic, after that the researcher gathers qualitative data to delve deeply and explain rationally the quantitative data.



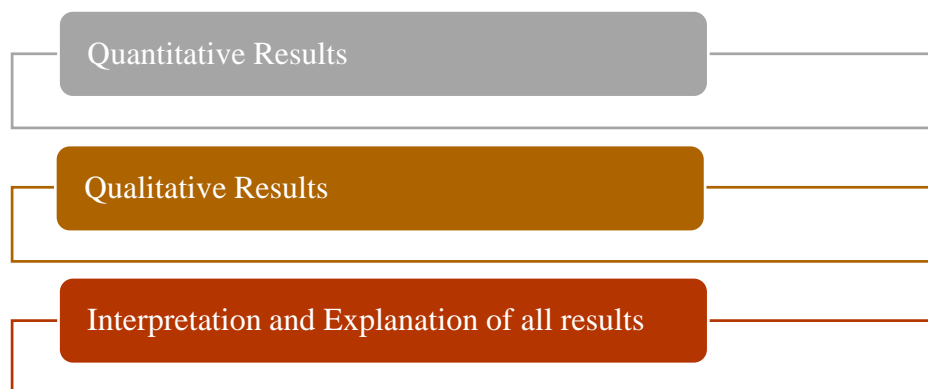
**Figure n° Sequential Explanatory Design of the Study**

It is vital to state that mixing in sequential explanatory design can be either via connecting the qualitative and quantitative phases, within the same participants and based on the results of the quantitative statistics. (Tashakkori and Teddlie, 2003). As the figure below shows:



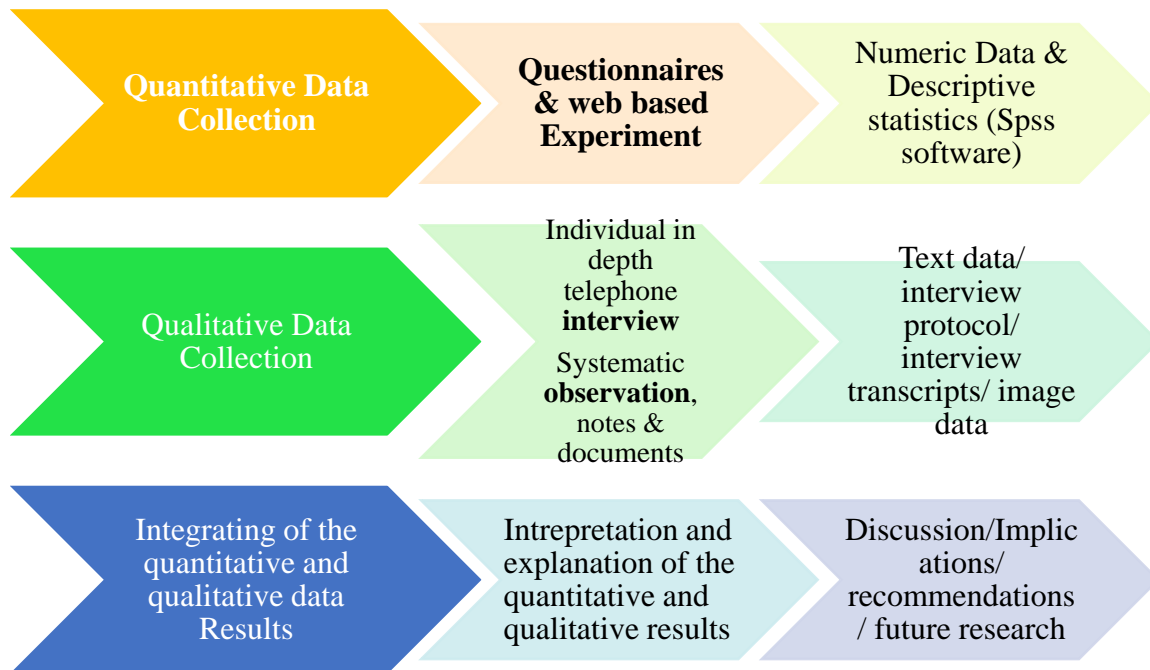
**Figure n° First Method of Mixing Quantitative and Qualitative Methods**

Or via integrating the quantitative and qualitative final results in the discussion phase of the whole research study. The aim of this mixing is ensuring higher quality of inferences (Tashakkori and Teddlie, 2003). As the below figure shows:



**Figure n° Second Method of Mixing Quantitative and Qualitative Methods**

In this study, the researcher will opt for the second method of mixing quantitative and qualitative methods therefore, via synthesizing the findings and combining them to draw final conclusion.



**Figure : Visual Model for Current Mixed Methods Study  
Sequential Explanatory Design Procedures**

Unquestionably, the integration of all the data tools together is supposed to contributed effectively in examining the impact of project based learning in maximizing learners’ digital literacy. Additionally, the primary concern behind using various data collection tools in a particular research study is to allow a researcher to gain a more insight concerning the topic, it enriches the work with a more comprehensive set of data, this will maximize the validity, practicality as well as the reliability of the final outcome ( Taherdoost , 2021), besides using a single research tool will meet several weaknesses as a consequence using multiple methods and tools will be merit.

**Questionnaires:**

Nunan (2010) declared clearly that a questionnaire is a famous research tool used in order to collect data, it systematically leads to quantification in field settings. Thus, the questionnaire is a popular elicitation technique in conducting research studies. Cohen et al. (2007) mentioned clearly that : “The questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher and often being comparatively straightforward to analyse” (p. 317)

Accordingly, a questionnaire; as one significant elicitation technique, is set of related questions designed rationally to generate the statistical information from given participants to accomplish the research objectives, it is a research instrument to collect, measure and analyse data.

Actually, the first questionnaire is administered to all EFL secondary school teachers of English language in kenchela, during a seminar meeting concerning Project based approach and learners ‘digital literacy (See Appendices). The primary aim is to quantitatively explore EFL teachers’ perspectives towards the effectiveness of project based learning in fostering learners’ digital literacy.

Moreover, the second questionnaire is administered to EFL learners in Arab Messoud secondary school in chechar kenchela, the primary aim of the questionnaire is to explore the participants’ readiness towards implementing project based learning to enhance learners’ digital literacy. Additionally, learners will be more comfortable while sharing their perspectives towards the impact of PjBL in maximizing learners’ digital literacy. It is also necessary to check learners’ readiness to prioritize PjBL and digital skills in 21<sup>st</sup> century education. In fact, learners have adequate time to answer the questions, they were all approachable.

## **The Experiment**

Interestingly, the experiment is an effective research tool, it is an ongoing process which is based on efficient measurements, via the use of tests, the aim of using a scientific research is to verify or even refute the research hypothesis. Unquestionably, the aim behind doing an experiment is to provide evidence-based efficient insights, as a useful contribution to existing knowledge, as an effective advance aiming to understand the target topic via rigorous and systematic investigation.

## **In Depth Interview**

Unquestionably, one way to conduct a qualitative research can be via an in depth interview. In this regard, the interview presents the interaction that happened verbally by the interviewer to an interviewee, it is defined as a conversation with a purpose. The interview aims to gather detailed data and insights from EFL inspectors of English language in Khenchela and Batna about enhancing learners' digital literacy via project based learning. Purposefully, it allows the researcher to gain rich data concerning mainly the challenges, recommendations and implications faced while promoting project based pedagogy to foster learners' digital literacy. Why inspectors? In addition to their personal academic long experiences, they had the ongoing opportunities to inspect formatively all EFL teachers, being present in all schools and in various settings, thus they add depth to the research study. It can be structured interview, unstructured interview, non-directive interview, or even focus group interview.

Practically, in depth interview can be done one on one (face to face) or via telephone calling, video calling, or record forms of digital communication. Interestingly, it is based heavily on open-ended questions. Therefore, there are three common interview structure:

- ✓ Informed conversational in depth interview in natural settings.
- ✓ Guided in depth interview wherein the interviewer controls the direction and aim of it.

- ✓ Open ended in depth interview, wherein the interviewer gives the same questions to all participants.

All in all, in depth interview presents rapport that facilitates clarification effectively.

### **Systematic Observation**

Evidently, the observation is an important tool for gathering data of a particular research study. It entails a systematic noting of events from the beginning till the end of the process. It is about watching what participants do in natural setting, and it is a type of correlational method. “Field notes” necessitates a detailed recording of events in a normal setting. Interestingly, all what the researcher has observed need to be recorded objectively. In this paper, the researcher documents events occurred inside the classroom natural settings. In a qualitative enquiry, conducting observation is extremely important to mirror real interactions and project process and presentation in natural settings. What is special about systematic observation is that It includes learners ‘verbal communication as well as non-verbal communication of the target sample. So, it can be structured observation, naturalistic observation, or participant observation. In addition to the questionnaire, the research problem is qualitatively approached via a classroom systematic observation. It helps collect useful information concerning what actually takes place within the confines of the classroom setting during the school years 2021/2022 and 2022/2023.

Remarkably, the researcher uses all the above mentioned research tools to gather quantitative data as well as qualitative data. Thus, a teachers’ questionnaire, a learners’ questionnaire, an experiment, an in depth interview and a systematic observation where used to underscore the effectiveness of PjBL in enhancing learners’ digital literacy. The coming chapter will examine carefully the data gathering tools, the rationale behind choosing them, the sample chosen and general frequent findings.

## **Conclusion**

All in all, this chapter provided a detailed account of the research process. Systematically, the chapter is divided to **various** sections. Generally, the sections highlighted the research designs and procedures, the utilized approaches, instruments, sampling and data analysis procedures. The first section introduces the terminologies research, research design and methods. Additionally, the chapter examined the popular research approaches and methods as well as the study designs. Furthermore, it described the population as well as the sample of the study. Moreover, the researcher discussed thoroughly the data collection tools mainly the questionnaire, the experiment, in depth interview, as well as the observation. Interestingly, the next chapter will analyse the data gathered from the research tools.

## **CHAPTER FIVE: DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS**

### **Introduction**

### **Quantitative Data Phase**

#### **Teachers' Questionnaire**

Introduction

Administration of the Questionnaire

Piloting the Questionnaire

Analysis of the Teachers' Questionnaire

Discussion of Results

#### **Learners' Questionnaire**

Introduction

Administration of the Questionnaires and Questionnaire Respondents

Analysis of the Learners' Questionnaire

Discussion of Results

#### **Learners' Experiment**

Experimental Design

Description of the Test Northstar Digital Literacy Assessment Project (U.S.A)

Discussion of Results

### **Qualitative Data Phase**

#### **In Depth Interview with Inspectors of National Education**

Subjects of the Study

Analysis of the in Depth Interview with Inspectors of National Education

Discussion of Results

## **Systematic Observation**

Phases of the Observation

Analysis of the Observation

Discussion of Results

Conclusion

## **Quantitative Data Phase**

### **Introduction**

Actually, the primary aim of this section is providing the analysis of the data collected from Teachers' Questionnaire, Learners' Questionnaire as well as the experiment. Collecting initially numeric quantitative data.

### **Teachers' Questionnaire**

Interestingly, the teachers' questionnaire mirrored the Algerian EFL teachers' perspectives towards the impact of PjBL in maximizing learners' digital literacy. It underscores challenges faced by teachers while implementing PjBL and digital literacy in their classrooms in addition to the recommendations proposed to make PjBL high quality that enhances learners' digital soft skills and to investigate the role of PjBL in fostering learners' digital literacy. The questionnaire is made of 26 questions. Rationally, it includes multiple choice questions, open-ended questions, and closed-ended questions. The questionnaire is organized in four sections as follow: Section One is entitled Teachers' Background Information. Section Two is about Project Based- Learning (PjBL). Section Three is related to Maximizing Learners' Digital Literacy and Section Four is about Maximizing Learners' Digital Literacy through PjBL.

#### **Section One: Teachers' Background Information (Q1 to Q4)**

Doubtlessly, the first section consists of four main questions about teachers' personal information basically their gender, degree, years of teaching experience, as well as levels in Secondary school they are in charge of teaching.

#### **Section Two: Teachers' Perspectives towards PjBL (Q5 to Q13)**

Evidently, the main concern of this section is to examine carefully teachers' perspectives towards implementing PjBL in classrooms, this section underscore teachers'

attitude about PjBL definition, implementations, strategies, examples, merits, challenges encountered as well as assessing learners' projects. It is therefore very extremely to investigate

### **Section Three: Maximizing learners' Digital Literacy (Q14 to Q21)**

Remarkably, the third section includes eight basic questions concerning teachers' perspectives towards maximizing and prioritizing learners' digital literacy in education, it provides basically definition of digital literacy in learning, educational digital tools and classroom strategies to foster digital literacy, importance of digital skills and general recommendations concerning how to measure progress in learners' digital literacy.

### **Section Four: Maximizing Learners' Digital Literacy through PjBL (Q 22 to 26)**

Evidently, this is the most important section. It systematically contains five main questions about the projects that foster learners' digital literacy, the role of PjBL in enhancing learners' digital skills, challenges and difficulties encountered by EFL teachers while implementing PjBP, implications and recommendations, as well as the urgent need for professional development opportunities to stay up-to-date with the latest digital tools and trends in education.

### **Administration of the Questionnaire**

Interestingly, the questionnaire was administered to all EFL teachers of English language in kenchela district 02 during a special Seminar meeting entitles (Project based Learning and Digital Literacy) a whole training day inspected by Grabsi Abdelmajid (See Appendices for Certificate of attendance/ programming the Seminar to all teachers). Worthy noted, that a seminar meeting was held to all teachers of the district concerning the role of PjBL in Fostering learners' digital literacy. (See Appendices), the seminar meeting took approximately 6 hours at khellaf Bachir School kenchela, whereby EFL teachers discussed all

the factors related to the effectiveness of PjBL in enhancing learners 'Digital literacy, the questionnaire was also posted in the EFL teachers of English in Khenchela group in Facebook.

### **Piloting the Questionnaire**

The Questionnaire has been initially piloted with 06 teachers. The aim is to judge the appropriateness as well as the efficacy of the chosen questions. Teachers helped in mitigating any ambiguous questions to avoid confusing the respondents, a consequence a revised version was administered to all secondary school teachers of district two khenchela.

### **Data Analyses**

Notably, data collected from the teachers' Questionnaire will be treated in tables, and graphs, and will be presented in percentages and numeric statistics for closed ended questions, and yet it will be presented by figure of Word Cloud (to generate the most frequent answer qualitatively) for open ended questions followed by a description of the findings. Interestingly, a word cloud entails a graphical representation of knowledge that allows the observer to form a quick, intuitive sense of a text consequently this tool is an easy way to share high-level data.

Worthy noted that various researchers acknowledged the use of Word Clouds to support qualitative data analysis mainly McNaught & Lam, (2010); Pithouse Morgan et al., (2015); Viégas & Wattenberg, (2008) in this context Concetta, DePaolo and Kelly (2014) declared in a research paper *entitled Using Word Cloud foa Analysing Qualitative Assessment Data* that:

“Word clouds (or tag clouds) are popular, fun ways to display text data in graphical form; however, we contend that they can also be useful tools in assessment. Using word clouds, instructors can quickly and easily produce graphical depictions of text representing student knowledge” (p1)

In the same context Hayley and Keane (2007) defined it as a “visual presentations of a set of words, typically a set of tags, in which attributes of the text such as size, weight or color can be used to represent features (e.g., frequency) of the associated terms”

Thus the use of the Word Cloud was basically chosen as a way to visually represent and synthesise frequent necessary ideas from the responses of the teachers as well as to create and explore different word clouds appear to have the potential to support data analysis, additionally, Information will be presented and analysed according to the order of items in the questionnaire.

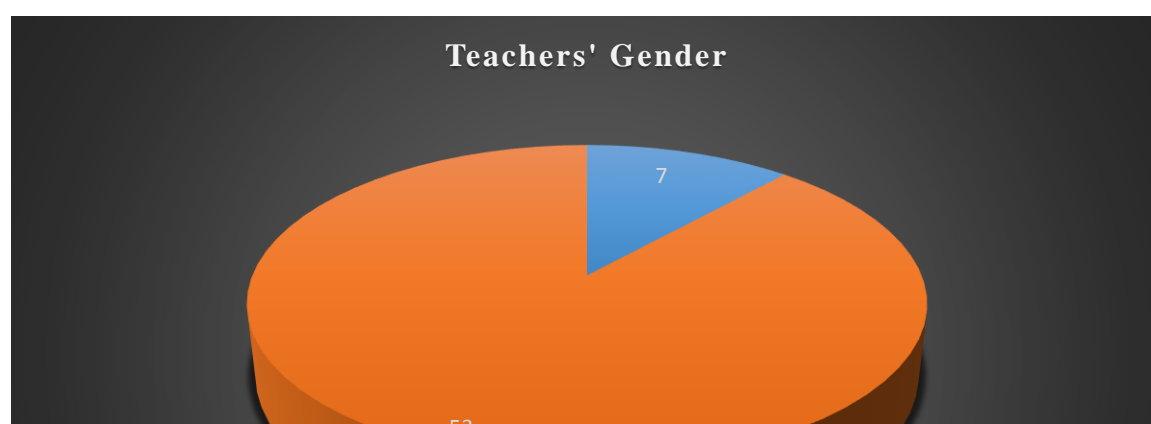
## **Analysis of the Teachers’ Questionnaire**

### **Section One: Teachers’ Background Information**

#### ***Item 01: Teachers’ Gender***

***Table: Teachers’ Gender***

<b>Options</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>Participants</b>	07	53	60
<b>Percentage</b>	11.66%	88.33%	100%



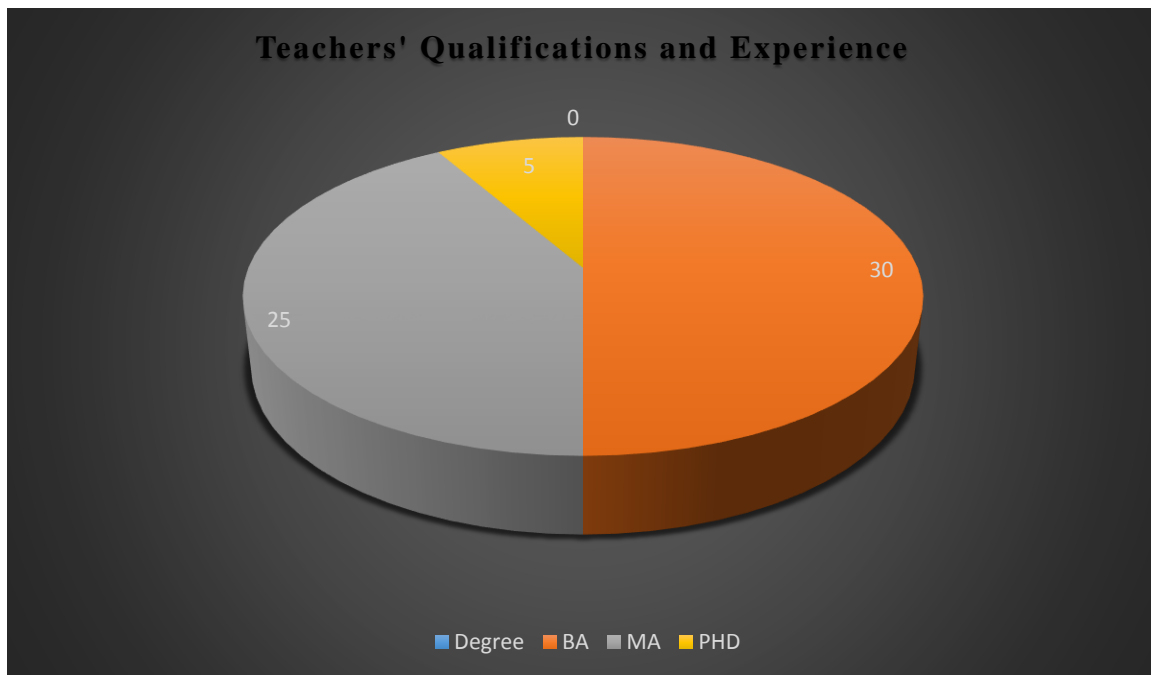
**Figure: Teachers 'Gender**

Interestingly, the table mirrors a clear predominance of female gender. Doubtlessly, a significant gender imbalance among participants is marked, still nothing can be done to balance the unbalanced gender. Out of total sample size of 60 teachers (100%) the most participants were female EFL teachers, they are 53 teachers representing about 88.33% from the whole sample 100%. And yet, 7 male EFL teachers answered the questionnaire representing a minority of 11.66% out of the whole sample 100%. Knowing the gender of the participants is important for describing the sample. Fortunately, the gender of the teachers is not a relevant factor in the context of the impact of PjBL in enhancing learners' digital literacy.

**Item 02: Teachers' Qualification**

**Table: Teachers' Qualification**

<i>Degree</i>	<i>BA( Licence)</i>	<i>MA (Master/Magister)</i>	<i>PHD (Doctorate)</i>
<b>Informants</b>	<b>30</b>	<b>25</b>	<b>05</b>
<b>Percentage</b>	<b>50%</b>	<b>41.66%</b>	<b>08.33%</b>



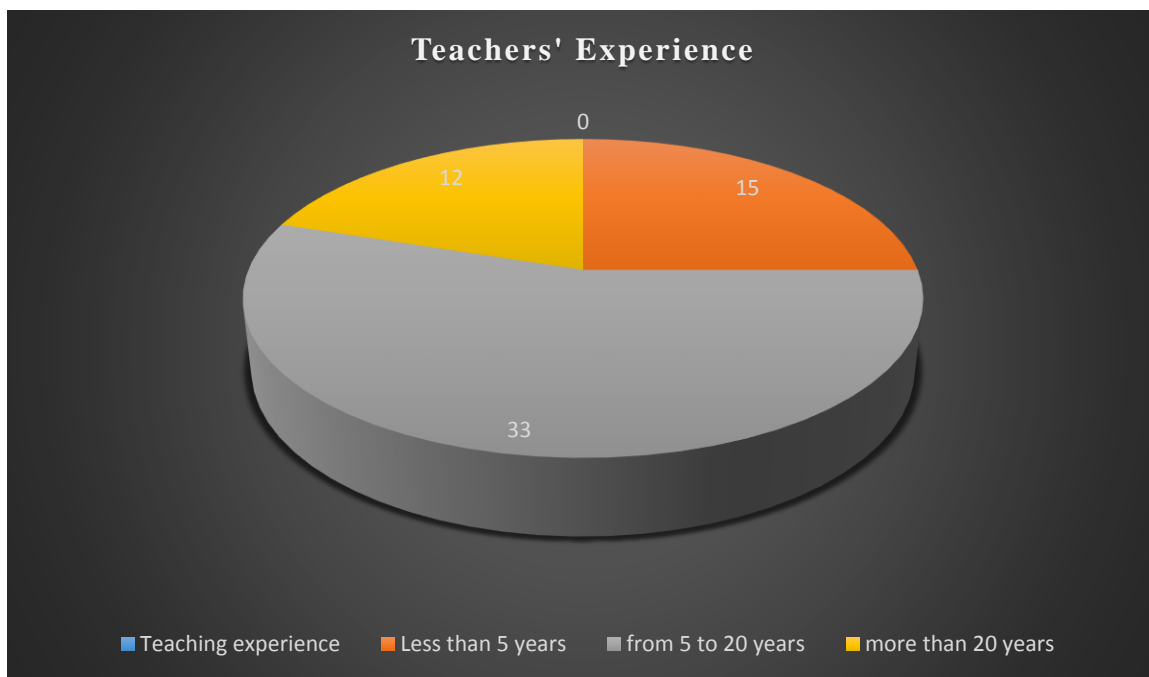
**Figure: Teachers' Qualification**

Unsurprisingly, the researcher noticed a fruitful range of educational backgrounds. The table and the figure provide a systematic key information regarding teachers' qualification and experience. They are distributed as follow: 30 EFL teachers had obtained the Licence Qualification, 25 EFL teachers had obtained the master degree, and 05 EFL teachers got the PhD. Therefore, the majority holding the licence and a minority had achieved the highest level of academic qualification. As part of describing the sample, it is vital to know their educational background.

**Item 03: Teachers' Experience**

**Table: Teachers' Experience**

Teaching Experience	Less than 5 years	5-20 years	More than 20 years
Participants	15	33	12
Percentage	25%	55%	20%



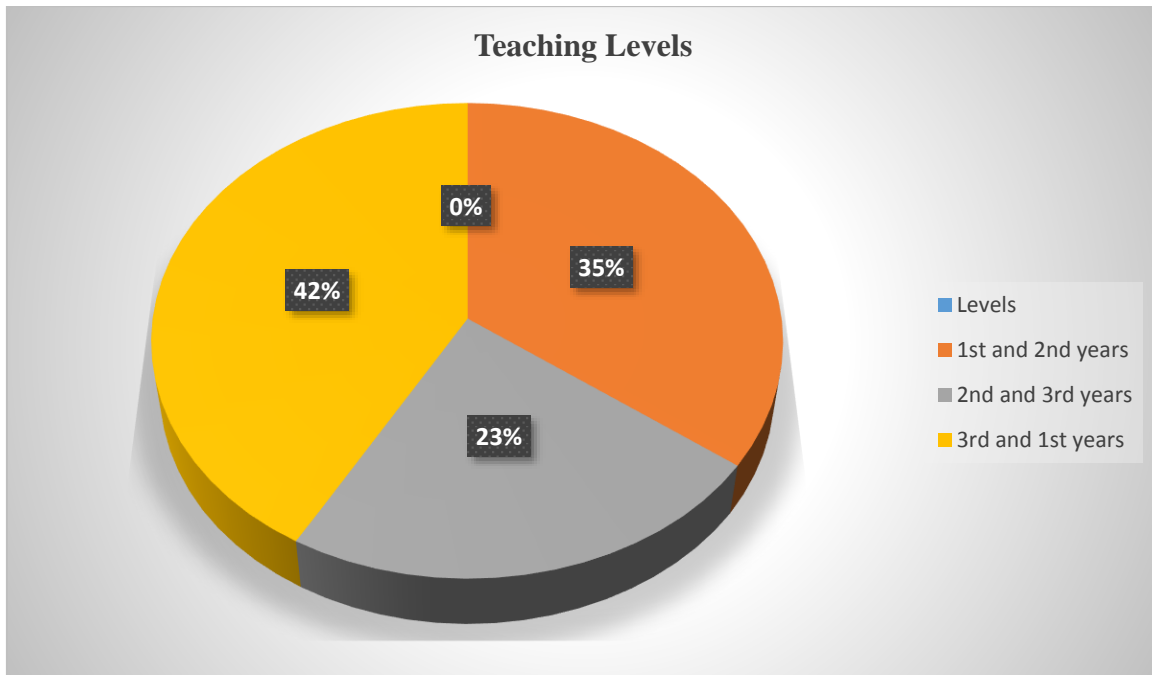
**Figure: teachers' Experience**

Remarkably, the researcher observed a diverse fruitful range of experience levels among EFL teachers of English language in Khenchela, making it a rich study with differentiated experience categories. Three main categories are marked, the larger category falls with 33 EFL teachers marking (five to twenty years) of expertise, EFL mid-career teachers. 15 had experience less than five years, and 12 opted for (more than 20 years) choice. Worthy noted that teachers 'experience may impact the outcomes of the research study, since novice teachers are not as experienced as experienced one thus the question examined deeply teachers' experience as a valuable part to mirror teachers' professional development category.

**Item 04: Teaching Levels**

**Table : Teaching Levels**

Options	1 <sup>st</sup> and 2 <sup>nd</sup> SE	2 <sup>nd</sup> and 3 <sup>rd</sup> SE	1 <sup>st</sup> and 3 <sup>rd</sup> SE
Participants	21	14	25
Percentage	35%	23%	42%



**Figure: Teaching Levels**

Purposefully, the researcher considers the teaching levels of the sample. Since the case study addressed secondary school teachers, it is extremely important to mark a diverse range of teaching levels. Therefore: 21 EFL teachers in charge of teaching first and second years SE, 14 EFL teachers teach second and third years SE, whereas 25 EFL teachers instruct first and third years.

**Section Two: Project Based- Learning (PjBL)**

Q5. How do you define a project-based approach in education?

In order to describe the quantitative result, the researcher used a word cloud figures, wherein the researcher entered texts from participants, and the application will build a word cloud from it, skipping prepositions, articles and similar words.



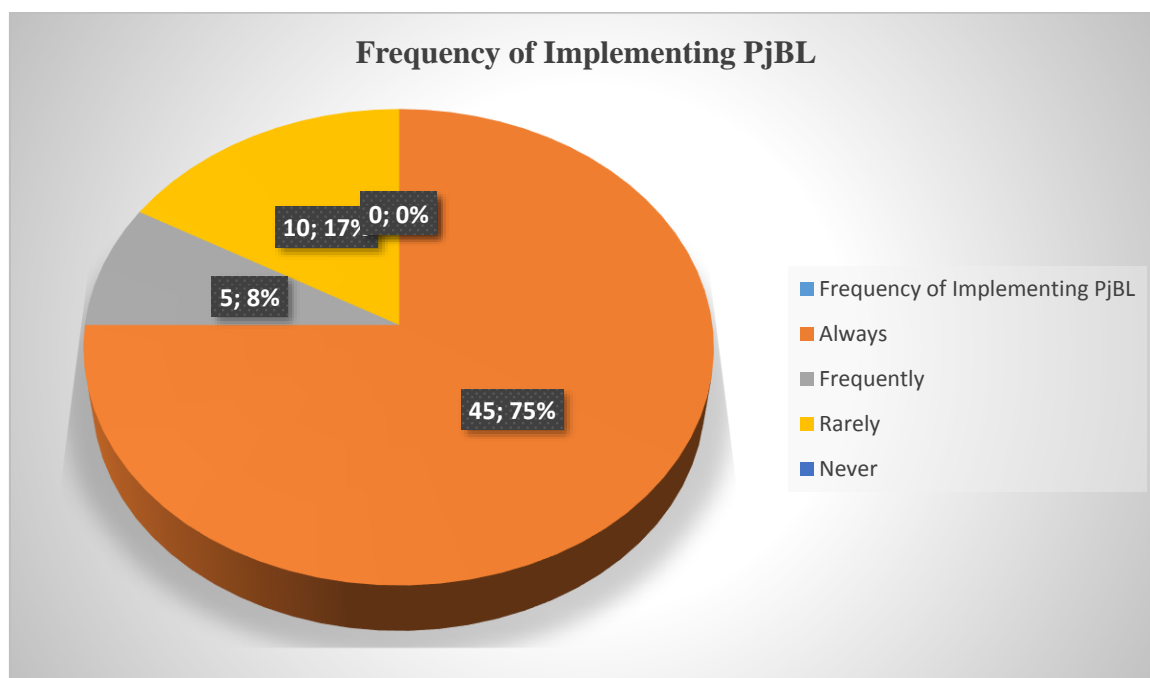
Figure: Word Cloud of the Definition of PjBL

In fact, EFL teachers provided various definition, the most frequent common definition of PjBL was that : “PjBL is an instructional approach built around projects and themes”.

Table: Frequency of Implementing PjBL

Frequency of Implementing PjBL	Always	Frequently	Rarely	Never
Participants	45	05	10	00

<i>Percentage</i>	<i>75%</i>	<i>08.33%</i>	<i>16.66%</i>	<i>00</i>
-------------------	------------	---------------	---------------	-----------



***Figure: Frequency of Implementing PjBL***

Unquestionably, one relevant factor to the research topic is the frequency at which EFL teachers do implement the pedagogy of project based during their instructional process. Consequently, via this questionnaire the researcher founded that:

45 EFL teachers (75%) always incorporate PjBL in their instructional practices.

05 EFL teachers (08.33%) frequently integrate PjBL in their classrooms.

10 EFL teachers (16.66%) rarely implement PjBL in their classrooms.

Fortunately, all of EFL teachers do implement PjBL and yet an obvious breakdown of incorporating PjBL is marked. After discussing the findings with EFL teachers who opted for (Frequently) and (rarely) options, they declared that they do not implement it all the times with 3rd year classes, they argued that learners are in charge of preparing for their baccalaureate exam therefore they show unwillingness to do projects.





Figure: Word Cloud about Examples of Successful Projects

Qualitatively, EFL teachers suggested various examples of successful projects they had implemented in their classrooms as: Gallery art exhibition, Gallery walk, debates, role playing, acrostic poems, power point presentations, storytelling, Descriptive pictures, real product, guest speaker.

**Item 09: The Merits of BjBL**

Q9. Decide upon the importance of PjBL in teaching process?

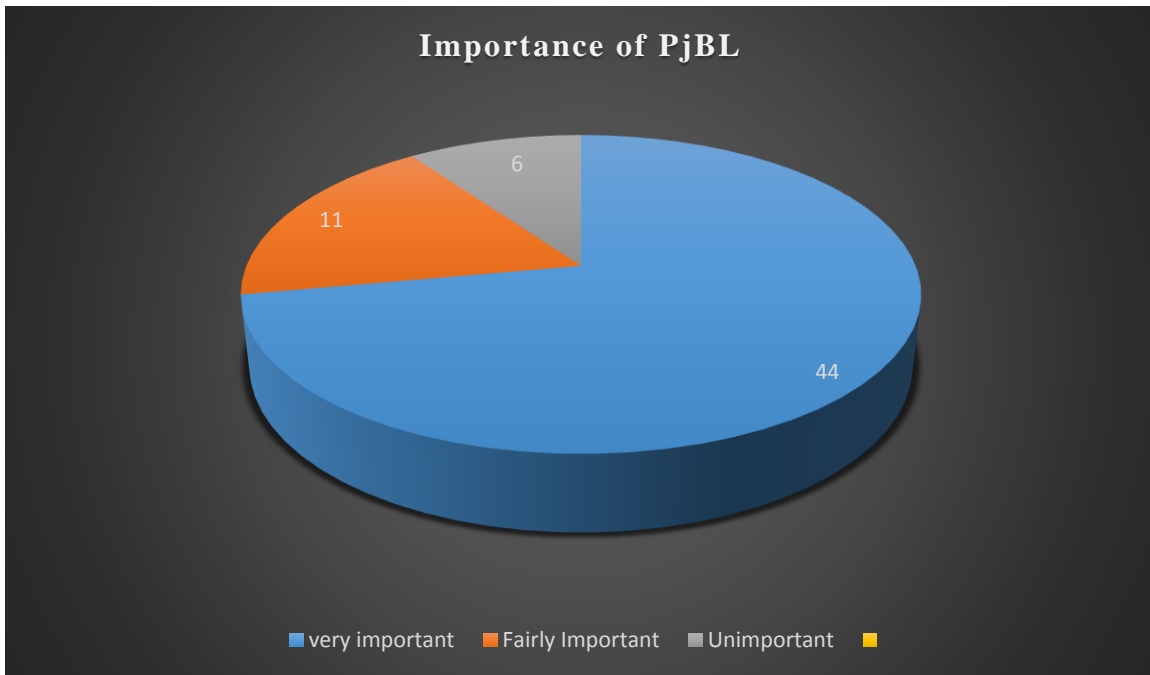
Very important

Fairly important

Unimportant

Table: Importance of PjBL

Importance of PjBL	Very Important	Fairly Important	Unimportant
Participants	44	11	06
Percentage	73.33%	18.33%	10%



**Figure: Importance of PjBL**

It is extremely significant to examine the EFL teachers' perspectives towards the importance of PjBL and a modern instructional approach. Thus the researcher observed that the majority of EFL teachers consider PjBL as a very important approach, since 44 teachers (about 73,33% from the whole sample of 100%) agreed that PjBL is very important pedagogy, 11 teachers (18.33%) said that PjBL is fairly important educational practice, while a minority of 6 teachers (representing 10% from 100%) viewed that PjBL in not that important approach. After reconsidering their teaching levels, the researcher founded that they are the same category of teachers in charge of teaching 3<sup>rd</sup> year classes who show a little bit unwillingness to make projects. All in all, the majority of EFL teachers considered Pjbl as an extremely significant approach to teaching and learning.

**Q10.** What are the merits and key benefits of using a project-based approach in the classroom compared to traditional teaching methods?







*Figure: Word Cloud about Solutions to Face-up challenges of PjBL*

Interestingly, EFL teachers suggested many solutions to mitigate the challenging problems faced while implementing project based learning basically: Grouping learners to groups, offering them choice to choose the theme, group and way of presentation, extra sessions, formative and summative feedback, checklists.

**Q13.** How do you assess and evaluate student learning in a project-based environment? What criteria do you use?

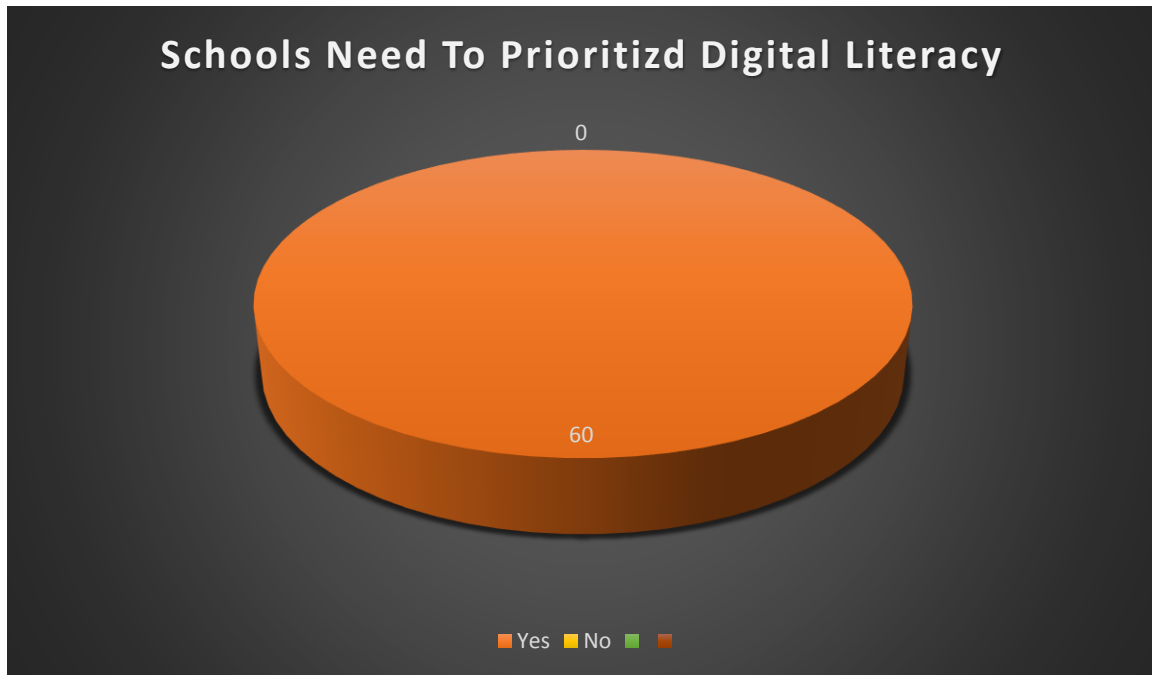
*Figure: Assessing Learners' Project Based Environment*



Q15. Do schools need to prioritize Digital literacy?

*Table: Schools Need to Prioritize Digital Literacy*

Options	Yes	No
<b>Participants</b>	<b>60</b>	<b>00</b>
<b>Percentage</b>	<b>100%</b>	<b>00%</b>



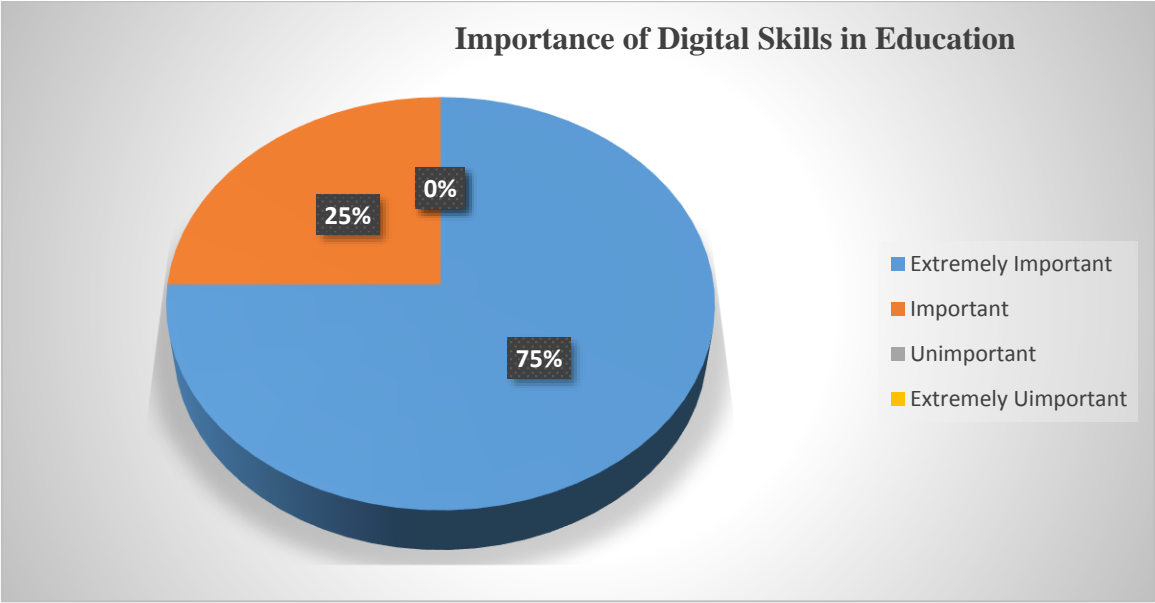
*Figure: Schools Need to Prioritize Digital Literacy*

Unsurprisingly, all the teachers agreed that modern schools have to prioritize digital literacy. They argued that learners should go digital and be active agents who are able to shift towards digitalization easily. All the sample number (60 EFL teachers representing 100%) called for a rethinking pedagogy wherein secondary schools prioritize digital literacy and skills.

Item Q16. Are Digital skills important in Education?

*Table: Importance of Digital Skills in Education*

Options	Extremely Important	Important	Unimportant	Extremely Unimportant
<b>Participants</b>	<b>45</b>	<b>15</b>	<b>00</b>	<b>00</b>
<b>Percentage</b>	<b>75%</b>	<b>25%</b>	<b>00%</b>	<b>00%</b>



**Figure: Importance of Digital Skills in Education**

Notably, EFL teachers accorded concerning the importance of digital skills. They are all, without exception, aware of the merits of fostering learners' digital skills and abilities in current era, out of the sample of sixty EFL teacher, the majority of teachers representing 45 teachers (approximately 75% out of 100%) viewed digital skills as fundamental valuable abilities. The acknowledged that it is vital to enhance digital skills in education.

Q17. How do you integrate digital literacy skills into your teaching to prepare learners for the digital age?



*Figure: Integrating Digital Literacy into Teaching*

All EFL teachers (60 ones) in the sample of this study declared that they are increasingly incorporating digital tools and resources, such as interactive software and online platforms, mobiles, data shows, videos, audios, games, computers, interactive boards and foreign languages laboratories. They acknowledged the effective incorporation of digital skills in digital age.

Q18. What specific digital tools or technologies do you use to enhance students' digital literacy skills?







*Figure: Assessing Learners' Progress in Digital Literacy*

Unfortunately, thirty EFL teachers did not answer the question. Others measure and assess learners' progress in developing digital literacy skills via testing and real incorporation of ICT's while presenting lessons or projects.

#### **Section Four: Maximizing Learners' Digital Literacy through PjBL**

Q22. Can you share examples of projects or activities that focus on developing digital literacy skills? What were the outcomes?

Remarkably, EFL teachers share various examples of projects and activities that focus on developing digital skills of EFL learners such as:

**Examples for 3<sup>rd</sup> year classes, they recommended:**

- 1- **Unit One:** Exploring the Past / **Project One:** Making The Profile of an Ancient Civilization  
**Recommendation:** using short videos about ancient civilizations.
- 2- **Unit Two:** Ill-Gotten Gains Never Prosper / **Project Two:** Writing a Charter of Ethics  
**Recommendation:** Newscasts using digital tools about ethical and unethical practices.
- 3- **Unit Three:** Schools Different and Alike / **Project Three:** Designing an Educational Prospects  
**Recommendation:** Guest Speaker videos of excellent learners
- 4- **Unit Four:** Safety First / **Project Four:** Conducting a Survey on the Impact of Advertising  
**Recommendation:** E-Advertisements on Social Network Page
- 5- **Unit Five:** Are We Alone / **Project Five:** Designing an Astronomy Booklet **Recommendations**  
**Presenting the solar system via the use of multimedia tools**
- 6- **Unit Six:** We Are a Family / **Project Six:** Writing a Booklet of Tips for Coping with Student's Emotions  
**Recommendation:** presenting a short online debate about showing/hiding emotions.

**Examples for 2<sup>nd</sup> Year SE Classes:**

- 1- **Unit One:** Signs of The Time / **Project One:** Writing a Profile about Lifestyles  
**Recommendation:** Filming a Ceremony about Lifestyles in Algeria
- 2- **Unit Two:** Make Peace / **Project Two:** Writing a Statement of Achievement  
**Recommendation:** Watching Videos about Palestine
- 3- **Unit Three:** Waste Not, Want Not / **Project Three:** Making A Conservation Plan  
**Recommendation:** Presenting power point presentation about protecting nature
- 4- **Unit Four:** Budding Scientist / **Project Four:** Writing Reports on Scientific Experiments or an ABC of Dreams  
**Recommendation:** Recording Scientific Experiments
- 5- **Unit Five:** News and Tales / **Project Five:** Writing A Collection of Stories  
**Recommendation:** Presenting and recording a newscast

6- **Unit Six:** No Man Is an Island / **Project Six:** Making A Survey

**Recommendation:** Arranging Videos of Disasters and Solidarity

7- **Unit Seven:** Science or Fiction / **Project Seven:** Writing Miscellanies or Making a Repertory

**Recommendation:** Creating a Facebook page about fiction movies

8- **Unit Eight:** Business is Business / **Project Eight:** Writing a Business Portfolio

**Recommendation:** Writing a Business E-Portfolio

**Examples for 1<sup>st</sup> year SE Classes:**

1- **Unit One:** Getting Through / **Project one:** Making a Job Application Booklet or Making An Internet User's Guide For Beginners

**Recommendation:** Recording a role play about the Internet

2- **Unit Two:** Once Upon a Time / **Project Two:** Writing A Book Review

**Recommendation:** Writing Collection of stories in the Secondary school Facebook Page

3- **Unit Three:** Our Findings Show / **Project Three:** Conducting A Survey

**Recommendation:** Sharing online Survey

4- **Unit Four:** Eureka! / **Project Four:** Making The Profile of an Invention

**Recommendation:** Watching Videos about Inventions

5- **Unit Five:** Back To Nature / **Project Five:** Designing A Consumer's Guide

**Recommendation:** Presenting power point presentation about nature

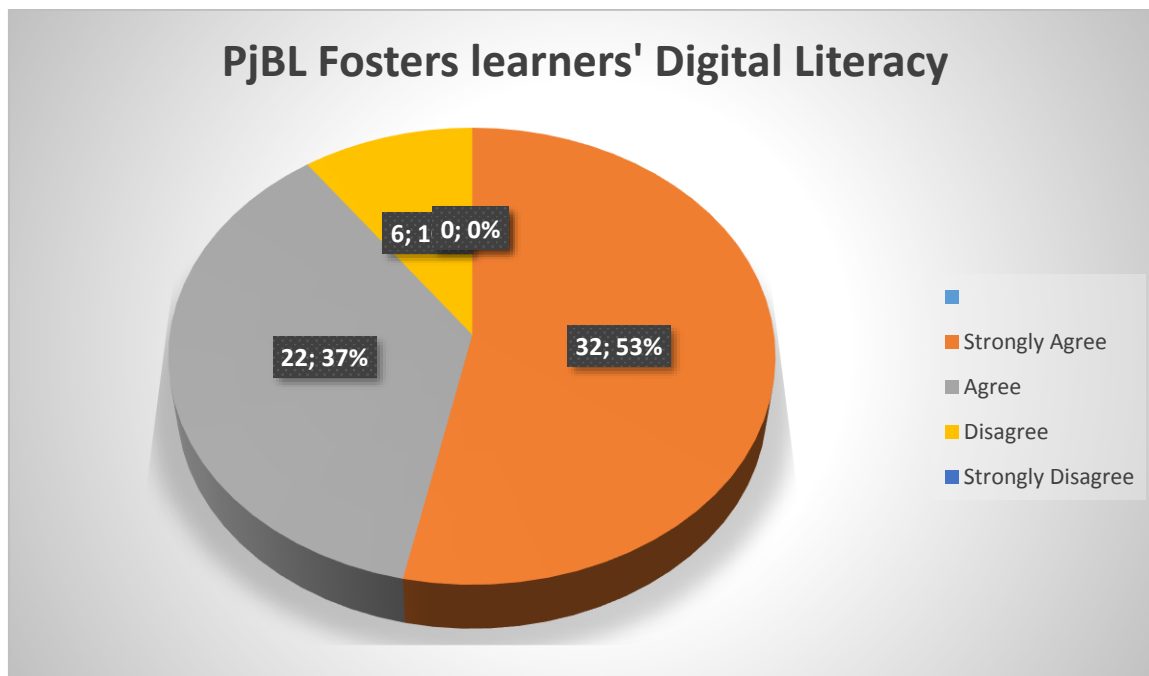
Generally, examples including presenting projects via the use of multimedia tools, videos, recording, power point presentations, social media pages and groups.

**The outcomes:** learners 21<sup>st</sup> century skills and competencies will be maximized basically digital literacy, including: digital citizenship, digital communication, computer basics, internet skills, information literacy, media literacy and creativity.

Q23. In your opinion, do you think that PjBL foster learners' digital literacy?

*Table: PjBL fosters learners' Digital Literacy*

Options	Strongly Agree	Agree	Disagree	Strongly Disagree
<b>Participants</b>	32	22	06	00
<b>Percentage</b>	53.33%	36.66%	10%	00%



**Figure: PjBL fosters learners' Digital Literacy**

Purposefully, most teachers declared that project based learning maximizes learners' digital literacy. 32 EFL teachers (representing 53.33% out of 100%) chose *strongly agree* option, as the majority of the sample. Unsurprisingly, 22 EFL teachers (approximately 37%) agree that PjBL fosters learners' digital skills. And yet 6 teachers (in charge basically of 3<sup>rd</sup> year classes) disagree about the statement. No one opted for (strongly disagree) option. Consequently, the majority of teachers are in complete agreement about the effective impact of PjBL in enhancing learners' digital literacy. They are in accord while discussing the merits of PjBL.

**Item: Q24.** In what follows, a list of items indicating the difficulties that teachers may face when applying PjBL to enhance learners' digital literacy. To answer, please, tick (✓) the appropriate box among the five (5) following possibilities:

□ It is difficult to apply PjBL to enhance learner's digital skills when teaching SE learners

because:

<b>Difficulties that EFL teachers may encountered:</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Undecided</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Learners have poor communicative skills.	10	15	00	20	15
Learners do not manage to relate meaning with structure.	08	20	06	14	12
It is hard to implement PjBL in an over-crowded classroom.	35	20	00	05	00
The syllabus is so loaded that it is unlikely to be finished implementing the PjBL principles.	36	18	06	00	00
Learners use their mother tongues rather than English in their interactions.	28	20	00	10	02
Learners seem not ready to accept learner-centered approach.	21	30	00	09	00
Teachers face the problem of classroom and time management.	15	35	00	10	00
Learners fear of negative evaluation and shyness prevent them from participation.	05	10	00	25	20
Teachers need intensive training to get more familiar with PjBL and DL principles.	10	45	05	00	00
The projects topics provided in the SE curriculum and textbooks do not fit the students' needs and interests.	00	00	05	20	35
The large number of school subjects can constitute an obstacle to the success of implementing PjBL to foster learners' digital skills.	04	30	00	20	06
Learners' individual differences constitute an obstacle in implementing PjBL.	13	15	02	10	20
Teachers spend much more time completing administrative documents (the log book, the diary book, the sequence or file plans, the yearly distribution...etc) than on preparing effective PjBL plans.	00	44	00	15	01
Learners prefer not to participate because they lack their teacher's positive feedback.	00	00	05	25	30

Without doubt, the above greed indicates the most encountered difficulties that EFL teachers face while incorporating PjBL to maximize learners' digital literacy. The more or the less the researcher is aware about challenges, the more or the less she can decide about questions of the interview with experts as to recommend solutions to end up these challenges. the aim

behind this question is to check the difficulties that EFL teachers are suffering from while implementing PjBL, the first step to make PjBL a high quality instructional approach is via facing up these challenges. First 10 EFL teachers strongly agreed that learners have poor communication skill, additionally 15 teachers agreed. And yet, 20 teachers disagreed thus learner's communicative competencies are accepted to implement PjBL. Second, 20 EFL teachers declared that learners do not manage to relate meaning with structure, 08 teachers strongly agreed about the statement, whereas 06 teachers opted for undecided option. Third, the majority of teachers strongly accorded that it is hard to implement PjBL in an overcrowded classroom, 20 teachers agreed and only 05 teachers opted for disagree option. Forth, 36 EFL teachers strongly agreed that the syllabus is so loaded that it is unlikely to be finished implementing the PjBL principles. 25 EFL teachers chose agreed for that and yet 06 teachers opted for undecided option. Concerning learners' of use their mother tongues (Arabic language) rather than English in their interactions, as for learners fear of negative evaluation and shyness prevent them from participation, only 05 EFL teachers strongly agreed about the statement, 10 others disagreed too, whereas 25 teachers chose strongly disagree and 20 disagreed thus the majority disagreed. For the next difficulty, teachers need intensive training to get more familiar with PjBL and DL principles. The majority of teachers agreed (45 EFL teachers) and 10 others strongly agreed, 05 were undecided, surprisingly no teacher opted for disagree/ and strongly disagree. More than that, no teacher agreed/strongly agreed for the reason that the projects topics provided in the SE curriculum and textbooks do not fit the students' needs and interests, still 05 teachers chose undecided option. 20 disagreed and the majority of 35 teachers strongly disagreed. Furthermore, the projects topics provided in the SE curriculum and textbooks do not fit the students' needs and interests, as far as this difficulty is concerned, 04 EFL teachers strongly agreed about it, the majority of teachers (30 EFL teachers) opted for agree option, 20 others disagreed and 6 chose strongly disagree option. Moreover, 13 teachers strongly agreed

for “Learners’ individual differences constitute an obstacle in implementing PjBL” difficulty, 15 teachers agreed representing the majority of teachers, whereas 2 chose undecided option, 10 teachers disagreed and 20 teachers strongly disagreed. Teachers spend much more time completing administrative documents (the log book, the diary book, the sequence or file plans, the yearly distribution...etc) than on preparing effective PjBL plans, consequently the majority of 44 teachers agreed about that, 15 disagreed and only one teacher chose strongly disagreed. For the last challenge: Learners prefer not to participate because they lack their teacher’s positive feedback, no teacher agreed/strongly agreed for that. And yet, 05 teachers were undecided, 25 teachers disagreed and 30 teachers strongly disagreed about it. All in all, variety of reasons may challenge learners to implement high quality PjBL to maximize learners’ digital skills and competencies. Thus experts had better provide urgent solutions to overcome these challenges as soon as possible.

**Q25.** What do you recommend to foster learners’ digital literacy through PjBL?





virtual training via google as well as Microsoft education center. Most teachers mentioned creating and joining social media groups devoted to digitalization of education. Others express their willingness to stay informed concerning educational digital trends as “the Google teacher tribe”.

Finally, the teachers’ questionnaire provides in depth investigation on teachers’ perspectives towards the valuable role of PjBL in enhancing learners’ digital literacy. The primary concern is to provide valid data to better understand the relation between PjBL and digital skills of learners.

## **Learners 'Questionnaire**

### **Introduction**

According to Horwitz (1987) and Savignon and Wang (2003) learners' perspectives play a vital effective role in determining whether an instructional approach is appropriate or no. thus the researcher uses a questionnaire addressed to EFL learners.

Unquestionably, the aim of learners' questionnaire is to provide in depth investigation concerning their perspectives towards the implementation of PjBL to maximize learners' digital literacy. Additionally, the researcher aims to gain purposeful insights related to learners' experiences within PjBL and digital literacy. Furthermore, the primary concern is to tailor effective up to date interesting strategies, techniques, and classroom activities to mitigate difficulties and challenging problems encountered while incorporation PjBL and digital literacy. Moreover, the researcher wants to highlight whether learners are motivated and interested in prioritizing PjBL and digital literacy consequently to enhance the learning outcomes reaching the target objectives.

Interestingly, the questionnaire starts with a brief introductory lines which explains the main aim of the research study. It consists of 21 questions. In fact, the questions are of different types, first questions of multiple choice type, wherein learners put a tick (✓) in the corresponding choice, second questions of open-ended questions requiring from learners to give their own answers and justify them where necessary, third questions of close-ended questions requiring from learners to choose yes or no options. All questions are spread out of four sections, each one is attempted to provide specific set of information rationally, and the following is a brief description of each section:

### **Section One: Learners' Background Information (Q1 → Q2)**

Purposefully, it consists of two questions designed to get general information about learners' background information including both their age and gender.

## **Section Two: Project Based- Learning (Q3→ Q8)**

Remarkably, this section contains of six main questions related to PjBL, including learners' interest and perspectives towards it, their experience and familiarity with presenting projects, their feelings towards the already presented projects, the resources, tools and materials used by them while starting the whole process, specific skills they need to enhance to develop projects, techniques of measuring the quality of their projects, as well as suggestions and recommendations to improve their performance/experience in coming projects.

## **Section Three: Maximizing Digital Literacy in Teaching and Learning (09 → 14)**

Notably section three is entitled maximizing digital literacy in teaching and learning. It includes six main questions related to promoting digital literacy in education, the researcher asked learners about their definition to digital literacy, types of Information and Communication technologies devices they have at home, as well as their level of knowledge in using digital devices, rating their internet literacy, as well as their level of frequency of using digital resources. In addition to that, the section examines carefully the encountered problems by learners with digital devices or software, with recommended solutions to make digital experience a high quality experience.

## **Section Four: Fostering Learners' Digital Literacy Via PjBL (14 → 21)**

Vitally, this section aims to underscore the impact of PjBL on maximizing learners' digital literacy. First of all, it aims to examine learners' perspectives towards the relatedness between PjBL experience and digital literacy, their experience with PjBL activities that involved digital tools or technology, describing their experiences, in addition to that, it highlights the specific digital skills acquired via PjBL, and the impact of these skills on learners' academic and professional future. It also reflects on learners' Pjbl experiences and their confidence in using various digital technologies. Besides, learners are asked to list some online

platforms, tools and resources discovered through PjBL that they believe every digital literate person should be aware of. Finally, it highlights the challenges learners faced during digital focused project work, recommendation to overcome difficulties as well as recommendations to foster digital literacy via Pjbl.

## **Administration of the Questionnaires and Questionnaire Respondents**

The learners' questionnaire was distributed to 80 EFL learners of First Year Secondary education in Arab Messoud Secondary school chechar in Khenchela, during a class session under their teachers' control. The distribution of the questionnaires took place in October during the academic year 2022/2023.

## **Data Analyses**

Interestingly, Data of the learners' Questionnaire will be treated in tables, and graphs. Information will be presented and analyzed according to the order of items in the questionnaire. It is worthy noted that a histogram 3D is used whereby numerical qualitative data and values of variables are represented and a figure composed of words used frequently by learners is used to generate qualitative data.

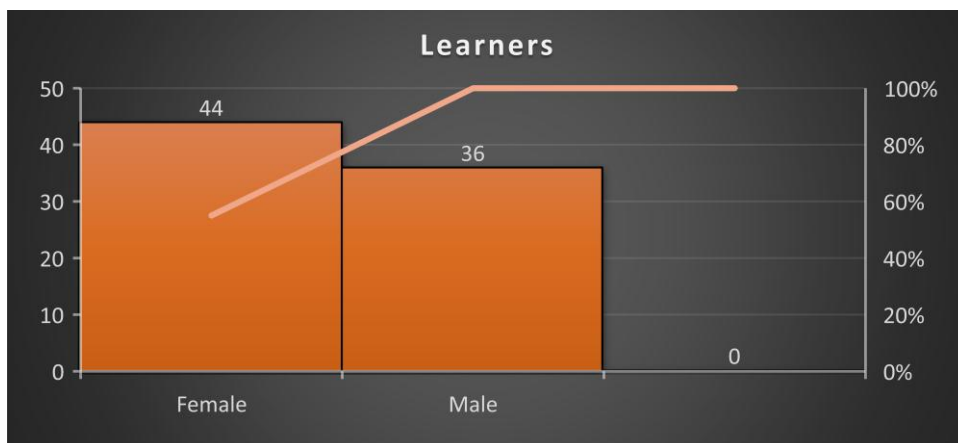
## **Analysis of the Learners' Questionnaire**

### **Section One: Learners' Background Information**

1- What is your gender? Male          Female

*Table: Learners' Gender*

<i>Options</i>	<i>Male</i>	<i>Female</i>
<i>Participants</i>	<b>36</b>	<b>44</b>
<i>Percentage</i>	<b>45%</b>	<b>55%</b>



**Figure: Learners' Gender**

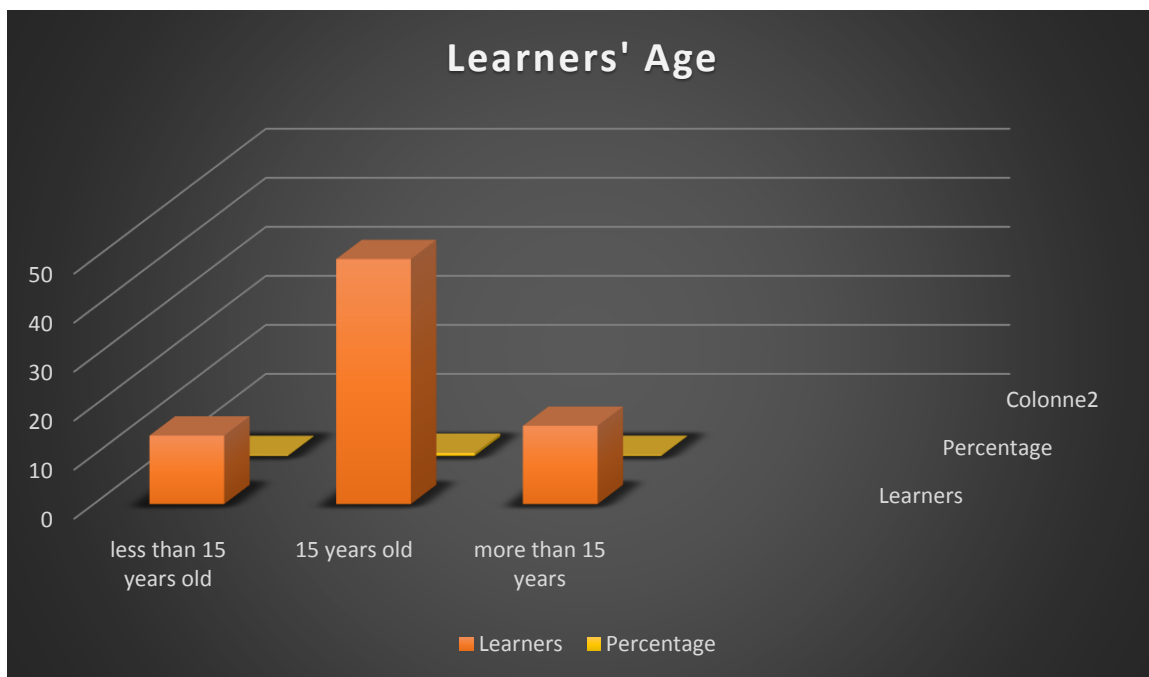
Doubtlessly, identifying the gender of the participants is extremely vital aspect in any research study. Remarkably, table number one shows that the majority of first year secondary education learners are female participants representing 44 girls, 55% from the total sample while males represent just 45% (36 male learners). In other words, the sample representation of gender illustrates a female slightly more participants compared to males. And yet, gender is not an influencing variable in the context of this research topic.

2- How old are you?

- Less than 15 years old
- 15 years old
- More than 15 years old

**Table: Learners' Age**

<i>Options</i>	<i>Less than 15 years old</i>	<i>15 Years old</i>	<i>More than 15 years old</i>
<b>Participants</b>	<b>14</b>	<b>50</b>	<b>16</b>
<b>Percentage</b>	<b>17.5%</b>	<b>62.5%</b>	<b>20%</b>



**Figure: Learners' Age**

Clearly, the aim of the second question is to collect data about the learners' age distribution. Within a total account of 80 EFL learners, the average age of the sample is 15 years old. Additionally, the table number and figure two show that the majority of learners of first year Secondary Education (SE) are 15 years old representing 50% from the whole sample. Only few of them are between are less than 15 years old, which represent 14 learners (about 17.5%) whereas the number of learners who are beyond 15 years old representing 20% of the total sample.

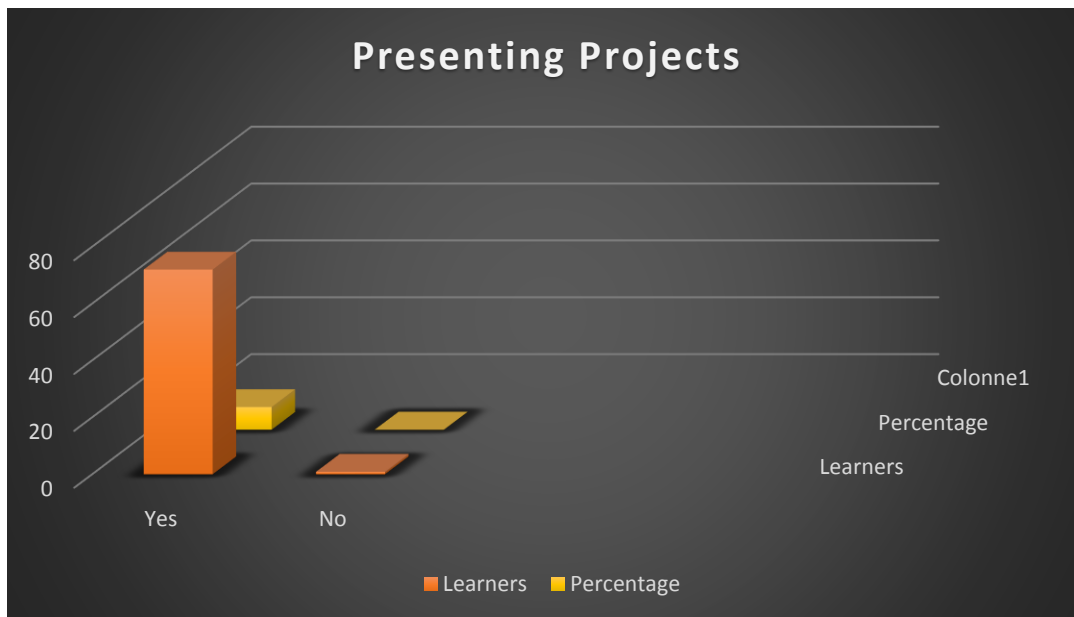
### Section Two: Project Based- Learning

3- As a learner, are you interested in presenting projects?

Yes                      No

**Table: Learners' interest in Presenting Projects**

<i>Options</i>	<b>Yes</b>	<b>No</b>
<i>Participants</i>	<b>72</b>	<b>08</b>
<i>Percentage</i>	<b>90%</b>	<b>10%</b>



**Figure: Learners' Interest in Presenting Projects**

Doubtlessly, nothing has as much importance as learners' interest in the research topic. It is the basic factor to the success of the adopted instructional approaches. Therefore, question number three aims to check whether EFL learners are really interested in presenting projects or no. with a total number of eighty learners, the majority of EFL learners representing seventy-two learners (90%) are highly interested in presenting various projects in all modules. Whereas a minority of eight learners are not interested in presenting projects. The researcher deduces that most of secondary school learners are willing to presenting project works happily.

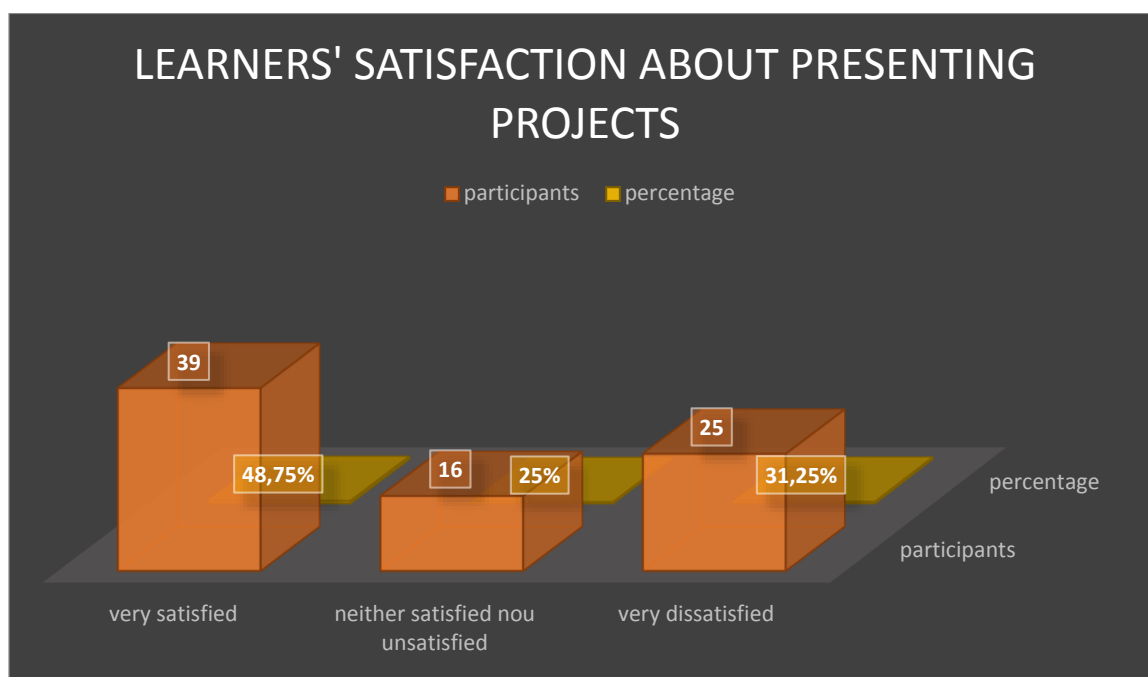
4- Overall, are you satisfied with your experience using Project Based Learning, dissatisfied with it, or neither satisfied or dissatisfied with it?

Very satisfied          Neither satisfied nor dissatisfied          Very dissatisfied

**Table: Learners' Satisfaction about Presenting Projects**

<i>Options</i>	<i>Very Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Very Dissatisfied</i>
<i>Participants</i>	<b>39</b>	<b>16</b>	<b>25</b>

<i>Percentage</i>	48.75%	25%	31.25%
-------------------	--------	-----	--------



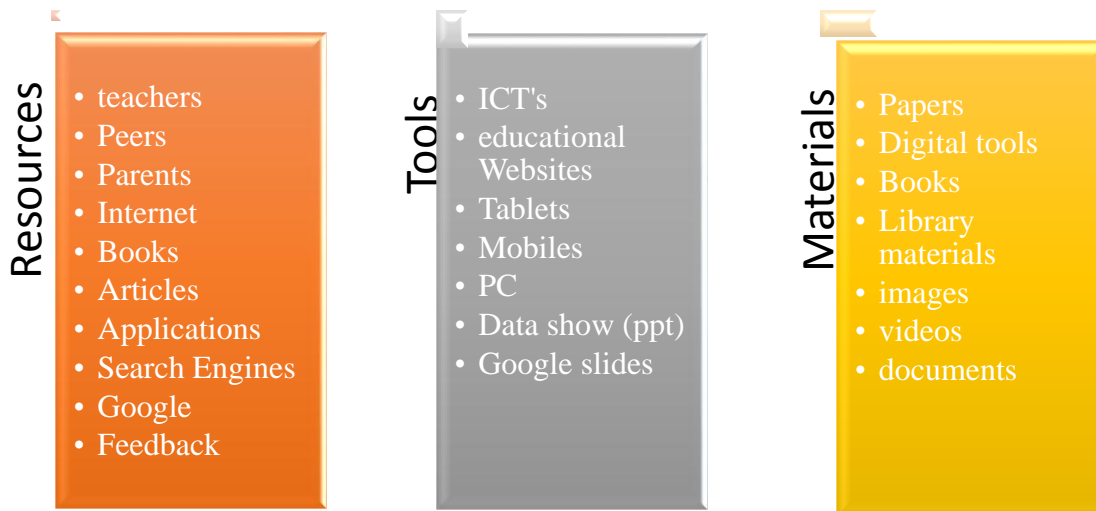
**Figure: Learners' Satisfaction about Presenting Projects**

Notably, the fourth question is related to the overall learners' satisfaction towards presenting projects. A good significant portion of learners presenting 39 EFL learners (approximately 48.75% out of the 100%) are really satisfied about the PjBL, a less significant portion of 16 learners are neither satisfied nor unsatisfied, however a quite significant portion of 25 learners (about 31.25%) are very dissatisfied about the presentation of projects. Therefore, it becomes highly necessary to discover why some learners are satisfied about project presentation while other learners are highly dissatisfied.

5- What resources, tools, or materials do you need to complete your project successfully?

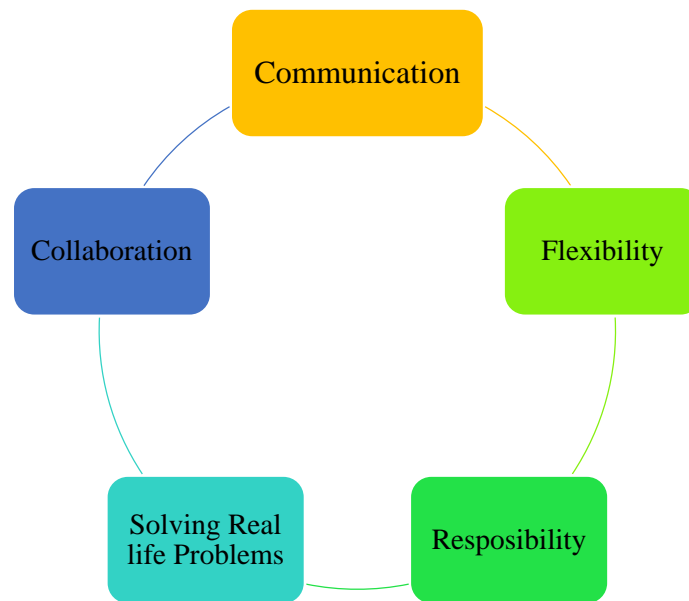
The primary concern of question five is to deduce the resources, tools as well as materials needed to complete projects successfully by learners. Surprisingly, as the researcher questioned EFL learners, they mentioned various resources basically: Paper,

library books of the secondary school, images, videos, internet, recordings, ICTs', library materials, educational websites, tablets, mobiles, search engines like Google, guidance from teachers and parents, presentation tools such as power point presentation, google slides and peer feedback. As a result, learners use variety of resources throughout the whole ongoing process of project based learning.



**Figure: Materials, Tools and Resources used by Learners in Doing Projects**

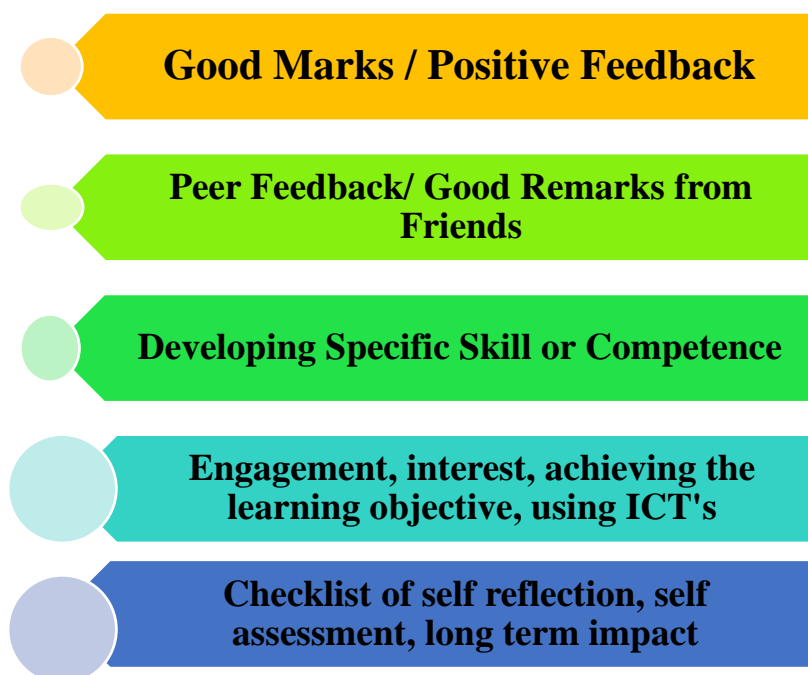
6- Are there any specific skills or knowledge areas you need to develop to succeed in this project?



*Figure: Skills Learners Need to Develop*

In fact, the rationale behind question six is to discover the points of weaknesses that learners ought to foster to achieve high quality PjBL. Learners used different styles to refer to the following skills: responsibility, communication, flexibility, collaboration, and solving real problems.

7- How will you measure the success of your project?



*Figure: Learners' Self-Assessment Criteria of the success of Project*

Based on learners' responses, Learners measure their success in a given project via the following: Good mark from the teacher, good remarks from friends, and if ever I develop a specific skill

Positive feedback, as well as using checklists of self-reflection and self-assessment.

8- What suggestions do you have for improving the next project experience?

**Pre- Project:** Use organized outline / Meet the learning objective / Solving previous mistakes/ Demonstrate creative thinking / Practice Presentation Skills

**During Project:** Motivate peers via the use of ICT's/ collaborate with peers / Using videos, images, clips.

**Post Project:** asking for feedback/ identifying weaknesses/ taking notes concerning other projects of peers.

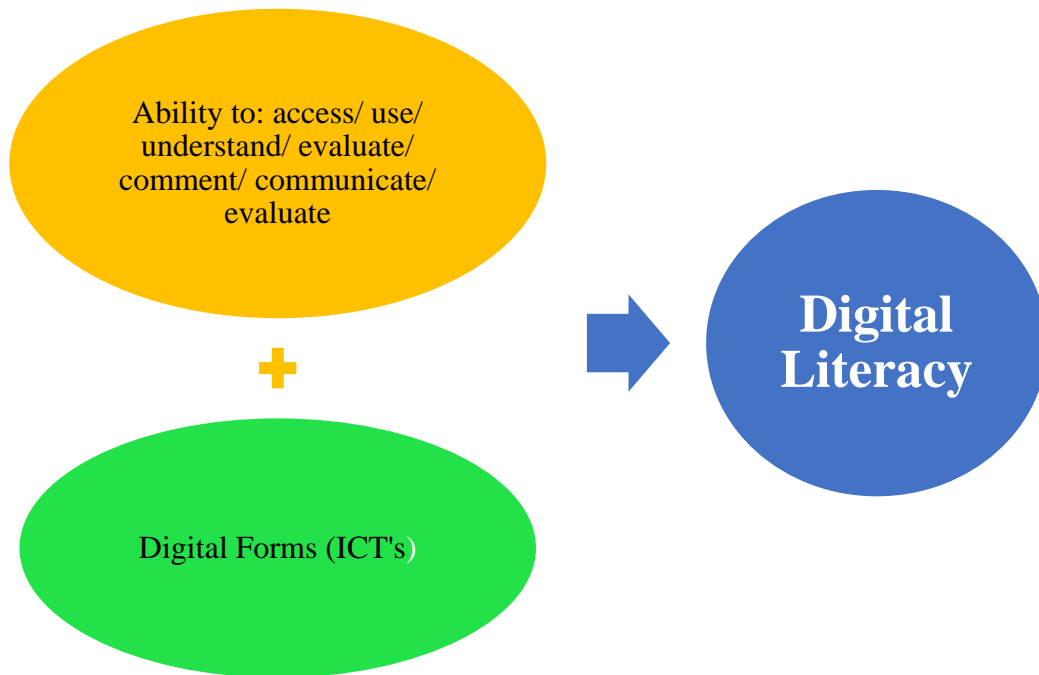
*Figure: Suggestions to Improve Project Experiences*

The rationale of the researcher in question eight is to know if there any learners' needs to maximize their project experience. Learners mentioned various suggestions mainly:

Working on previous mistakes, recognizing the weaknesses of previous project, trying to motivate learners via the use of videos, images, clips. Plan effectively, integrate ICT's, identify learning objective, collaborate with peers, asking for feedback, demonstrate creativity, practice presentation skills. The above figure identifies all responses accordingly to three basic phases. Pre project needs and suggestions, during project suggestions and post projects suggestions.

### **Section Three: Maximizing Digital Literacy in Teaching and Learning**

9- How would you define digital literacy?



**Figure: Learners ‘Definition of Digital Literacy**

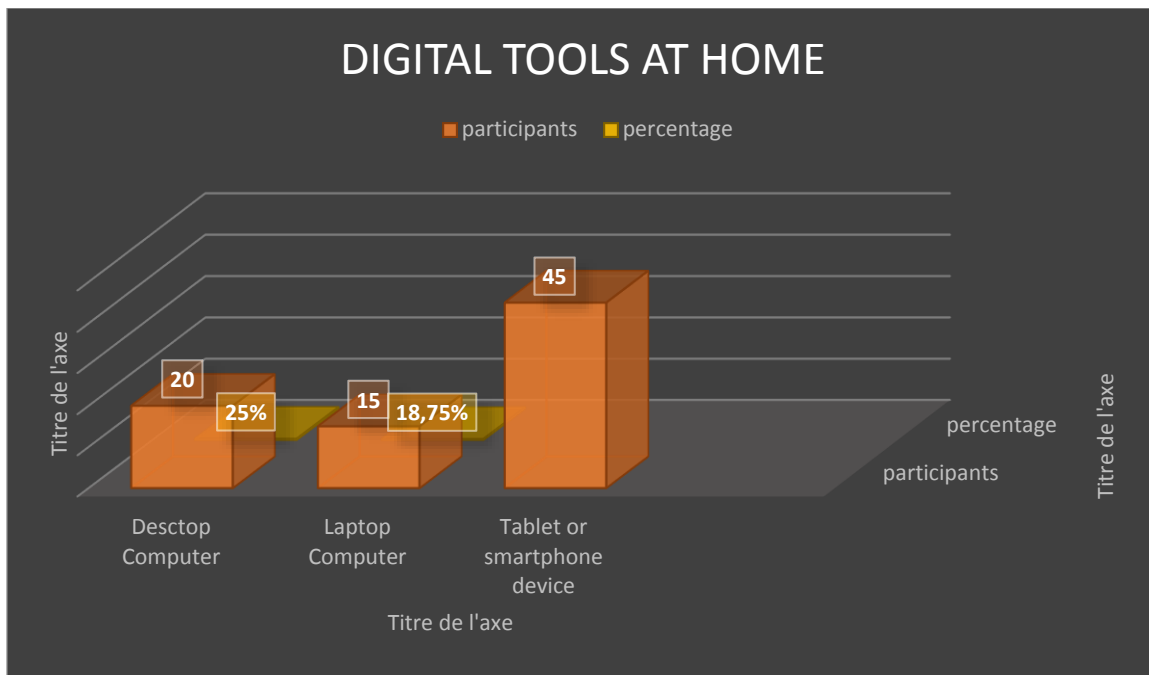
The researcher wants to discover whether learners are aware of the definition of digital literacy or no, in fact they provided various similar definitions, thus digital literacy is the ability to interact through a digital mean. This is the common definitions provided by EFL learners. This ability includes: access, use, understand, evaluate, comment, communicate and evaluate a digital form. Interestingly, all the learners are really aware of the definition of digital literacy.

10- What types of Information & Communication Technologies (ICT) devices do you have at home?

Desktop computer Laptop computer Tablet or smartphone device

**Table: Digital Tools at Home**

<i>Options</i>	<b>Desktop Computer</b>	<b>Laptop Computer</b>	<b>Tablet or Smartphone Device</b>
<i>Participants</i>	20	15	45
<i>Percentage</i>	25%	18.75%	56.25%



**Figure: Digital Tools at Home**

It is highly necessary to know whether learners are surrounded by a digital environment or no, as a result the researcher questioned EFL learners about the availability of any digital soft tools at home or no. Surprisingly three categories of Information & Communication Technologies (ICT) devices they have at home were: Desktop computer 20 learners representing 25%, 15 others representing 18.75% opted for Laptop computer and the majority of learners (45 learners representing 56.25%) chose Tablet or smartphone device .

11- How do you appreciate your level of knowledge in using a computer / laptop / tablet / other digital device?

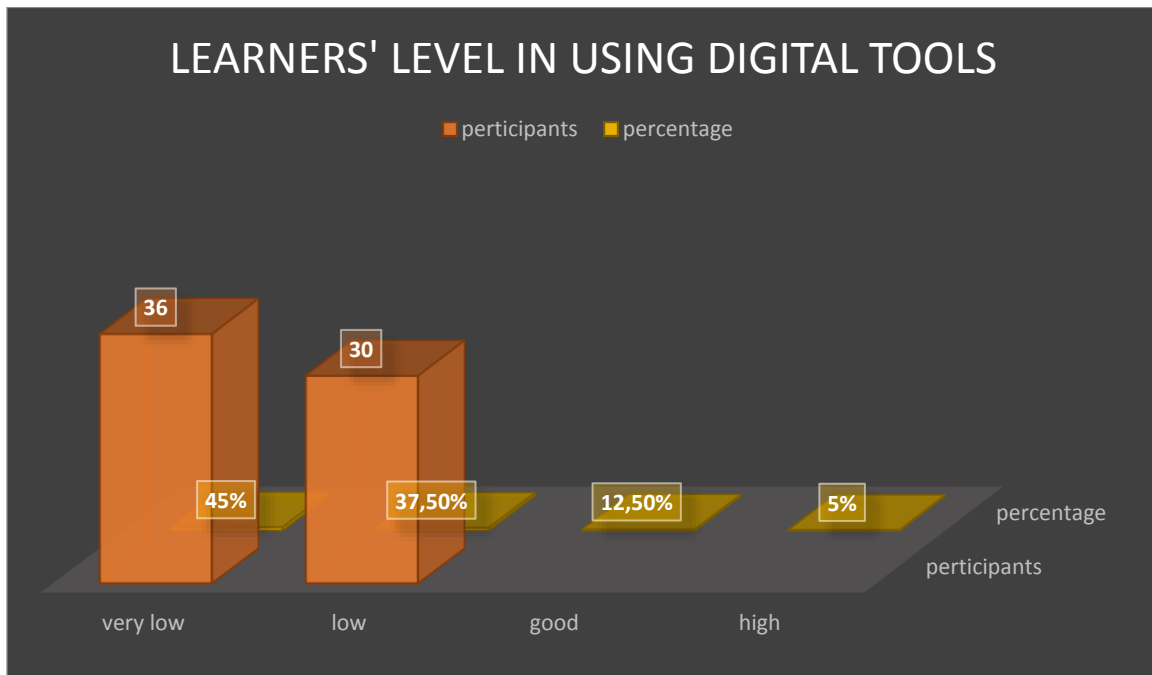
Options: Very low Low Good High

**Table: Learners' Level in Using Digital Devices**

<i>Options</i>	<i>Very Low</i>	<i>Low</i>	<i>Good</i>	<i>High</i>
<i>Participants</i>	<b>36</b>	<b>30</b>	<b>10</b>	<b>04</b>

*Percentage*

45%	37.5%	12.5%	5%
-----	-------	-------	----



***Figure: Learners' Level in Using Digital Devices***

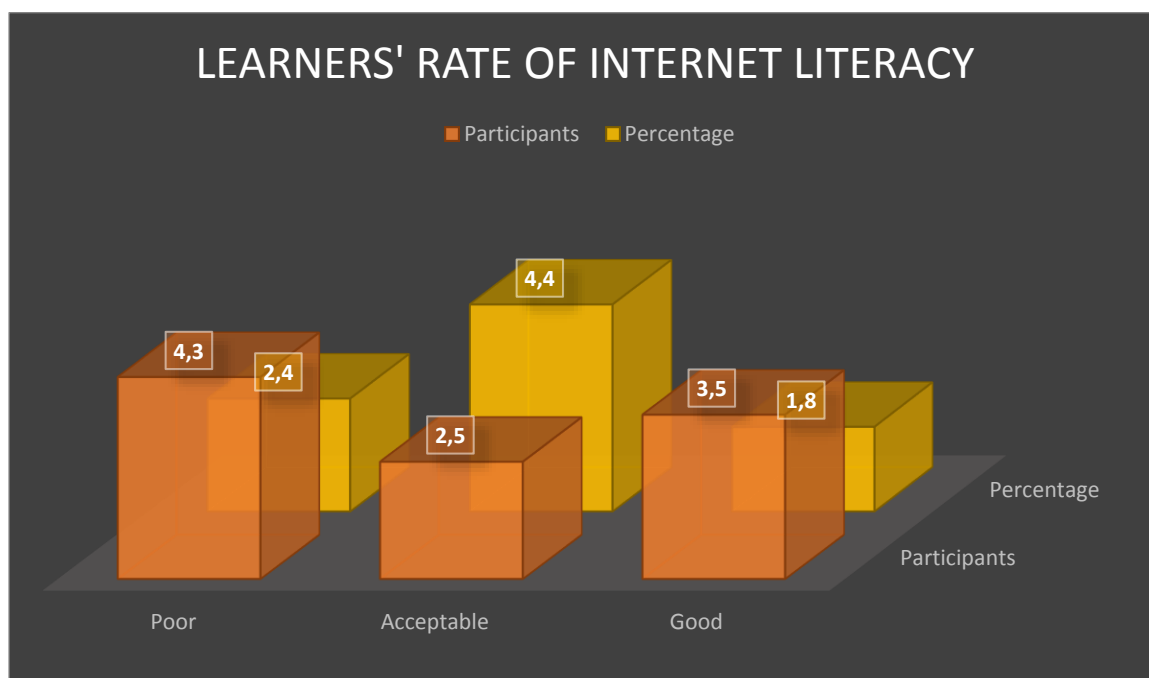
Unquestionably, It is extremely to know learners' level in using digital devices. After questioning learners, the majority of learners declared that their level is very low in using digital devices, they represent 45% of the whole sample, besides 30 learners who have low level in using ICT's. only 10 learners representing 12.5. % out of 100% are really good in using such soft tools. Unfortunately, a minority of 4 learners are really excellent and very competent in dealing with ICT's. thus there are various factors behind this distinction in levels. The researcher therefore had better identify the reasons and recommend solutions to maximize learners' level in using ICT's.

12- How would you rate your Internet literacy (the ability to use the Internet)?

Options: Poor    Acceptable    Good

***Table: Learners' Rate of their Internet Literacy***

<i>Options</i>	<b>Poor</b>	<b>Acceptable</b>	<b>Good</b>
<i>Participants</i>	38	21	21
<i>Percentage</i>	47.5%	26.25%	26.25%



**Figure: Learners' Rate of their Internet Literacy**

Actually, the above figure shows that learners who participate in the sample have multiple rate of their internet literacy. The table shows three main options: poor, acceptable, and good level. Most learners declared that their rate of internet literacy is poor level. 38 learners representing 47.5% have poor internet skills and are in need of a serious training to enhance their internet literacy. 21 EFL learners think that their internet literacy competencies are acceptable whereas 21 learners have good internet literacy level. Since the majority have poor internet literacy, the research had better suggest implications to foster learners' internet literacy.

13- Please indicate your level of frequency of using each of the followings by putting a tick (☐) in the box

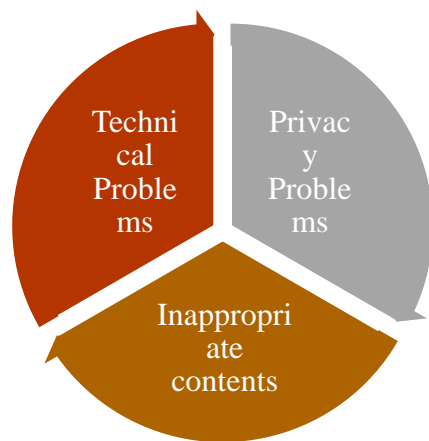
<b>Options</b>	<b>Frequently</b>	<b>Occasionally</b>	<b>Rarely</b>	<b>Never</b>
<b>1 Word processor</b>	19	15	45	01
<b>2 Email</b>	14	2	43	00

<b>3 World Wide Web</b>	33	10	37	00
<b>4 Language learning mobile app</b>	40	15	25	00
<b>5 Text chatting</b>	25	25	25	05
<b>6 Voice chatting</b>	26	18	26	10
<b>7 Video conferencing</b>	00	00	20	60

The aim behind this question is to deduce learners' level of frequency using digital resources. Interestingly, 19 EFL learners declared that they frequently use word process to write and draft home works and projects, 15 others occasionally chose word applications, while a majority of 45 learners rarely use it, only one learner opted for "never" options. Thus learners do not generally use word processing. However, concerning email services, 14 learners frequently text via emails, 02 learners occasionally use the electronic mail, the majority of 43 learners rarely use it, consequently learners do not use the service of electronic mail. Coming to world wide web, 33 EFL learners frequently use the web services, this indicates that they are familiar with using soft research engines, 10 learners occasionally use the WWW services, while 37 EFL learners rarely use it. In addition to that, half of the sample participants frequently use language learning mobile applications representing learners' frequency using digital smartphones, 15 EFL learners occasionally utilize mobiles, while 25 others rarely use it. As a result, the majority of learners are frequent with the use of mobile applications available at home. Furthermore, 25 EFL learners in Arab Messoud Secondary school use chatting messages via digital tools, 25 of them rarely use text messages while 25 others rarely use them. Moreover, 26 participants frequently use voice chatting, 18 occasionally utilize it, but 26 learners rarely apply voice messages while communicating with others, and 10 participants never use voice chatting. Finally, learners do not frequently use video conferencing, 20 participants rarely utilize video conference via various applications and yet the majority of learners never use them

this indicates that they are unfamiliar with some features and applications. It is clear that learners are more familiar with using mobile applications and word processing but they lack skills to use video conferences.

14- Have you ever encountered problems with digital devices or software? If so, how did you try to solve them?



**Figure: Problems while Using ICT's**

Most of participants declared that they frequently encounter challenging problems using digital devices and software. Learners mentioned various difficulties inside and outside the classroom basically related to technical challenges, privacy challenges as well as inappropriate contents, sometimes they lack knowledge of utilizing digital resources, others are shy to use them in front of audience, others do not know how to secure their personal profiles, some learners mentioned that they lack dealing with interrupting unappropriated contents. All learners agreed that there whatever the tool they are using, too much up to date updates, too much viruses and bad programs. Two learners mentioned that excessive use of digital tools in classroom create a kind of distraction, one other problem mentioned is that they cannot keep using their digital devices all the time.

According to participants, the always ask for parents help and feedback, they sometimes ask their classmates and teachers for extra help. The majority mentioned that they google the

problem and follow the guidance. Two learners mentioned that they change the digital tool with other ones. Unfortunately, the challenges hinder the process of developing learners' digital soft skills that's why the researcher ought to examine them and propose recommendations to minimize them.

#### Section Four: Fostering Learners' Digital Literacy Via PjBL

14) Have you participated in any Project-Based Learning activities that involved digital tools or technology? If so, could you describe your experience?

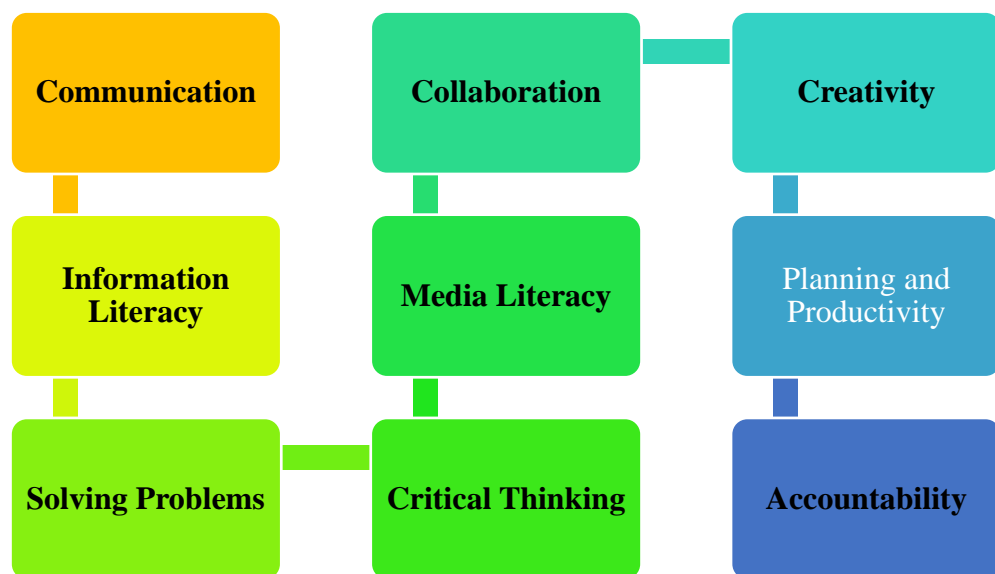
PjBL Experience	Digital Tools Used	Description
<ul style="list-style-type: none"> <li>• <b>Unit 1:</b> Recording Videos about the internet</li> <li>• <b>Unit 2:</b> Roleplay about Communication tools</li> <li>• <b>Unit 3:</b> Cleaning Day to Protect Nature</li> <li>• <b>Unit 4:</b> Profile of inventions</li> </ul>	<ul style="list-style-type: none"> <li>• PC</li> <li>• Data Show</li> <li>• Speakers</li> <li>• Tablets</li> <li>• Mobiles</li> <li>• Camera</li> <li>• Platforms</li> <li>• Google Workspace</li> <li>• Microsoft Word</li> </ul>	<ul style="list-style-type: none"> <li>• Interesting experience.</li> <li>• Enagaging Projects.</li> <li>• Outstanding themes.</li> <li>• Learners of other groups were highly motivated to participate/ see the projects.</li> <li>• Collaborative cooperative classroom settings.</li> </ul>

Participants were asked if they participated in project workshops and activities that systematically involved digital tools and ICT's, in fact they mentioned many examples during their middle school learning as well as first year learning, the researcher chose examples according to the syllabus. For the first unit, the majority mentioned recording videos about the internet since the major concern of unit one is intercultural exchanges via means of communication, unit two is entitled role-play about communication tools. More than that, unit three's project is about organizing a cleaning day with shootings and recording videos, the project of the last unit is about creating a profile of inventions (a

technological invention). Learners used various digital tools mainly: computers, mobiles, data show, speakers, tablets, camera, platforms, google workspace and Microsoft word. Furthermore, learners used interesting statements to express their feeling regarding their project experiences such as: interesting project, memorable workshops, an engaging activity, outstanding themes. Additionally, the researcher recognized through their responses that they were motivated to join groups and learn in collaborative cooperative settings.

**Figure: Examples of Learners ‘Experiences with PjBL that Promote Digital Tools**

15) What specific digital skills have you acquired through Project-Based Learning? How do you see these skills being valuable in your academic or professional future?



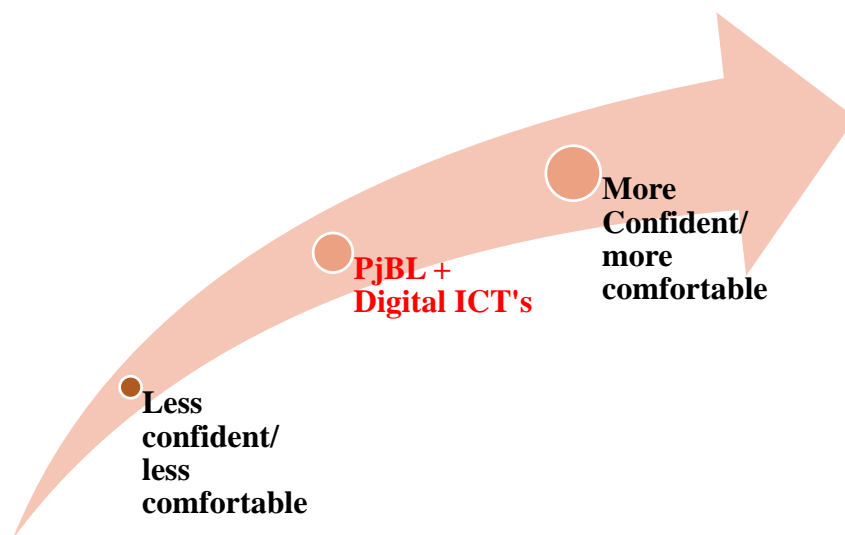
Actually, learners wrote various digital skills learned via project based learning. They all agreed that PjBL enhances their communicative abilities and skills, each and every time they prepare for project presentation, they train themselves to deliver a specific speech thus communication skills enhanced. Second, all participants declared that their information literacy level changed positively. They gained more knowledge about various issues. Third, planning and productivity skills were maximized by regular project planning procedures not only in

English language but in the majority of subject matters (Science, Physics, Literature.). the majority of learners learned how to use media resources via PjBL and others learned how to solve real life problems via critical creative thinking. Five learners wrote that they acquired self-accountability, flexibility and self-esteem via facing the audience of project workshop.

Learners believed that the above mentioned skills in the figure have a vital significant role in boosting their fundamental, academic as well as professional future. All of participants share the same perspective.

***Figure: Skills Acquired Via PjBL***

16) Reflecting on your PjBL experiences, how has your confidence in using various digital technologies evolved? Do you feel more comfortable now than before?



***Figure: Learners' Confidence after Implementing PjBL using Digital Technologies***

All learners stated that their confidence in using digital tools evolved through the implementation of PjBL. Thus they felt more confident and more comfortable in presenting their projects, since they practiced their works previous times before presenting the work to real audience. One learner stated that: “I was extremely shy to face audience, today and after working with my closest friends in the same project work group, I am ready to inspire learners in other groups”, therefore learners show more confidence in conducting projects. The arrow illustrates the shift towards being more comfortable learners via PjBL.

17) In your opinion, do you think that presenting projects foster your digital literacy?

Yes No

**Table: Project Based Learning Fosters Learners' Digital Literacy**

	<i>Options</i>	<i>Yes</i>	<i>No</i>
	<i>Participants</i>	<b>75</b>	<b>05</b>
<i>Percentage</i>		<b>93.75%</b>	<b>06.25%</b>

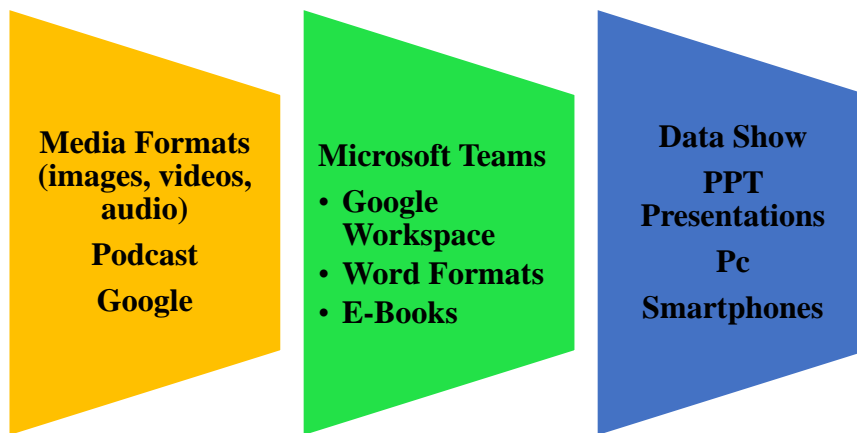
**Figure: Project Based Learning Fosters Learners' Digital Literacy**

When asking learners about their perspectives towards the impact of PjBl in maximizing their digital literacy, the majority of learners, exactly 75 participants believed that Pjbl played valuable role in enhancing their skills and abilities (approximately 94%), however a minority of 5 learners stated that PjBL does not really affect their digital skills.

18) If yes, would you explain it briefly please?

Learners mentioned that PjBL pushed them to use digital resources indirectly. As the teacher give them the topic of the project, they start searching using ICT's (e.g. the internet search engines Google). Each one collects specific title or part and then communicate with other members via communication tools (Facebook was frequently mentioned by learners), once they agreed they present it to their teacher for formative feedback, modifying where necessary learners present their project via digital tools basically: pc, data show, speakers, camera and microphones. Generally, they share their project in the social media networks. It is PjBL that encourages them to utilize ICT's and therefore to maximize their soft digital literacy.

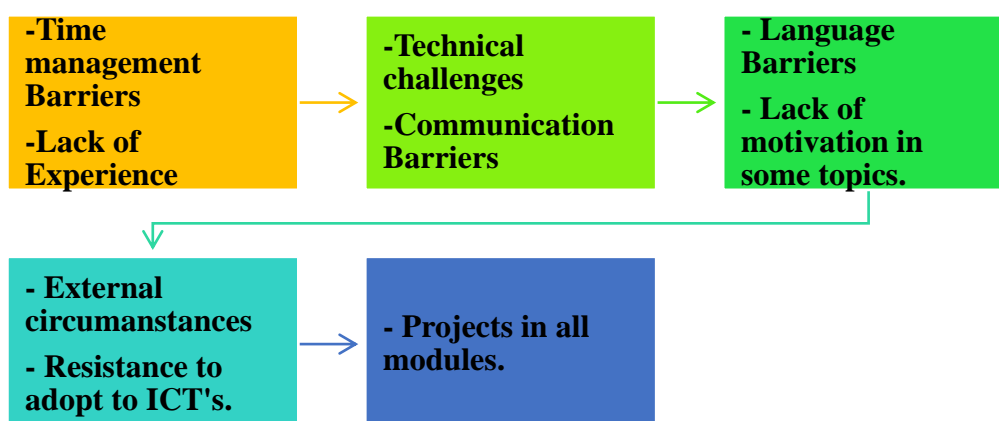
19) What are some digital resources you've discovered through Project-Based Learning that you believe every digitally literate person should be aware of?



**Figure: Digital Resources Discovered by Learners via PjBL**

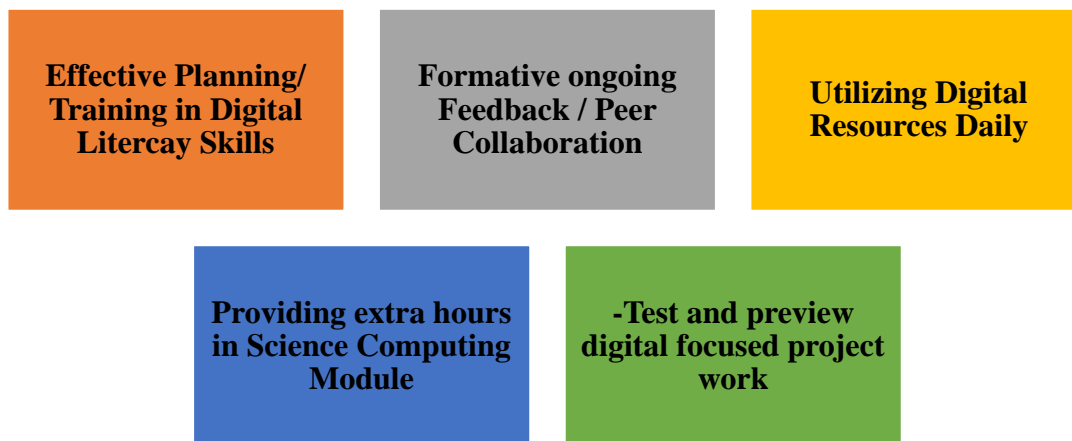
Learners stated directly that every digital literate learner must use the following digital resources and tools: media formats via printing images, recording audios, podcast and videos, as well as using Google services and Microsoft services (Word, Excel, Power Point Presentation) besides the use of data show, projectors, laptops and smartphones. They mentioned that PjBL provides numerous opportunities to use such resources and tools rationally.

20) Were there any challenges you faced during digital-focused project work, and how did you overcome them? What did you learn from these challenges?



**Figure: Challenges Learners Faced during Digital Focused Project Work**

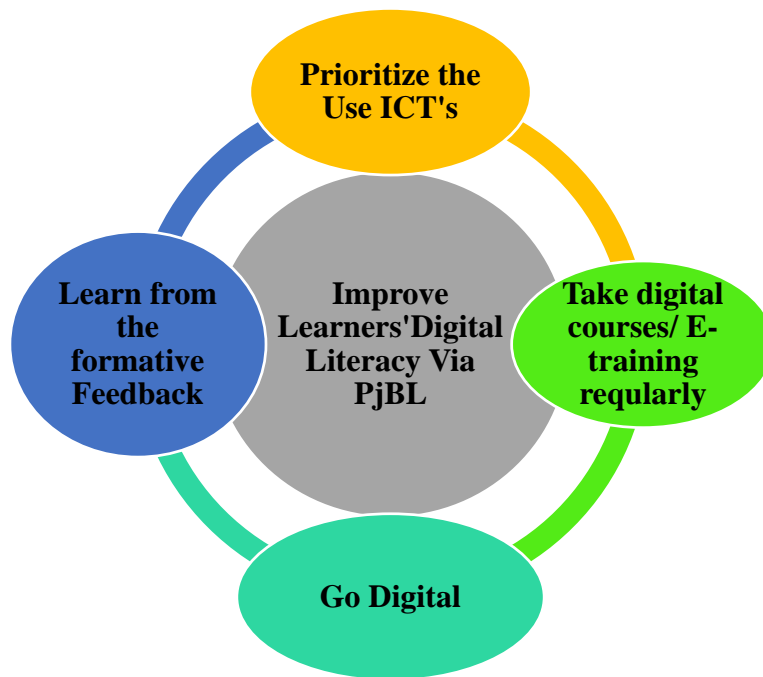
All the participants mentioned that they encountered different challenges while implementing digital-focused project work such as time management in overcrowded classes, lack of experience in using ICT's, technical challenges related to the digital tool itself, too many projects almost in all modules, as well as language barriers and being demotivated with some topics. Some learners added resistance to up to date technologies evolving daily, one learner wrote external circumstances is effecting my skills. Learners declared that they wrote all their challenges in their daily school journals so teachers may help them. Some discussed the challenges with their parents.



***Figure: Recommendations to Overcome Challenges During Digital Focused Project Work***

Remarkably, “being flexible learner” is the lesson learned by all learners while encountering challenging problems to implement Pjbl. They said that they easily switch to plan (B) all the times. Additionally, they asked for formative ongoing feedback of their teachers. The following figure illustrates their recommendations.

21) What do you recommend to foster digital literacy via PjBL?



***Figure: Fostering Learners' Digital Literacy Via PjBL***

All the participants suggested various solutions to foster their digital literacy via PjBL. First, they declared that all secondary schools had better prioritize the effective use of ICT's especially in the light of digital era, second some learners suggested to have extra courses be it free or private to enhance their soft skills, "go digital" was a frequent expression used by the majority of the sample. Additionally, they recommended taking the teacher's remarks into consideration (Formative Feedback).

All in all, learners' questionnaire aims to gather data concerning the impact of PjBL in fostering learners' digital literacy. It gathers data about learners' attitudes and perspectives towards the urgent need of prioritizing both PjBL and Digital literacy. It also examines the final outcome of project workshops to promote 21<sup>st</sup> century skills and competencies. It highlights the challenging problems encountered by participants and it gathers feedback to improve the quality of PjBL. Thus data founded is going to be analyzed in detailed study.

### **Learners' Experiment**

Systematically, the impetus behind the research study was the shift towards digitalization of education especially in post Covid19 era thus, the research aimed at examining the impact of PjBL in maximizing learners' digital soft skills, this study will accomplish this aim by meeting the following objective: To examine the impact of PjBL in fostering learners' digital literacy.

### **Purpose and Research Question (s):**

Evidently, the primary major objective of the research study is to investigate carefully the impact of Project Based Learning (PjBL) in maximizing learners' digital literacy. Thus, questions have been raised concerning the role of PjBL in enhancing learners 'soft and digital

skills. consequently, the research attempts to successfully address a host of educational pedagogical questions, the primary major question is:

- ✓ Do Project-Based Learning (PjBL) foster first year SE learners' digital literacy skills?

Interestingly, other minor research questions are:

- ✓ How does the integration of technology and digital tools (in Foreign Languages Laboratory) in Project-Based Learning (PjBL) presentations impact learners' digital literacy acquisition?
- ✓ To what extent does the duration and intensity of Project-Based Learning (PjBL) preparations influence the digital literacy outcomes of first year SE learners?
- ✓ Do different project work types or approaches within Project-Based Learning (PjBL) have varying impacts on maximizing learners' digital literacy?

### **Hypothesis of the experiment:**

The researcher hypothesized that PjBL fosters learners' digital literacy in Secondary education. Therefore:

**1. Null Hypothesis:** The implementation of PjBL does not foster learners' digital literacy.

**2. Alternative Hypothesis:** The implementation of PjBL fosters positively learners' digital literacy.

In addition to that, it is hypothesized that:

- ✓ The integration of technology and digital tools (in Foreign Languages Laboratory) in Project-Based Learning (PjBL) presentations impact positively learners' digital literacy acquisition.
- ✓ The more or the less the duration and intensity of Project-Based Learning (PjBL) preparations is, the more or the less learners develop their digital literacy.
- ✓ Different project work types and approaches within Project-Based Learning (PjBL) have varying positive impacts on maximizing learners' digital literacy.

## **Experimental Design:**

### **1. The Selection of Variables**

Actually, the researcher needs to assess and measure any progress or enhancement in learners' digital literacy via the implementation of PjBL thus:

- **Dependent Variable:** what to assess and measure, in this context it is learners' digital literacy.
- **Independent Variable:** PjBL, which is the factor or intervention that is manipulated differently by the instructor to influence the development of learners' digital literacy.
- **Manipulation the Independent Variable:**
  - Incorporate technology based setting in the foreign languages laboratory.
  - Extra sessions (time duration) in the laboratory.
  - Design projects that need digital tools and resources.
  - Creating Digital virtual group for project planning.
  - Extra feedback and reflection on the use of digital platforms, applications and resources.
  - Adaptation of themes mentioned in the course book.
  - Drafting ideas of projects using computers and programs.
  - Watching previous years' projects (which are technology based) via the use of digital tools to motivate learners to use them.
  - Rewarding the use of digital tools, extra marks for the group who will use any digital resource or device safely.

### **2. The Control Group:**

In this research experiment, the control group consists of forty 40 learners in the secondary school of Arab Messoud Chechar in kenchela, they are in their 1<sup>st</sup> year scientific

stream, in fact the number of 2<sup>nd</sup> year learners are not enough since various streams are there, and 3<sup>rd</sup> year learners are in charge of preparing for their Bac examination that's why the choice falls into first year learners of the scientific stream. Purposefully, the control group serves as a reliable baseline against which the researcher can easily compare the final scores and outcomes and of the experimental interventions. Worthy noted that these forty 40 learners have been selected randomly from the same secondary school "Arab Messoud Secondar School", from scientific stream as the experimental group, the rationale is to ensure that the two groups are comparable in terms of their level (First year learners), stream (Scientific streams), educational background (Same schools, same teachers), same age, and same learning settings and conditions. Unfortunately, the control group will not be exposed to the specific treatment, the manipulation of PjBL will certainly differ, in addition to that their performance will be closely monitored. Rationally, the researcher will use confidentially the final outcome to compare the control group's results with those of the experimental group, the primary aim is to assess the effectiveness of PjBL and determine critically whether any observed improvements can be attributed to the experimental treatment after analyzing the findings. In short, it is via the experiment, the researcher ensures the validity and reliability of the final research findings.

### **3. The Experimental Group**

Unquestionably, as the number of the control group, the experimental group consists of forty 40 secondary school learners, in the scientific stream, first year learners in Arab Messoud Secondary School Chechar in kenchela. Remarkably, learners were rationally selected to participate in the experimental treatment of the impact of PjBL in maximizing learners' digital literacy. Purposefully, unlike the control group, the experimental group will be exposed to the unique treatment and manipulation of HQ PjBL aiming to test the research hypothesis. Worthy noted that the HQ PjBL intervention include motivating educational strategies, technology-based tools in Foreign Language Laboratory in the Secondary School (1 hour per week for a

year see the ethical approval Demand and photos in the Appendices), curriculum adaptations and modifications, furthermore, the primary aim is to carefully assess the ongoing formative PjBL progress, monitor learners' performance, and evaluate formatively learners' outcomes of these forty 40 learners. All in all, the implementation of the experimental process will identify critically if the treatment has valuable significant impact on maximizing learners' digital soft skills. Without the experimental group, it is difficult to evaluate critically the effectiveness and potential merits of PjBL in fostering learners' digital literacy.

### **Data Collection:**

Evidently, in this context, data are collected via measurements of learners' digital literacy through tests (paired sample T test for both groups to test the differences in scores before and after the experiment for each group separately in addition to independent sample T test for both groups to compare their results and the differences between them in pre and post stages). Worthy noted that the test used is a reliable standardized international test designed critically to learners to assess formatively their digital literacy. It is called: **NORTHSTAR Digital Literacy Assessment Project (NDLAP)**. It highly motivates learners since the use of various educational paralinguistic audio visual resources. (see appendices)

### **Description of the Test**

#### **Northstar Digital Literacy Assessment Project (U.S.A)**

Interestingly, Jen Vanek (2013) described the "Northstar Digital Literacy Assessment Project" in his article "Northstar Digital Literacy Assessment Project: A community Engagement Initiative" as a vital measure to test the progress in learners' digital literacy skills. (young and adults mainly) designed by a nonprofit organization in Minnesota, United States.

Vanek (2013) declared that in 2010, various leaders supported digital literacy training for adults mainly, however they disagreed about what exact skills and abilities of digital literacy to be fostered, each participant, libraries, community-based organizations, and state agencies, and educational programmers were all describing digital literacy skills differently. The aim behind having a unified standardized test for all states is the lack of shared understanding of what digital skills need to be maximized, what to learn, and how to learn it, (“Northstar basic computer skills certificate: History and purpose,” 2012).

According to Vanek (2013) the **Saint Paul Public Library** collaborated purposefully with the **St. Paul Community Literacy Consortium**, organized a useful taskforce of practitioners to identify clearly and basically a unified definition of **Digital Literacy for numerous representatives belonging to different organizations, to name few:** nonprofit community-based agencies, public and academic libraries, Minnesota Department of Education, Minnesota Literacy Council, Department of Employment and Economic Development, workforcedevelopment agencies, and Adult Basic Education (ABE) professionals ( including Vanek himself). They collaborated and worked together for several months, finally the taskforce designed successfully the “Northstar Digital Literacy Standards. (“Northstar basic computer skills certificate: History and purpose,” 2012).

Consequently, the work ended the design with the “Northstar Digital Literacy Assessment Project” which is used not only in St. Paul but across the Unites states of America, and now it moved from local states to international level. (“Northstar basic computer skills: Sponsoring sites,” 2012).

He added that the skills and abilities included in the assessment are extremely essential to ensure learners’ growth, academic success and career professionalism, with the target skills

they will succeed in 21<sup>st</sup> Century education, he added that they are the basic essential computing skills needed to use computers, internet, and devices for educational aims, academic works and search. (“Northstar basic computer skills certificate: History and purpose,” 2012, “Northstar basic computer skills certificate: Standards,” 2012).

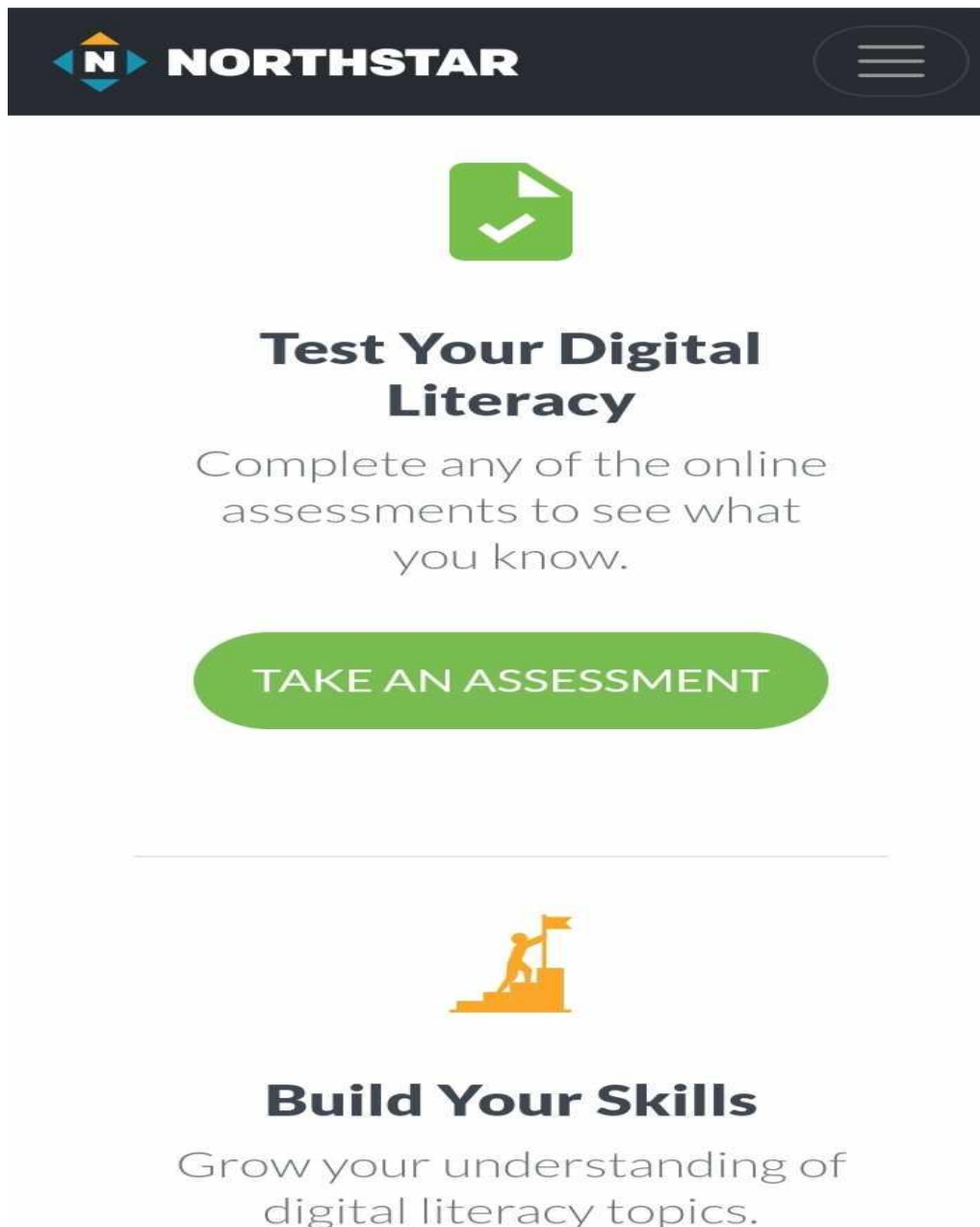
Furthermore, what is special concerning the assessment modules is that they are free, and available without registration, and identify the level of the test takers, in this context Vanek (2013) stated clearly that:

"The assessment modules are unique in that they are completely free, interactive, and developed specifically for the very learners who most desperately need to understand their current digital literacy skills and learning needs" p.4

thus it purposefully identifies the competency of the test takers before and after the test easily. (“Northstar basic computer skills certificate: Standards,” 2012). The assessment consists of the following self-guided modules:

1. Basic Computer Use
2. Internet, Windows Operating System
3. Email
4. Word Processing
5. Microsoft Word
6. Microsoft Power Point
7. Social Media
8. Information Literacy (“Northstar basic computer skills certificate: Assessment homepage,” 2012).

Doubtlessly they are graphically found in the homepage of the assessment project website ([www.digitalliteracyassessment.org](http://www.digitalliteracyassessment.org). ) , therefore learners can easily access the assessment modules through the open online portal.(See Appendices and figures)



**NORTHSTAR**

**Test Your Digital Literacy**

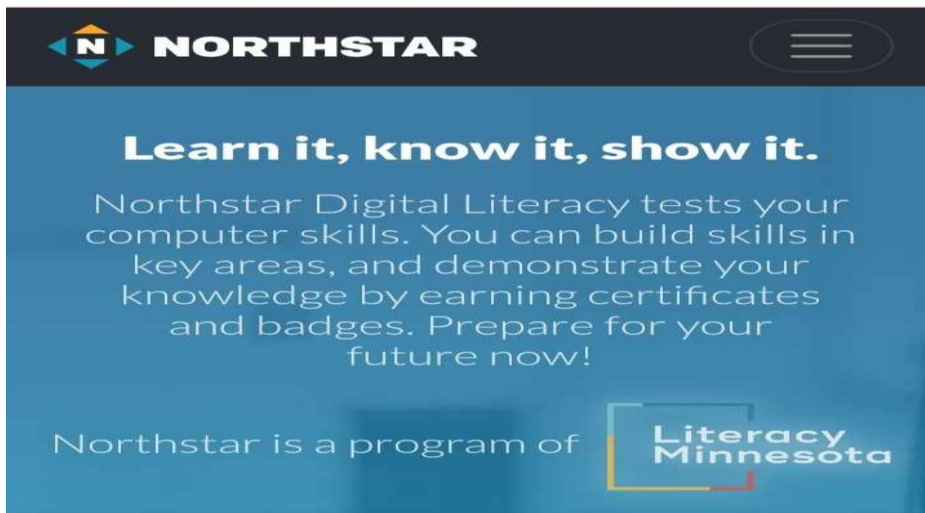
Complete any of the online assessments to see what you know.

**TAKE AN ASSESSMENT**

**Build Your Skills**

Grow your understanding of digital literacy topics.


*Figure: Northstar Digital Literacy Assessment: purpose, [www.digitalliteracyassessment.org](http://www.digitalliteracyassessment.org), 2023*



**NORTHSTAR**

**Learn it, know it, show it.**

Northstar Digital Literacy tests your computer skills. You can build skills in key areas, and demonstrate your knowledge by earning certificates and badges. Prepare for your future now!

Northstar is a program of 



## **Test Your Digital Literacy**

Complete any of the online assessments to see what

*Figure: Northstar Digital Literacy Assessment: History and purpose, [www.digitalliteracyassessment.org](http://www.digitalliteracyassessment.org), 2023*

# About Northstar

Northstar Digital Literacy defines basic skills needed to perform tasks on computers and online. Online, self-guided modules assess the ability of individuals to perform tasks based on these skills.

Included are [basic computer digital literacy standards](#) and modules in three main areas:

- **Essential Computer Skills** - Basic Computer Skills, Internet Basics, Using Email, Windows OS, Mac OS
- **Essential Software Skills** – Microsoft Word, Excel, PowerPoint, Google Docs
- **Using Technology in Daily Life** - Social Media, Information Literacy, Career Search Skills, Accessing Telehealth Appointments, Supporting K-12 Distance Learning, Your Digital Footprint.

Northstar was developed in response to the needs of job seekers who may lack the

*Figure: Northstar basic computer skills certificate: Standards,2023 /*

[www.digitalliteracyassessment.org](http://www.digitalliteracyassessment.org)

Basically, the target skills are:

## The Test Basic Skills (See Appendices for paralinguistic Materials)

*Table N\*: Basic Computer Skills Northstar Digital Literacy Test*

Basic Computer Skills		Yes i can	No i can not
1.	Distinguish between different types of devices (tablets, desktop and laptop computers).		
2.	Identify specific computer hardware (system unit, monitor, printer, keyboard, mouse or touchpad, ports, touchscreen).		
3.	Log on to and shut down a computer.		
4.	Demonstrate knowledge of keys on keyboard (Enter, Shift, Control, Backspace, Delete, Arrow Keys, Tab, Caps Lock, Number Lock).		
5.	Identify types of mice: mouse and touchpad.		
6.	Identify mouse pointer shapes and the functions they represent (spinning wheel (loading), iBeam (text), arrow (basic clicking), hand pointer (clickable links)).		
7.	Demonstrate knowledge and appropriate use of mouse clicks (right-click, left-click, and double click).		
8.	Drag and drop.		
9.	Utilize common controls for screen interaction (selecting check boxes, using drop-down menus, scrolling).		
10.	Access and control audio output features (volume, mute, speakers and headphones).		
11.	Identify icons on desktop.		
12.	Demonstrate ability to trash and retrieve items using the trash or recycle bin.		
13.	Demonstrate understanding that it is possible to customize a computer for increased accessibility (customizing a mouse for left-handed use and sensitivity, and changing screen resolution on a monitor).		
14.	Demonstrate understanding that software programs are upgraded periodically to fix bugs and increase utility, and that different versions may be installed on different computers.		
15.	Identify mechanisms for storing files (flash drives, hard drives, cloud-based storage).		
16.	Identify whether or not a computer is connected to the internet.		
17.	Identify and locate camera and mic on laptops, tablets.		

<b>18. Turn computer and monitor on and off.</b>		

The table shows the basic computer skills chosen by the Northstar Digital Literacy group, they are the most essential abilities learners are really in need of, here are some examples from the table: opening/switching the computer, identifying mechanism for storing files, locating camera, mic, and laptops, access and control computing features, as well as demonstrating computer hardware (system unit, printer, monitor,). Learners must start with this essential step.

*Table N\*: Internet Basics Northstar Digital Literacy Test*

c

<b>Internet Basics</b>	<b>Yes I can</b>	<b>No I can not</b>
<b>1. Identify the different ways a person can connect to the internet.</b>		
<b>2. Demonstrate knowledge of browsers and identify commonly used browsers.</b>		
<b>3. Demonstrate familiarity with website structure (e.g., landing pages, internal pages).</b>		
<b>4. Identify top-level domains (e.g., .edu, .com, .org).</b>		
<b>5. Demonstrate understanding of how to use browser tools and settings to protect privacy (e.g., private browser windows, clearing search history, and declining to save passwords on shared computers).</b>		
<b>6. Demonstrate understanding of when it's safe and appropriate to share personal, private, or financial information (e.g., recognizing phishing attempts, identifying unsecured websites).</b>		
<b>7. Identify ways to protect your devices (e.g., anti-malware software, recognizing possible virus attacks).</b>		
<b>8. Demonstrate to a website that you are a legitimate user using CAPTCHA or other verification methods.</b>		
<b>9. Fill out an online form.</b>		
<b>10. Identify address bar and demonstrate understanding of its functionality.</b>		

<b>11. Identify common browser tools and icons (e.g., favorites, downloads, refresh, and back).</b>		
<b>12. Perform internet search using clear parameters (terms and filters).</b>		
<b>13. Demonstrate ability to scroll up and down a page and left and right on a page.</b>		
<b>14. Identify and make use of common website interactions (e.g., play buttons, hyperlinks).</b>		
<b>15. Identify and work with tabs and windows.</b>		
<b>16. Enable a specific pop-up window.</b>		
<b>17. Use shortcut keys, or menu or mousing equivalents, to support user experience on the web (e.g., zoom, find text). Identify and locate camera and mic on laptops, tablets.</b>		
<b>18. Turn computer and monitor on and off.</b>		

The table is related to internet basics. Illustrations include learners' ability to Perform internet search, to connect with people, to identify websites structures, to know browser tools, browsers and search engines, and privacy protection issues. Worthy noted that internet skills are set of abilities to utilize the net rationally and safely.

*Table N\*: Email Northstar Digital Literacy Test*

<b>Using Email</b>	<b>Yes I can</b>	<b>No I can not</b>
<b>1. Define email and identify common email clients.</b>		
<b>2. Tell the difference between a URL and an email address.</b>		
<b>3. Register for a new email account, using a professional user name and a strong password.</b>		
<b>4. Log into email.</b>		

<b>5. Create and send an email, including recipient address, subject, and message.</b>		
<b>6. Open and reply to an email.</b>		
<b>7. Understand why and how to reply, reply all, and forward an email.</b>		
<b>8. Add an attachment to an email.</b>		
<b>9. Open and download an email attachment.</b>		
<b>10. Manage email: Delete and retrieve messages, identify spam, and unsubscribe from unwanted mailing lists.</b>		
<b>11. Understand basics of email etiquette (using salutations and closings, avoiding all caps, making use of the subject line, understanding when it's ok to forward messages, knowing who to cc or bcc, etc.).</b>		
<b>12. Use caution when opening or replying to an email from an unfamiliar source, downloading attachments, following links, or giving out personal information.</b>		
<b>13. Sign out of email, especially when using shared computers.</b>		

Interestingly, the above table illustrates the e-mail skills. They are vital abilities to communicate virtually via electronic mail. It includes basically: creating e-mail account, having e-mail address, e-mail clients, sending and receiving e-mails, adding attachments to our e-mails, downloading attachments, as well as managing the in box mail. only via mastering the e-mail skills, learners may communicate effectively and appropriately.

***Table N\*: Windows Skills Northstar Digital Literacy Test***

Windows		Yes I can	No I can not
1.	Identify the operating system used by a computer.		
2.	Identify the parts of the Windows 10 interface (desktop, taskbar, etc.).		
3.	Demonstrate knowledge of the Windows Start Menu, including Get Help.		
4.	Use Cortana to search for a file, program, or document.		
5.	Identify icons, functions, and any file extensions related to basic office software (Word, PowerPoint, and Excel) and default Windows programs (Microsoft Edge, Windows Defender, etc.).		
6.	Start and exit programs.		
7.	Minimize and maximize windows.		
8.	Open, close and switch between windows.		
9.	Demonstrate knowledge of Windows File Explorer and identify drives on the computer, as well as cloud storage services (e.g., OneDrive).		
10.	Move documents and files, including to and from Recycle Bin.		
11.	Log off, restart, and shut down a computer.		
12.	Use Settings to uninstall or modify apps.		

Doubtlessly, the above table mirrors the windows skills needed by learners. Examples include the ability to identify systematically the operating system, the parts of windows 10 interface, and how the windows start. Besides starting/ existing a program, installing, uninstalling, or modifying a specific application. In deed windows skills are very important skills to go digital.

**Table N\*:** Microsoft Word Skills Northstar Digital Literacy Test

Microsoft Word	Yes I can	No I can not
1. Open a new or existing document.		
2. Identify the parts of the Word window, including the Ribbon, Status Bar and Quick Access Toolbar.		
3. Save a document, being intentional about name and location.		
4. Identify file extensions that can be opened by Microsoft Word.		
5. Use Spelling and Grammar check.		
6. Format text: size, color and font type.		
7. Set text spacing and alignment. 8. Apply bullets and automatic numbering.		
9. Undo the previous action.		
10. Cut, copy and paste.		
11. Modify page layout, including margins and orientation		
12. Print.		
13. Close a document.		
14. Insert objects into a document, including images, shapes, hyperlinks, and tables.		

The table is about Microsoft Word skills. They were the primary concern of learners while collecting data for their project works. Examples mentioned clearly by the Northstar Digital Literacy test include: the ability to open/name/modify a document, be it old document or new one. In addition to the skill of identifying the Ribbon, status Bar and Quick access toolbar. Furthermore, saving or modifying a document present another essential Microsoft skill. Changing the format text (font type, page, color, style, size), printing and closing a document are as much significant as the already mentioned Microsoft skills.

***Table N°: Microsoft Power Point Skills Northstar Digital Literacy Test***

<b>Microsoft PowerPoint</b>	<b>Yes I can</b>	<b>No I can not</b>
<b>1. Open a new or existing PowerPoint presentation.</b>		
<b>2. Identify parts of the PowerPoint screen</b>		
<b>3. Insert new slides, duplicate, or reuse slides.</b>		
<b>4. Manage text (insert, delete, copy, cut and paste, drag and drop, format, and use spellcheck).</b>		
<b>5. Apply or change a theme.</b>		
<b>6. Use zoom control.</b>		
<b>7. Insert items into a presentation, resize, and adjust them</b>		
<b>8. Add a textbox, adjust it, resize it, or delete it.</b>		
<b>9. Change the view</b>		
<b>10. Insert, delete, and move slides using slide navigation pane.</b>		
<b>11. Use the quick access toolbar.</b>		
<b>12. Apply and customize slide transitions (select, preview, add sound, automatic advance).</b>		
<b>13. Understand the basics of PowerPoint etiquette (limited text, text that stands out on background, clear titles).</b>		

<b>14. Play a slideshow, advance through the slides, and end slideshow (using screen toolbar features).</b>		
<b>15. Save a presentation as a .ppt, .pdf, .png, etc.</b>		
<b>16. Create handouts.</b>		
<b>17. Print a presentation.</b>		

Unquestionably, the table indicates Microsoft Power Point Skills chosen by the Northstar Digital Literacy Test. Learners are frequent with presenting projects via power point presentations, therefore the list included creating/ and opening a new presentation, managing text (linguistic material and paralinguistic material). Besides, the ability to change themes, using the Zoom control, modifying slides and understanding the basics of power point presentation etiquette. In addition to saving and printing presentations. Worthy noted that learners are highly interested by presenting projects via power point creative presentations.

**Table N\*: Social Media Skills Northstar Digital Literacy Test**

<b>Social Media</b>	<b>Yes I can</b>	<b>No I can not</b>
<b>1. Identify different types of social media and their primary functions (especially Facebook, LinkedIn, Instagram, Twitter).</b>		
<b>2. Create a new account on a social media network and log in.</b>		
<b>3. Recognize information posted on social media networks that may present a risk to you (user as consumer of information).</b>		
<b>4. Demonstrate knowledge of managing “friends” on Facebook: adding friends, accepting/declining “friend” requests, and the difference between that and “following” someone.</b>		
<b>5. Understand and change privacy settings.</b>		

<b>6. Demonstrate an understanding of the consequences of “liking” or commenting on something.</b>		
<b>7. Share and delete content, including photos, videos, and links.</b>		
<b>8. Identify information that is unwise to post and/or upload on a social media (too much personal sharing, inappropriate photos/comments).</b>		
<b>9. Distinguish between public and private “spaces” on social media sites (e.g., Facebook messages vs. Facebook timeline).</b>		
<b>10. Post, share, like, or comment on content.</b>		
<b>11. Demonstrate knowledge of the permanence of anything posted on the internet.</b>		

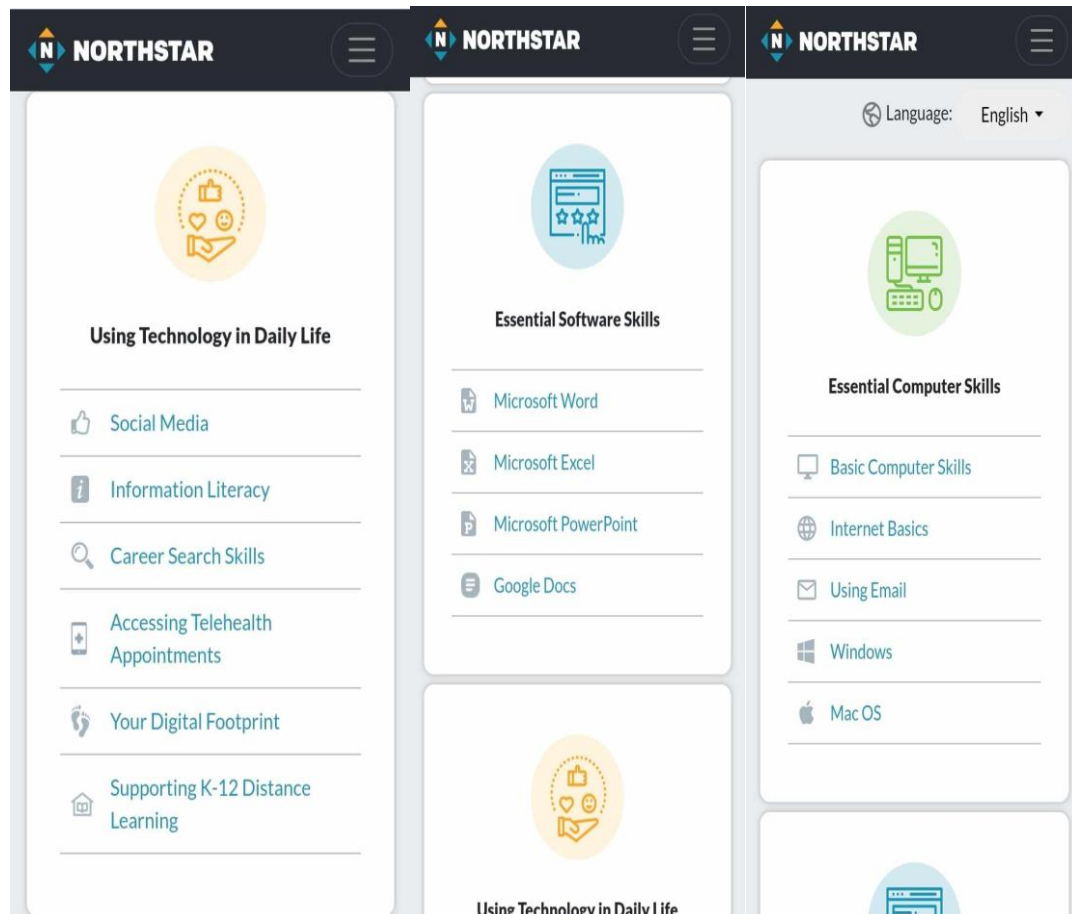
The table is entitled social media skills. In fact, learners need them to maximize their communicative competencies. Examples include: identifying types of social media and examples (Facebook, twitter, Instagram). Creating account and log in, in addition to responding to information posted, by liking, commenting or sharing, besides sending and receiving friendship invitations. These are the basic social media skills chosen by the Northstar Digital Literacy Test project.

**Table N\*: Information Literacy Skills Northstar Digital Literacy Test**

<b>Information Literacy</b>	<b>Yes I can</b>	<b>No I can not</b>
<b>1. Define a problem, formulate a question, or identify a decision that needs to be made</b>		

<b>2. Identify the purpose for accessing information (how the information will help solve the problem, answer the question, make a decision, or accomplish a goal or objective).</b>		
<b>3. Define the kind of information needed to complete the task.</b>		
<b>4. Identify types and formats of information found online (articles, databases, images, videos, etc.).</b>		
<b>5. Plan steps required to solve the problem or accomplish the task.</b>		
<b>6. Recognize the costs, in time or money, and benefits of accessing different sources of information (article, newspaper, consumer reports).</b>		
<b>7. Demonstrate use of efficient search strategies to hone in on relevant information.</b>		
<b>8. Locate relevant information in media found online, including text, video, images, etc. Locate the source of the information.</b>		
<b>9. Make use of hyperlinks to follow desired/required path of information.</b>		
<b>10. Demonstrate basic understanding of use of non-Internet sources of information (personal documents, Excel spreadsheets, etc).</b>		
<b>11. Discern between relevant and non-relevant information in an information source and select the information that addresses the issue that motivated the search.</b>		
<b>12. Integrate new information into current knowledge and use it to support understanding, views, perspectives, or opinions.</b>		
<b>13. Act on information to solve basic problems or answer a question.</b>		
<b>14. Select appropriate format for sharing information, based on audience and purpose, and distribute to intended audience.</b>		
<b>15. Evaluate the result of gaining/using the information. Was the question answered? Was the problem solved? Was a better decision made? Was a goal or objective met?</b>		

Purposefully, the table illustrates the information literacy skills chosen by the Northstar Digital Literacy Test, initially they include defining a problem, planning, formulating a question, and searching for information using articles, images, videos and databases, the aim is to plan to solve complex problems. Besides using efficient searching strategies, using and evaluating the results.



***Figure: Northstar basic computer skills and essential skills: Assessment homepage, 2023***

In short, The Northstar Digital Literacy Assessment Project is a widely reliable and recognized tool used to assess a young learner's digital literacy skills and abilities. Systematically it aims to evaluate and certify learners' proficiency in various digital soft skills. Furthermore, the assessment test is free and adaptive, evidently it adjusts the difficulty of the tasks according to the user's performance.

## Analysis of Experiment / Analysis of the Paired Sample T-Test

### Testing Scores Before and After Implementing PjBL to maximize Digital Literacy

#### 1. Learners' Scores in Basics Computer Skills Total = 18

Number of learner	Score Before the PjBL	Score After the PjBL
01	05	16
02	08	15
03	07	14
04	06	12
05	03	08
06	02	09
07	09	16
08	11	18
09	05	09
10	04	08
11	10	16
12	08	13
13	13	18
14	05	16
15	04	17
16	06	16
17	11	18
18	08	14
19	04	09
20	10	10
21	09	17
22	02	14
23	01	12
24	06	16
25	05	14
26	08	17
27	02	11
28	04	14
29	05	13
30	05	15
31	10	18
32	09	14
33	04	13
34	11	14
35	02	12
36	06	13
37	05	16
38	07	15
39	11	18

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Learners' Scores in Basics Computer Skills	Score After the PjBL	14.0000	40	2.90887	17.958	39	0.000
	Score Before the PjBL	6.3500	40	3.08470			

The table presents the results of a Paired Samples Test to study the scores before and after implementing the Project-Based Learning (PjBL) approach to enhance digital literacy. This test is used to compare differences between the pre-implementation and post-implementation values.

We can observe that the mean score for students after implementing the Project-Based Learning (PjBL) approach is 14.0000, while the mean score before implementing PjBL is 6.3500. It's evident that the mean after implementation is significantly higher than the mean before implementation, indicating a substantial improvement in students' performance.

Additionally, we notice that the standard deviation for scores after implementing PjBL (2.90887) is lower than the standard deviation for scores before implementation (3.08470). This suggests that the distribution of scores after implementing PjBL is more consistent compared to scores before implementation.

The t-value is 17.958, which is used to estimate the difference between the means. A higher t-value indicates a significant difference between the means, and in this case, the value is significantly high.

As for the p-value (or sig), it equals 0.000, which is less than the significance level of 0.05. This means that there is strong statistical evidence supporting a significant and meaningful difference between the scores after implementing PjBL and the scores before implementation. Therefore, it can be concluded that there is a statistically and practically positive effect on students'

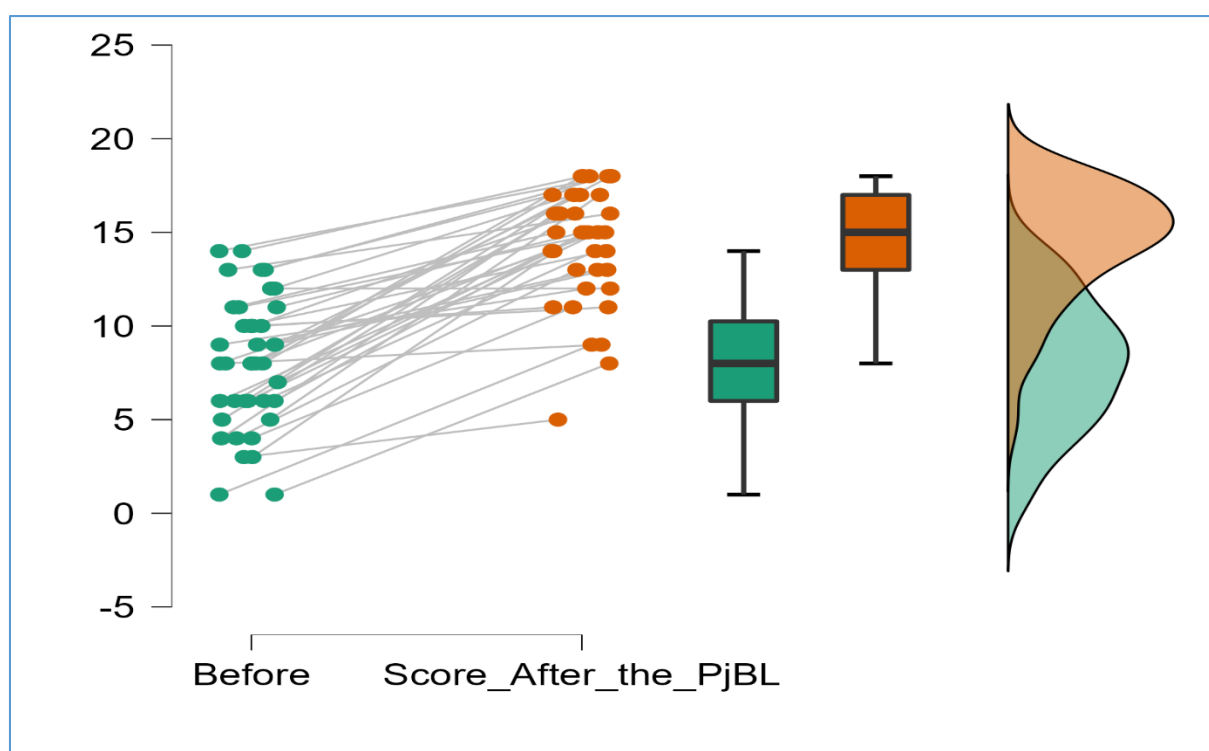
performance after implementing the Project-Based Learning approach to enhance digital literacy.

**2. Learners' Score in Internet Basics Total= 18**

<b>Number of learner</b>	<b>Score Before the PjBL</b>	<b>Score After the PjBL</b>
01	09	13
02	11	15
03	1	08
04	6	15
05	9	12
06	10	14
07	8	18
08	13	17
09	3	15
10	4	13
11	10	16
12	8	15
13	12	17
14	11	15
15	13	16
16	12	12
17	14	18
18	09	13
19	10	11
20	06	17
21	03	05
22	08	09
23	04	16
24	10	11
25	09	17
26	11	15
27	06	14
28	04	11
29	06	15
30	08	18
31	14	18
32	08	18
33	05	17
34	01	09
35	06	14
36	07	15
37	06	16
38	08	14

39	13	18
40	05	16

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in <b>Internet Basics</b>	14.4000	40	3.07012	11.878	39	0.000
	Score Before the Learners' Score in <b>Internet Basics</b>	8.0250	40	3.45289			



**JASP 0.16Source**

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in <b>Internet Basics</b>	14.4000	40	3.07012	11.878	39	0.000
	Score Before the Learners' Score in <b>Internet Basics</b>	8.0250	40	3.45289			

Source: Conducted using SPSS V.28

The table above reflects the results of the Paired Samples Test, showing the evaluation of scores before and after implementing the Project-Based Learning (PjBL) approach to enhance digital literacy, with a specific focus on "Learners' Score in Internet Basics." Here is an analysis of the results:

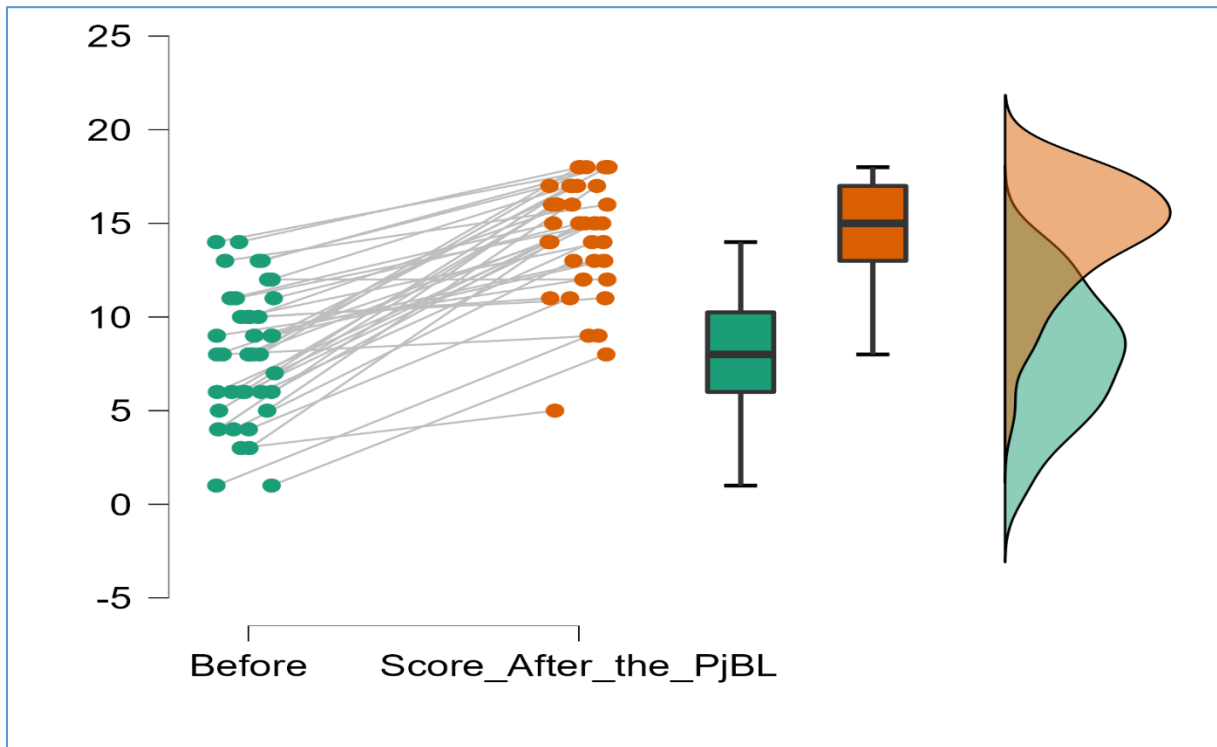
**01. Differences in Means:** The mean score of students in Internet Basics after implementing PjBL is 14.4000, significantly higher than the mean before PjBL, which was 8.0250. This indicates a substantial improvement in students' performance in Internet Basics.

**02. Standard Deviation:** The standard deviation of students' scores after implementing PjBL is 3.07012, which is lower than the standard deviation of their scores before PjBL (3.45289). The lower standard deviation after PjBL suggests that students' performance has become more consistent and less scattered.

**03. t-value (t-test):** The t-value is 11.878, significantly high, indicating statistically significant differences in scores after PjBL compared to before PjBL.

**Significance (Sig):** The p-value (Sig) is 0.000, which is less than the typical significance level (e.g.,  $\alpha = 0.05$ ). This means there is strong statistical evidence supporting significant differences in scores after PjBL compared to before PjBL.

In summary, the analysis indicates that implementing PjBL (Project-Based Learning) positively and statistically significantly affected students' scores in Internet Basics. The students' performance improved significantly, and their scores became more consistent after the implementation of PjBL.



Source: Conducted using JASP 0.16.

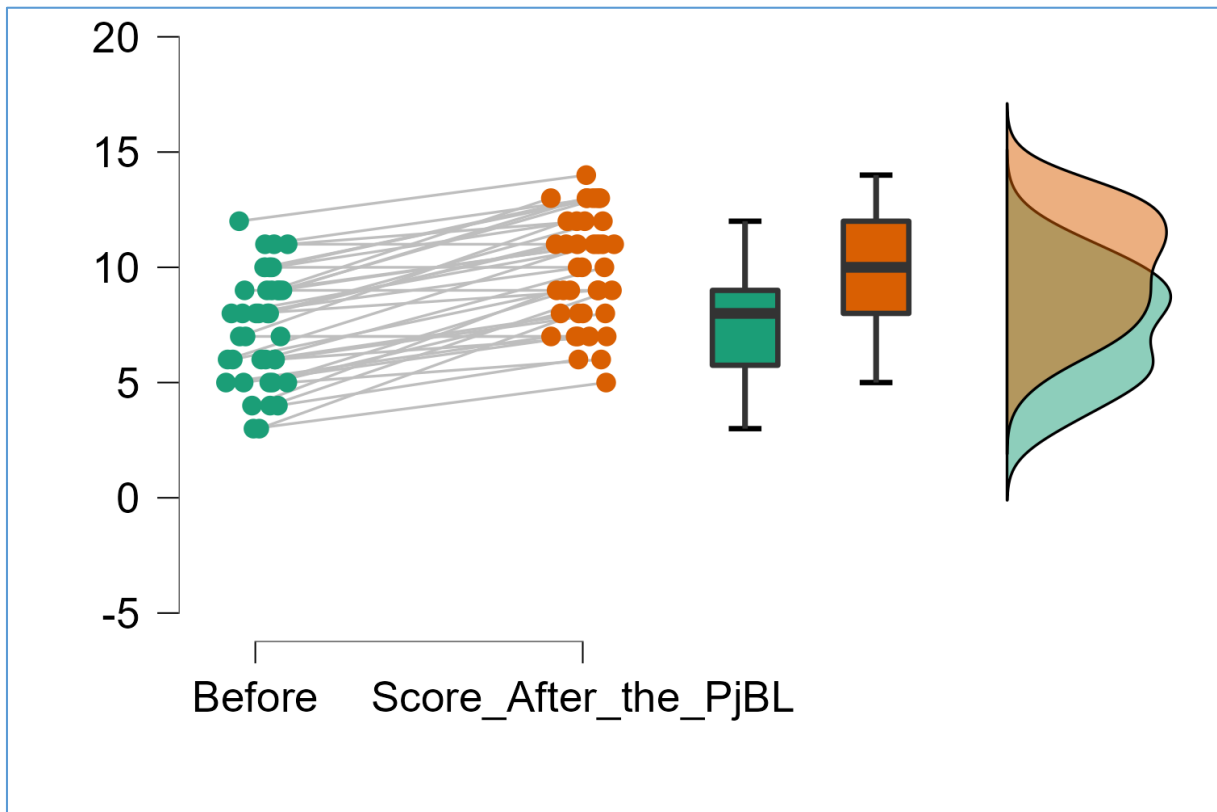
Regarding the statistical significance of the differences in means (before implementing PjBL and after implementing PjBL), the T-Test (Paired Samples Test) yielded a t-value of 11.878, which is significantly high. This indicates statistically significant differences in scores after PjBL compared to scores before PjBL. This is further supported by the p-value (Sig) of 0.000, which is less than the significance level of 0.05. In short, there is strong statistical evidence supporting significant differences in scores after PjBL compared to before PjBL.

In conclusion, the analysis suggests that the implementation of PjBL had a positive and statistically significant impact on students' computer skills and increased their level of digital literacy. This implies that PjBL contributed significantly to improving students' performance compared to the previous situation before its implementation.

### 3. Learners' Score in Using E-mail Total =13

Number of learner	Score Before the PjBL	Score After the PjBL
01	05	09
02	06	11
03	10	12
04	06	09
05	03	08
06	08	11
07	12	14
08	10	13
09	11	11
10	06	08
11	09	13
12	03	05
13	08	12
14	07	07
15	08	10
16	10	10
17	11	13
18	08	09
19	05	07
20	09	13
21	08	11
22	09	09
23	04	09
24	05	07
25	06	10
26	06	07
27	09	11
28	04	09
29	05	08
30	07	12
31	10	13
32	05	06
33	08	11
34	10	13
35	04	06
36	11	12
37	07	07
38	09	11
39	09	13
40	06	08

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using E-mail	9.9500	40	2.40606	10.514	39	0.000
	Score Before the Learners' Score in Using E-mail	7.4250	40	2.40672			

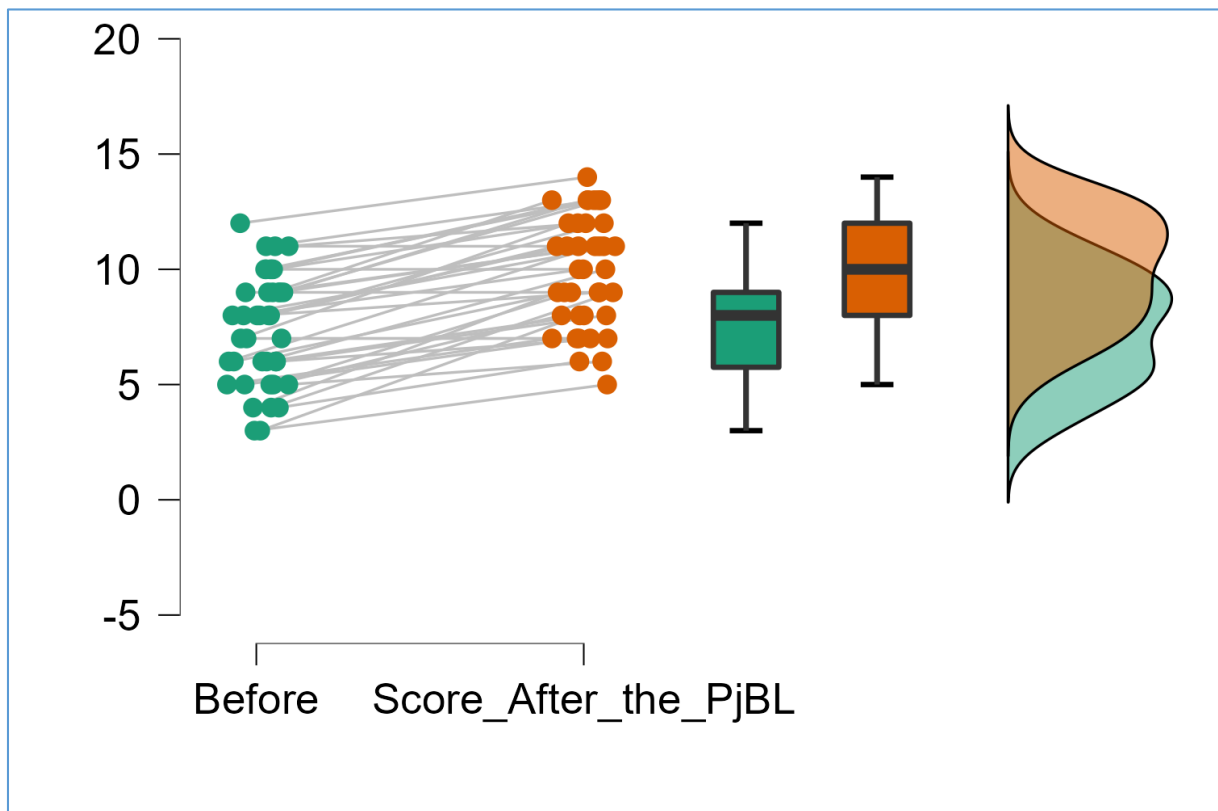


Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using E-mail	9.9500	40	2.40672	10.514	39	0.000
	Score Before the Learners' Score in Using E-mail	7.4250	40	2.40606			

The table above shows the results of the Paired Samples Test to assess scores before and after implementing the Project-Based Learning (PjBL) model to enhance digital literacy, with a focus on "students' scores in using email." Here is an analysis of the results:

**Regarding differences in means:** The mean score of students in using email after implementing PjBL is 9.9500, significantly higher than the pre-PjBL mean of 7.4250. This indicates a substantial improvement in students' performance in using email.

**For standard deviation:** The standard deviation of students' scores after PjBL is 2.40672, slightly lower than the standard deviation before PjBL, which was 2.40606. This suggests that scores after PjBL became less variable and more consistent.



Source: Conducted using JASP 0.16.

Regarding the statistical significance of the differences in means (pre-PjBL vs. post-PjBL): The T-Test value (Paired Samples Test) is 10.514, significantly high, indicating statistically significant differences between scores after PjBL and scores before PjBL.

Significance (Sig): The significance value (Sig) is 0.000, which is less than the significance level (0.05). This means there is strong statistical evidence supporting significant differences in scores after PjBL compared to scores before PjBL.

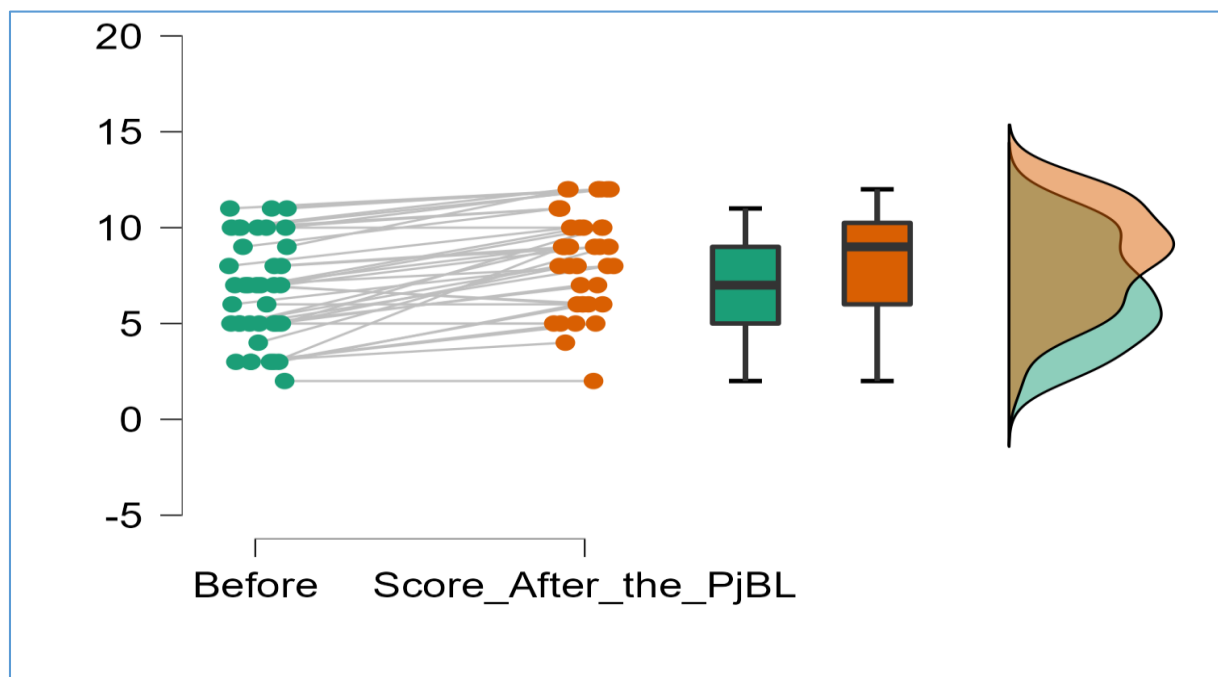
In summary, the analysis suggests that implementing PjBL had a positive and statistically significant impact on students' scores in using email. Based on these results, it can be concluded that implementing the PjBL model positively contributed to improving students' performance in using email, emphasizing the effectiveness of this model in enhancing digital awareness and improving relevant skills.

#### 4. Learners' Score in **Using Windows** Total =12

Number of Learner	Score <b>Before</b> the PjBL	Score <b>After</b> the PjBL
01	06	08
02	05	05
03	09	11
04	10	10
05	05	08
06	03	05
07	07	08
08	11	12
09	05	09
10	07	10
11	10	12
12	11	12
13	09	12
14	07	09
15	05	08
16	05	07
17	10	12
18	10	11
19	08	09
20	03	04
21	06	06
22	07	10
23	03	05
24	04	09
25	05	10
26	03	09
27	07	06
28	05	05
29	07	06
30	08	09

31	11	12
32	10	11
33	03	06
34	02	02
35	07	09
36	05	08
37	03	06
38	05	07
39	10	12
40	08	10

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using Windows	8.5000	40	2.61161	7.705	39	0.000
	Score Before the Learners' Score in Using Windows	6.6250	40	2.65723			



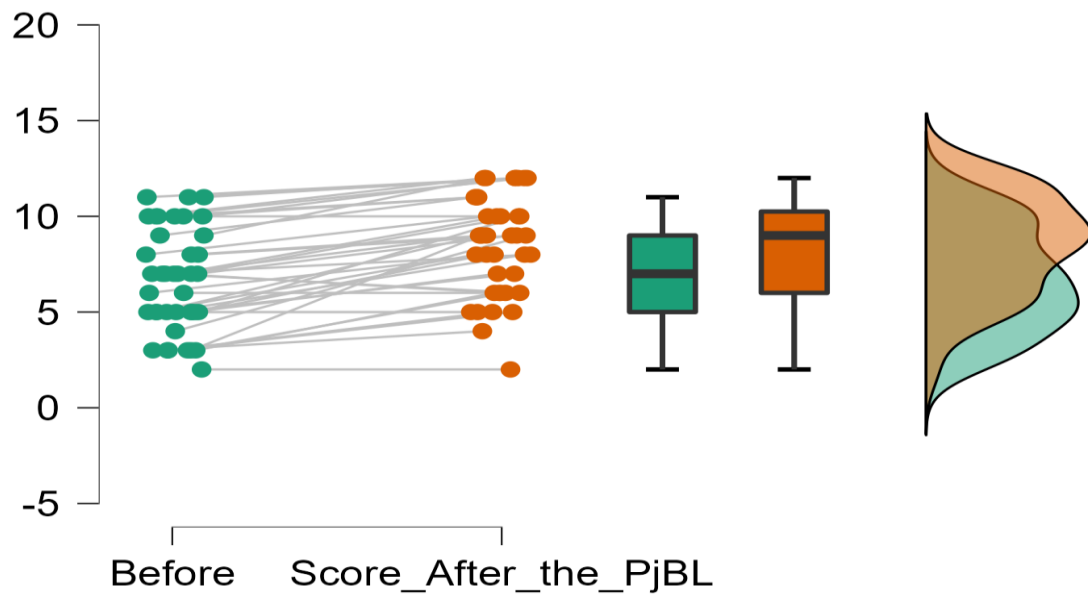
Source: Conducted using JASP 0.16.

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the <b>Learners' Score in Using Windows</b>	8.5000	40	2.61161	7.705	39	0.000
	Score Before the <b>Learners' Score in Using Windows</b>	6.6250	40	2.65723			

The table above shows the results of the Paired Samples Test to assess grades before and after implementing the Project-Based Learning (PjBL) model to enhance digital literacy, focusing on "students' scores in using **Windows**." Here is an analysis of the results:

Regarding differences in means: The mean score for students in using Windows after implementing PjBL is 8.5000, significantly higher than the pre-PjBL mean of 6.6250. This indicates a substantial improvement in students' performance in using Windows.

Regarding standard deviation: The standard deviation of students' scores after implementing PjBL is 2.61161, slightly lower than their pre-PjBL standard deviation of 2.65723. This suggests that the scores after PjBL became less variable and less dispersed.



Source: Conducted using JASP 0.16.

**Regarding the statistical significance of the differences between means (before implementing PjBL - after implementing PjBL):** We observe that the T-Test value (Paired Samples Test) is 7.705, significantly high. This indicates statistically significant differences between the scores after implementing PjBL and the scores before implementing it.

**Significance:** The significance value (Sig) is 0.000, which is less than the significance level (0.05). This means there is strong statistical evidence supporting the existence of statistically significant differences between the scores after PjBL and the scores before PjBL.

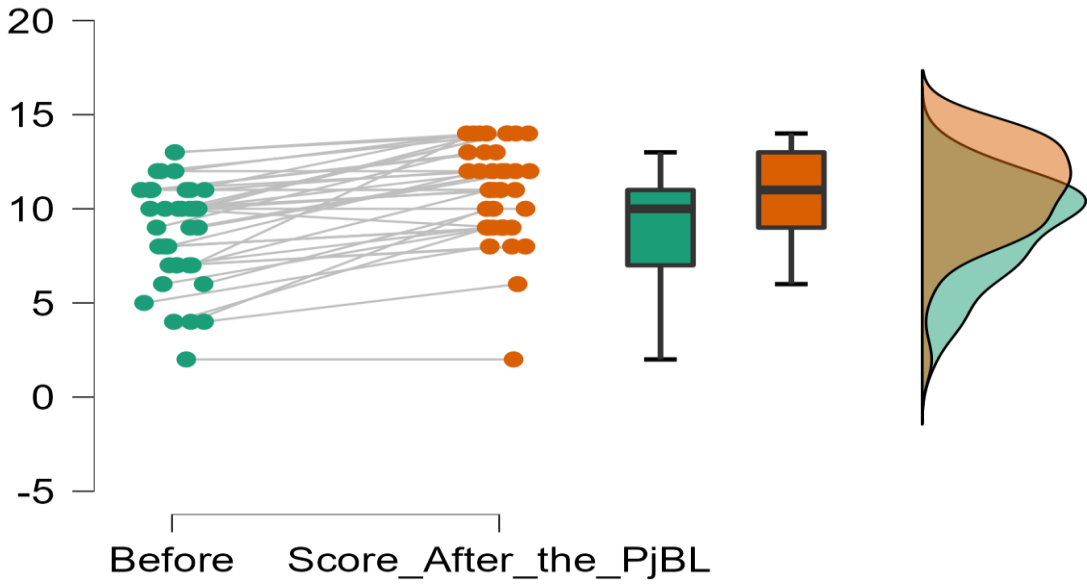
In summary, the analysis indicates that implementing PjBL has had a positive and statistically significant impact on students' scores in using Windows. Based on these results, it can be said that implementing the Project-Based Learning (PjBL) model has positively contributed to improving students' performance in using Windows. The significant difference in means before and after implementation reflects a notable enhancement in students' performance.

Overall, this analysis clearly demonstrates that implementing PjBL has had a positive and significant effect on improving students' proficiency in using Windows. This enhances the effectiveness of the model in promoting digital awareness and improving relevant skills.

**5. Learners' Score in Microsoft Word Total= 14**

<b>Number of Learner</b>	<b>Score Before the PjBL</b>	<b>Score After the PjBL</b>
01	08	09
02	04	10
03	10	10
04	08	12
05	13	14
06	11	12
07	09	13
08	12	14
09	09	12
10	12	12
11	11	13
12	10	11
13	13	14
14	07	11
15	09	12
16	11	13
17	10	14
18	07	09
19	06	10
20	11	11
21	10	09
22	11	14
23	07	08
24	06	09
25	11	11
26	10	14
27	05	08
28	04	09
29	11	11
30	07	08
31	12	14
32	08	09
33	02	02
34	11	12
35	07	14
36	10	12
37	04	06
38	08	09
39	10	14
40	10	11

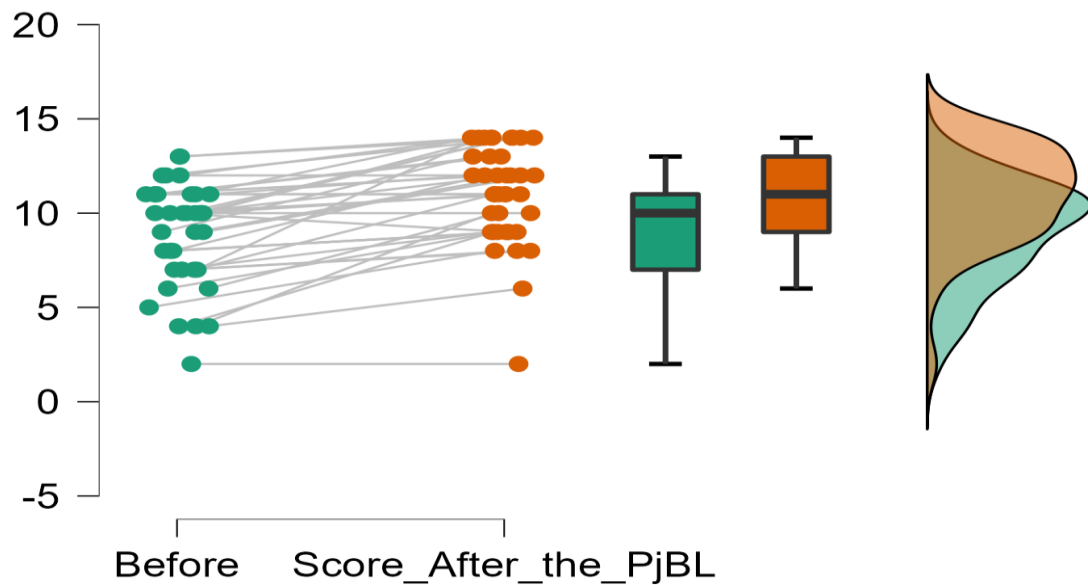
Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using Microsoft Word	11.0000	40	2.60177	7.466	39	0.000
	Score Before the Learners' Score in Using Microsoft Word	8.8750	40	2.68125			



The table above shows the results of the Paired Samples Test to evaluate scores before and after implementing the Project-Based Learning (PjBL) model to enhance digital literacy, with a focus on "students' scores in using Microsoft Word." The following is an analysis of the results:

Regarding differences in means: The mean score for students in using Microsoft Word after implementing PjBL is 11.0000, significantly higher than the mean before PjBL, which was 8.8750. This indicates a substantial improvement in students' performance in using Microsoft Word.

Regarding the standard deviation: The standard deviation of students' scores after implementing PjBL is 2.60177, slightly lower than the standard deviation of their scores before PjBL, which was 2.68125. This suggests that the scores after PjBL became less variable and less dispersed.



Source: Conducted using JASP 0.16.

Concerning the statistical significance of the differences between means (before PjBL - after PjBL):

- The T-Test value (Paired Samples Test) is 7.466, significantly high. This indicates statistically significant differences between the scores after PjBL and the scores before PjBL.
- Significance: The significance value (Sig) is 0.000, which is less than the significance level (0.05). This means there is strong statistical evidence supporting the presence of significant differences in scores after PjBL compared to scores before PjBL.

In summary, the analysis indicates that implementing PjBL had a positive and statistically significant impact on students' scores in using Microsoft Word. The results clearly demonstrate

that implementing the Project-Based Learning model significantly contributed to enhancing students' performance in using Microsoft Word.

**6. Learners' Score in Microsoft Power Point Total=17**

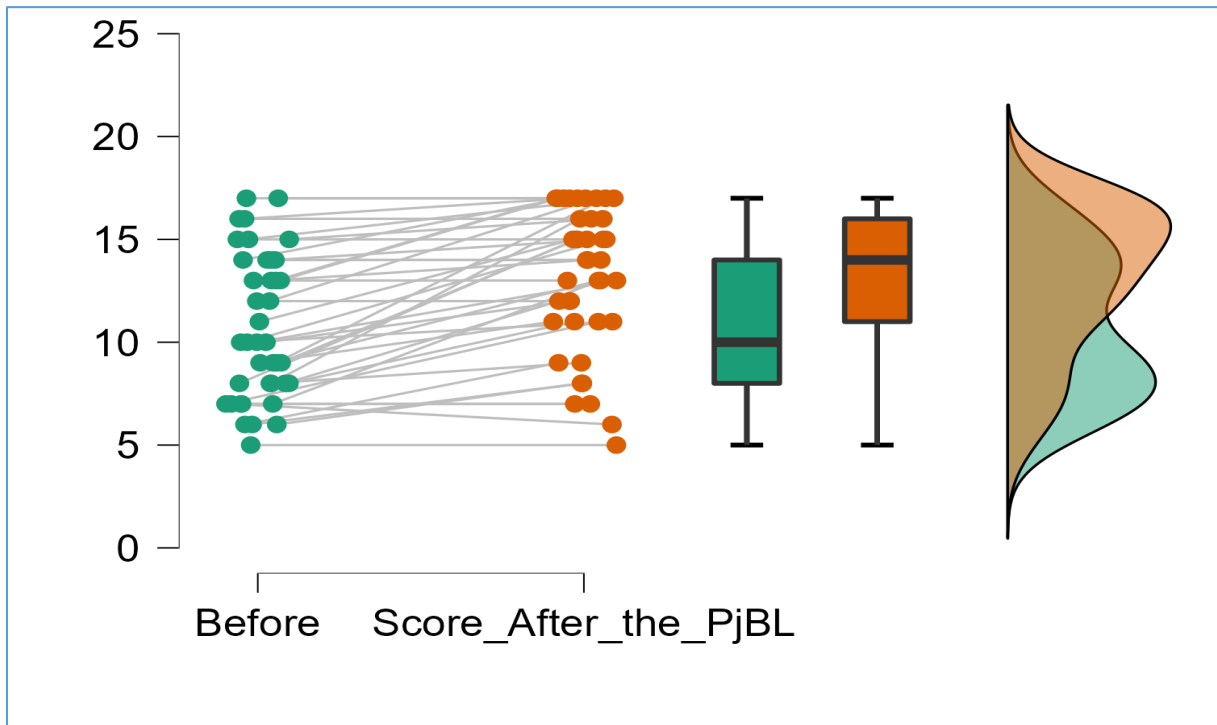
<b>Number of Learner</b>	<b>Score Before the PjBL</b>	<b>Score After the PjBL</b>
01	10	13
02	08	11
03	07	07
04	06	09
05	10	11
06	07	13
07	14	15
08	14	17
09	12	12
10	13	13
11	16	17
12	17	17
13	13	17
14	09	11
15	07	07
16	06	08
17	13	17
18	08	12
19	14	14
20	07	11
21	08	09
22	10	15
23	14	14
24	07	06
25	09	13
26	15	15
27	15	16
28	06	08
29	10	12
30	16	16
31	15	17
32	11	15
33	05	05
34	12	17
35	13	14
36	09	15
37	08	16
38	09	17
39	17	17
40	08	15

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using Microsoft Power Point	13.1000	40	3.52136	6.283	39	0.000
	Score Before the Learners' Score in Using Microsoft Power Point	10.7000	40	3.49505			

The table above presents the results of the Paired Samples Test for assessing scores before and after implementing the Project-Based Learning (PjBL) model to maximize digital literacy, with a focus on "Learners' scores in using Microsoft PowerPoint." Here is an analysis of the results:

Regarding differences in means: The mean score for learners in using Microsoft PowerPoint after implementing PjBL is 13.1000, significantly higher than the mean before PjBL, which was 10.7000. This indicates a substantial improvement in learners' performance in using Microsoft PowerPoint.

Regarding the standard deviation: The standard deviation of learners' scores after implementing PjBL is 3.52136, slightly higher than the standard deviation of their scores before PjBL, which was 3.49505. This suggests that the scores after PjBL became somewhat more variable.



Source: Conducted using JASP 0.16.

Concerning the statistical significance of the differences between means (before PjBL - after PjBL):

- The T-Test value (Paired Samples Test) is 6.283, significantly high. This indicates statistically significant differences between the scores after PjBL and the scores before PjBL.
- Significance: The significance value (Sig) is 0.000, which is less than the significance level (0.05). This means there is strong statistical evidence supporting the presence of significant differences in scores after PjBL compared to scores before PjBL.

In summary, the analysis suggests that implementing PjBL had a positive and statistically significant impact on learners' scores in using Microsoft PowerPoint. The results indicate a significant enhancement in learners' performance in this particular digital literacy skill.

**07. Learners' Score in Social Media Total= 11**

<b>Number of Learner</b>	<b>Score Before the PjBL</b>	<b>Score After the PjBL</b>
01	08	10
02	09	11
03	06	09
04	07	09
05	10	10
06	08	10
07	08	08
08	11	11
09	06	09
10	08	11
11	10	11
12	09	10
13	09	11
14	06	08
15	09	11
16	07	09
17	10	11
18	10	10
19	04	09
20	04	10
21	08	11
22	06	09
23	08	11
24	06	10
25	09	11
26	10	11
27	08	10
28	04	11
29	06	11
30	03	09
31	09	11
32	04	10
33	04	05
34	07	09
35	10	11
36	06	08
37	09	11
38	10	09
39	11	11
40	08	08

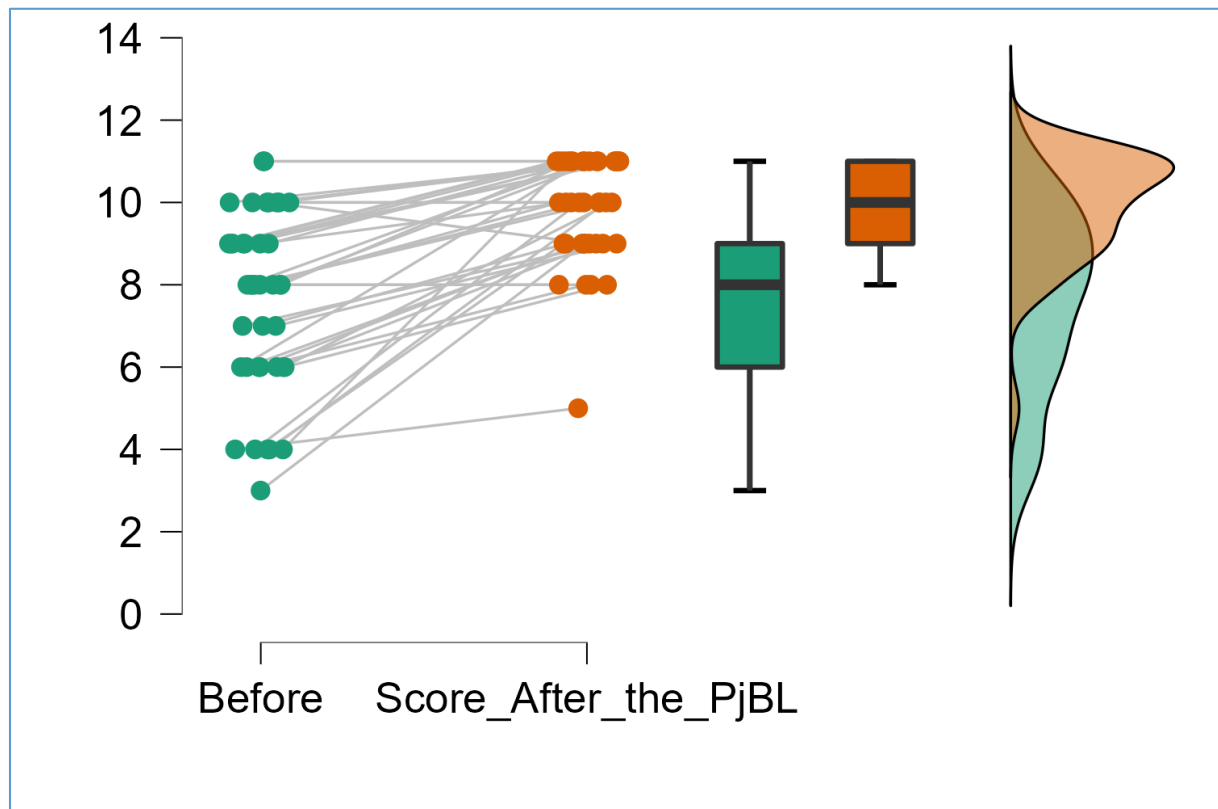
	<b>Descriptives</b>	<b>Paired Samples Test</b>
--	---------------------	----------------------------

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using Social Media	9.8750	40	1.30458	7.579	39	0.000
	Score Before the Learners' Score in Using Social Media	7.6250	40	2.16839			

The table above presents the results of the Paired Samples Test for assessing scores before and after implementing the Project-Based Learning (PjBL) model to maximize digital literacy, with a focus on "Learners' scores in using social media." Here is an analysis of the results:

**Regarding differences in means:** The mean score for learners in using social media after implementing PjBL is 9.8750, significantly higher than the mean before PjBL, which was 7.6250. This indicates a substantial improvement in learners' performance in using social media.

**Regarding the standard deviation:** The standard deviation of learners' scores after implementing PjBL is 1.30458, lower than the standard deviation of their scores before PjBL, which was 2.16839. This suggests that the scores after PjBL became less variable and more consistent.



Source: Conducted using JASP 0.16.

**Concerning the statistical significance of the differences between means (before PjBL - after PjBL):**

- **The T-Test value (Paired Samples Test)** is 7.579, significantly high. This indicates statistically significant differences between the scores after PjBL and the scores before PjBL.
- **Significance:** The significance value (Sig) is 0.000, which is less than the significance level (0.05). This means there is strong statistical evidence supporting the presence of significant differences in scores after PjBL compared to scores before PjBL.

In summary, the analysis suggests that implementing PjBL had a positive and statistically significant impact on learners' scores in using social media. The results indicate a significant enhancement in learners' performance in this particular aspect of digital literacy.

**8. Learners' Score in Information Literacy Total score = 15**

Number of Learner	Score before the PjBL	Score After The PjBL
01	08	09
02	04	10
03	06	12
04	06	14
05	14	15
06	10	13
07	09	09
08	14	15
09	04	04
10	12	16
11	11	15
12	14	14
13	10	15
14	07	07
15	06	07
16	10	10
17	10	15
18	05	09
19	07	09
20	10	11
21	08	12
22	12	14
23	07	06

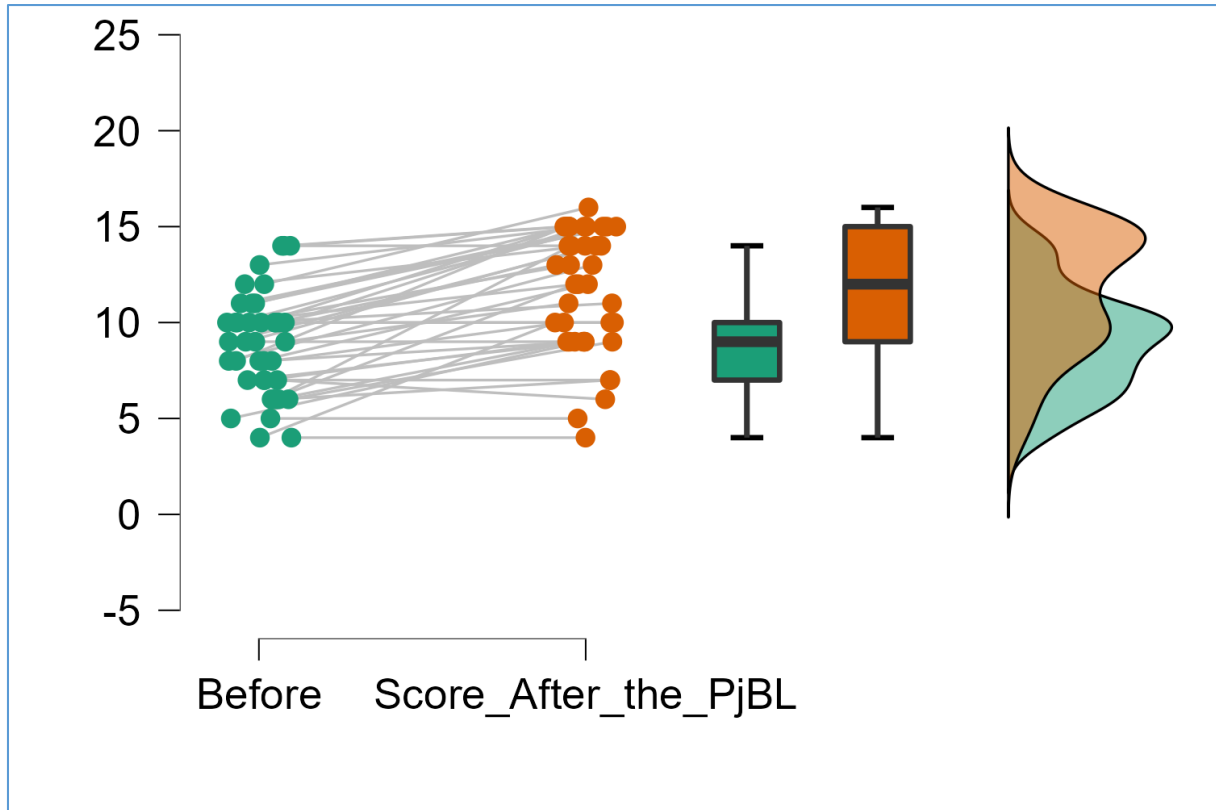
24	08	10
25	06	09
26	11	15
27	10	10
28	09	11
29	08	13
30	09	14
31	11	15
32	07	09
33	05	05
34	10	15
35	10	12
36	08	15
37	10	13
38	09	14
39	13	15
40	06	09

Testing Scores Before and After Implementing PjBL to maximize Digital Literacy		Descriptives			Paired Samples Test		
		Mean	N	Std. Deviation	t	df	Sig
Score After the PjBL - Score Before the PjBL	Score After the Learners' Score in Using Information Literacy	11.6250	40	3.21605	7.890	39	0.000
	Score Before the Learners' Score in Using Information Literacy	8.8500	40	2.66554			

The table above illustrates the results of the Paired Samples Test for evaluating scores before and after implementing the Project-Based Learning (PjBL) model to maximize digital literacy, with a focus on "Learners' scores in using information literacy." Here is an analysis of the results:

**Differences in Means:** The mean score for learners in using information literacy after implementing PjBL is 11.6250, significantly higher than the mean before PjBL, which was 8.8500. This indicates a substantial improvement in learners' performance in using information literacy.

**Standard Deviation:** The standard deviation of learners' scores after implementing PjBL is 3.21605, higher than the standard deviation of their scores before PjBL, which was 2.66554. This suggests that the scores after PjBL became more variable.



**Source:** Conducted using JASP 0.16.

Concerning the statistical significance of the differences between means (before PjBL - after PjBL):

The **T-Test** value (Paired Samples Test) is **7.890**, which is significantly high. This indicates statistically significant differences between the scores after PjBL and the scores before PjBL.

**Significance:** The significance value (Sig) is **0.000**, which is less than the significance level (0.05). This means there is strong statistical evidence supporting the presence of significant differences in scores after PjBL compared to scores before PjBL.

**In summary**, the analysis suggests that implementing PjBL had a positive and statistically significant impact on learners' scores in using information literacy. The results

indicate a significant enhancement in learners' performance in this particular aspect of digital literacy.

### **In Depth Interview with Inspectors of National Education**

Doubtlessly the present research paper aims to examine carefully the impact of PjBL in maximizing learners' digital literacy in the Algerian secondary schools. Therefore, the primary concern behind the interview is to gain fruitful insights about inspectors' perspectives towards incorporating PjBL to maximize learners' digital literacy skills and competencies. To put it differently, various studies stressed the importance of guiding teachers to go digital stressing the valuable impact of digital literacy (Djik (2005), asniza et al., (2013) and Chai et al., (2013)) the interview is collecting data about the impact of PjBL in boosting learners' DL in order to assist and guide educators, teachers and administrators in understanding more about the effects of PBL in ensuring a high quality education. Approximately, this interview is designed to take about 30 minutes with inspectors of English language. Doubtlessly their contribution will be of great value for the validity of this research paper.

### **Subjects of the Study**

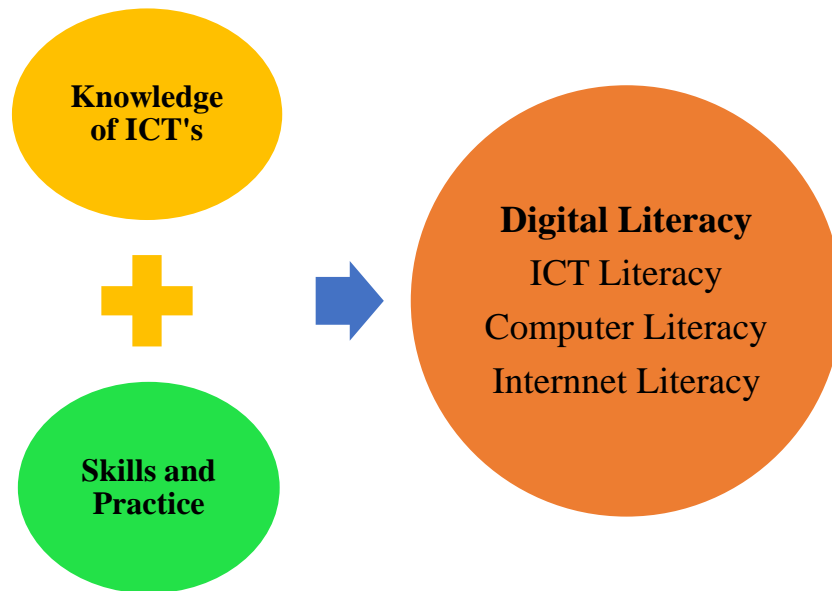
Four inspectors of National Education in English language at the level of Algerian Secondary Schools in kenchela and Batna were asked. They are in charge of 123 Secondary schools in various districts. Rationally, the researcher used a qualitative data to answer the research questions, the interview was administered individually to inspectors via online tools (e-mail – messenger- and facebook messages), after a discussion the researcher took charge of writing the inspectors' responses thus the interview is a vital valid tool for gathering data basically with expert inspectors.

**Q1. What are the merits and repercussions of maximizing learners' digital literacy?**

The first question aims to examine the merits as well as repercussions of enhancing learners' digital skills, inspectors agreed that digital skills refer to learners' abilities to critically leverage ICT's to use information in various interactive modes (audio, video, image...). digital skills are extremely valuable to learners in secondary schools, as well as in different facets of current evolving ever changing world, they mentioned that, today learners had better be more resilient be it online or offline. A number of strategies has better be implemented to maximize learners' 21<sup>st</sup> century skills basically media literacy, information literacy, digital literacy, and communicative literacy in addition to content creation strategies. Furthermore, inspectors declared that the use of digital resources will enhance resilience, they maximize learners' self-esteem, self-confidence, and accountability to learn. Leading to the development of collaboration, computational cognitive thinking as well as communicative abilities. Moreover, learners will be able to develop informational benefits via both PjBL and digital literacy. they will find themselves in front of numerous online opportunities whereby they will communicate, play and learn. Learners will be highly motivated to use digital soft tools, and their performance in tasks will improve. Learners who are generally do their projects, will have an extremely positive orientation to digital tools thus their digital abilities will be maximized remarkably. Additionally, high quality education is basically linked to learners' motivation and engagement. Well ICT's provide an extremely inspiring environments to learners with different abilities. Interestingly, the incorporation of digital tools via PjBL facilitates diverse materials, digital tools facilitates vocabulary up take, they foster learners' collocational competence. It is required to follow upskilling for all learners with different backgrounds, finding gleaned from different teachers prove the effectiveness of PjBL in digital literacy. thus it is high time, the national

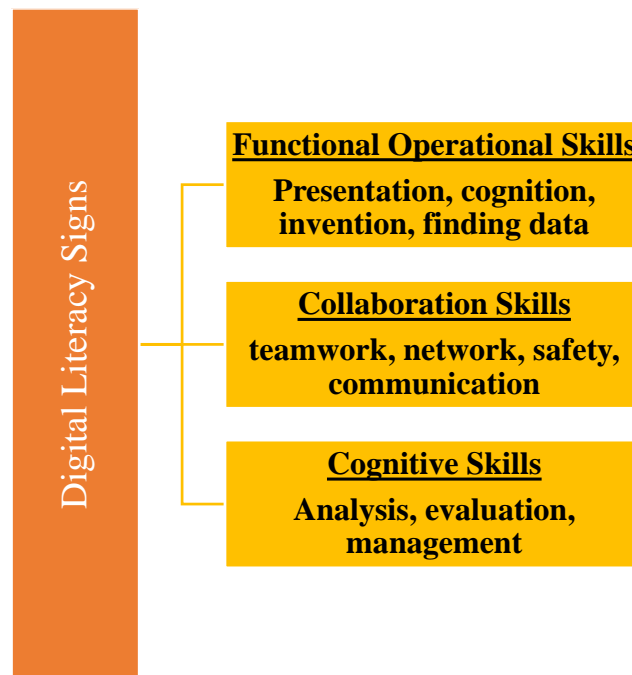
ministry rethink about “towards going digital learner” above all digital learners provide lifelong learning experience for all.

**Q2. What are the signs of digital literacy/ digital illiteracy?**



***Figure: Digital Literacy***

In fact, the figure is entitled digital literacy, it reflects the very simple definition to digital literacy, inspectors mentioned various terms to be used interchangeably to refer to digital literacy, basically: ICT literacy, ICT fluency, E literacy, computer literacy, technological literacy, media literacy, internet literacy. and they use various signs of digital literacy such as: being creative learner, being active citizen, having critical thinking, a good communicator, information literacy, technical skills, communication skills, innovative skills, cognition, presentation, thinking skills, analysis, evaluation, collaboration, networking, sharing and teamwork.



***Figure: Digital Literacy Signs***

The figure mirrors the signs of digital literacy, including operational functional skills, collaborative cooperative skills, as well as cognitive computational skills. Additionally, one inspector added awareness skills to ethics, online safety, and legal literacy. However, the signs of digital illiteracy are low productivity, low literacies, low income in education. Above all learners' comfort/discomfort while using ICT's mirrors their digital literacy level.

**Q3. What suggestions to effectively train EFL teachers to incorporate digital technologies in their classes? And with the vast evolving ICT's what Professional Development Opportunities recommended for EFL teachers?**

“Pedagogical training is crucial for adequate digital competence of teachers” (Estevez - Mor et al., 2020, p-403)

Asking inspectors to comment, they stated that it is extremely vital to create a kind of balance between teachers' technical knowledge, ICT's knowledge and pedagogical knowledge. Not only learners, teachers too are in need of implicit and explicit scaffolding with their peers

and colleagues as well as science computing teachers to boost their digital literacy. teachers had better design digital learning resources, lesson plans and create groups for learners. They ought to use ICT's inside and outside the classroom setting, and support learners to use them while solving real life problems. More than that, teachers can use PjBL as Bulter (2013) recommended to foster the enquiry ongoing learning process, via PjBL learning is really happening outside the class.

Currently, teachers had better use digital resources in an ethical innovative and accountable way, they should be teachers with digital abilities, teachers ought to handle ICT's and apply it in their digital pedagogical practices. Taking into consideration digital literacy levels (basic level, intermediate level, advanced level and expert level), it is recommended to take independent courses, because each teacher has his/her specific needs, level and abilities. It is recommended to teachers to test their digital literacy be it operational informational and strategic skills, teachers should develop knowledge as well as practice.

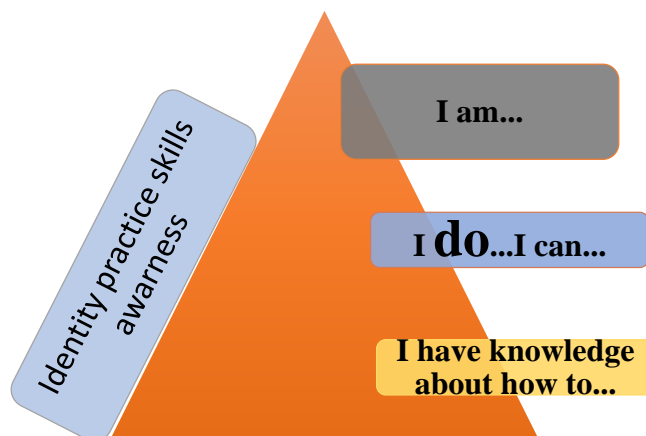
**Q4.** Do Algerian secondary schools need to prioritize an Equitable access to digital resources to all learners with various backgrounds?

Unquestionably, all inspectors appreciate the question. They declared that no learner should be left behind. All secondary schools need to prioritize an equitable access to digital resources to all learners with various backgrounds. They recommended that teachers use the laboratories devoted to science computing as well as foreign languages learning, thus all learners will be empowered to use digital tools regardless their socioeconomic backgrounds.

**Q5.** Do you have any suggestions to foster learners' digital literacy via PjBL?

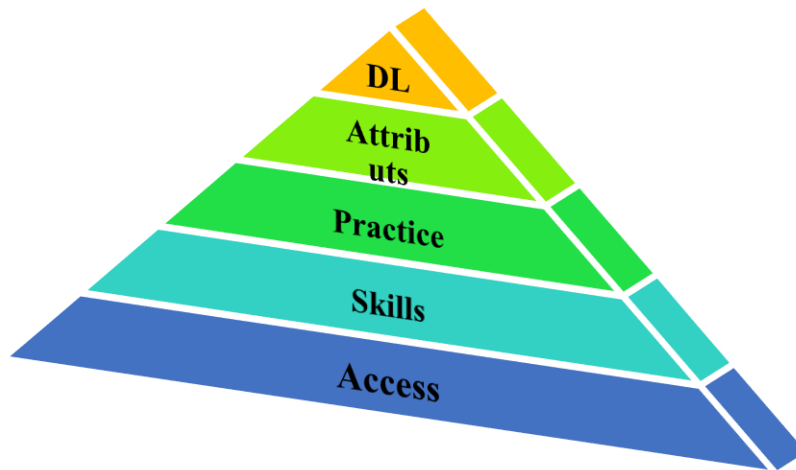
**If** PjBL is implemented effectively it will maximize learners' 21<sup>st</sup> century skills basically digital literacy. thus it is time teachers empower learners to go digital to be digital citizens via safe guided use of digital resources, encourage learners to access, analyse and

manage content via the use of digital tools such as: e-books, e-library, applications. Teachers can create comfortable environment with ICT's meeting learners' various styles and needs. One inspector recommended the use of the Beetham and Sharpe "Pyramid Model of Digital Literacy Development Model, 2010", in fact the pyramid summaries the process that EFL teachers had better consider levels of digital literacy, from knowing to doing. They added that it is not sufficient to let learners only use ICT's, instead teach them to cope with up to date evolving technologies, teachers had better enhance communication on developing the e-competence. In addition to that, integrating soft skills development to the syllabus, in all subjects' digital literacy must be integrated to the curriculum. As they need to explore and share effective instructional approaches that develop critical digital literacies.



***Figure: Beetham & Sharpe Pyramid Model of Digital Literacy Development Model (2010)***

They added that there has been growing interest in providing teachers with professional development opportunities to teaching excellence. Educators in this digital age are in need of completely rethinking pedagogy based on the necessary current competencies.



***Figure: The Digital Practitioner Framework***

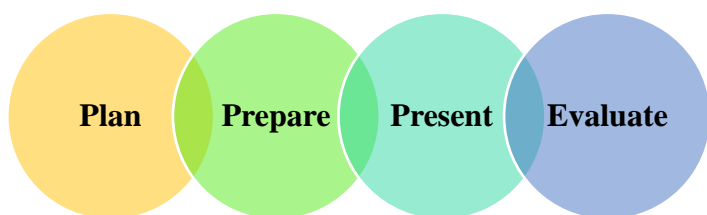
Sharpe and Beetham (2010) mentioned several levels of the pyramid relate to digital literacy framework. They used in their model an arrow going up the pyramid labelled ‘learners’ experience and appropriation’ to reflect that learners’ experience of using tools and applying them in PjBL, teachers must regard these levels carefully. One inspector stated clearly that: “teachers are in need of training to effectively incorporate ICT’s in modern classrooms via PjBL”, another one mentioned “learning by doing” as Dewey called experiential learning, in seminars, trainings, and online virtual courses.

## **Systematic Observation**

The researcher relied qualitatively on a classroom observation to record the needed data accurately. Classroom observation is a vital tool to construct a clear real data about the impact of PjBL in maximizing learners' digital literacy. Accordingly, recording the classroom environment mirrors in details how EFL learners prepare projects, present them and how their digital skills are boosted.

Using non-experimental tool, the observation was carried in natural settings to underscore the effectiveness of PjBL in fostering learners' digital skills and abilities. The researcher (a secondary school principal teacher of English language since 2013) watches, records and analyses learners in all PjBL phases. The naturalistic observation took place in real setting place in Arab Messoud Secondary school. Concerning the time sampling, the researcher records all relevant behaviours at set of points, every 15 minutes was devoted to group over one-hour observation. Despite the fact that, the behavioural categories of learners are clear, interpreting observed behaviour can be affected by bias. That's why another teacher observation is needed to assess the reliability of the researcher's observation.

The teachers used the observational research via recording learners' behaviours in four phases of PjBL (Project planning and launching, Project preparing, Project presenting and implementing, Project evaluating) in natural settings. Both teachers took notes without any interference, they were watching learners in a quite normal setting. Worthy noted that this tool is a longitudinal observation, it took one whole year 2022/2023 since measuring learners' digital literacy can not only have seen over time. In other words, longitudinal studies necessitate the observers to keep an eye on the participants over a long period of time.



**Figure: Project Based Learning Phases**

The observers record data in the four stages. Learners being observed are belonging to the scientific and technological stream, since the researcher is in charge of teaching them through the whole academic year 2022/2023, consequently they are requested to present four projects per a year as defined by the national ministry of education. Learners studied English language three hours per a week, the ministry devoted 7 weeks/21 hours per unit one, 7 weeks/21 hours per unit two, 6 weeks/ 18 hours per unit three and finally 6 week/18 hours per the last unit. Project planning and launching starts by the unit preview, while project planning and preparation is an ongoing process via the whole unit, by the end of the unit, learners were asked to present their projects; and an evaluation (self-evaluation, peer-evaluation, teacher-evaluation) is followed up.

**Table: Units and Projects Devoted to 1st Year SE Learners**

<i>Unit Number</i>	<i>Title of the Unit</i>	<i>Project Number</i>	<i>Title of the Project</i>
01	Getting Through	01	Making a Job Application Booklet or Making An Internet User's Guide For Beginners
02	Our Findings Show	02	Conducting A Survey
03	Back to Nature	03	Designing A Consumer's Guide
04	Eureka!	04	Making The Profile of an Invention

The above table mirrors the units and projects devoted to the participants. And yet, as far as adaptation of project is concerned, the role of the teacher is just to launch the project. The

majority of learners express their willingness to adapt the projects creatively keeping the same theme of the unit. They did not modify the themes, interestingly some learners did not adapt projects but they present the ones recommended by the national ministry. The teacher did not interfere to reduce the observation bias, consequently learners agreed on the following:

***Table: Adapted Projects by Learners***

<b><i>Unit Number</i></b>	<b><i>Title of the Unit</i></b>	<b><i>Project Number</i></b>	<b><i>Title of the Adapted Project</i></b>
01	Getting Through	01	Presenting and Recording a role-play about the advantages and Disadvantages of the internet
02	Our Findings Show	02	Conducting A Survey about social networks
03	Back to Nature	03	Organizing Cleaning day/Recording
04	Eureka!	04	Filming The Profile of an Invention

After agreeing about projects themes. The observers decided to take notes concerning each stage of implementing PjBL, results are to be compared to deduce common remarks. The observers use a project evaluation grid provided by the inspector of English language in Khenchela city. It covers the whole stages as well as it deals with the incorporation of digital ICT's via PjBL. The primary aim of the grid, is to help the researcher determine clearly learners' prior knowledge, their current level, and what they need to learn. (See Appendices)

Actually, the sample of this observation is 80 learners indicating the four classes the researcher is in charge of teaching. Since the PjBL is an ongoing process the researcher observes her own classes to consider all their behaviors from unit preview and project launching till project evaluation step. As project based learning is implemented, learners chose the groups that want to join. Five learners per a group, the researcher and the observer did not interfere. Finally, learners formed 16 groups (five learners in each group), to present the above mentioned 4 projects.

The project evaluation Grid was distributed to teachers by the inspector of English language, it is constructed to meet the features of project based learning as well as technology based learning. It includes ten main questions that are directly linked to high quality PjBL that integrates digital technologies and ICT's.

## Project Evaluation Grid

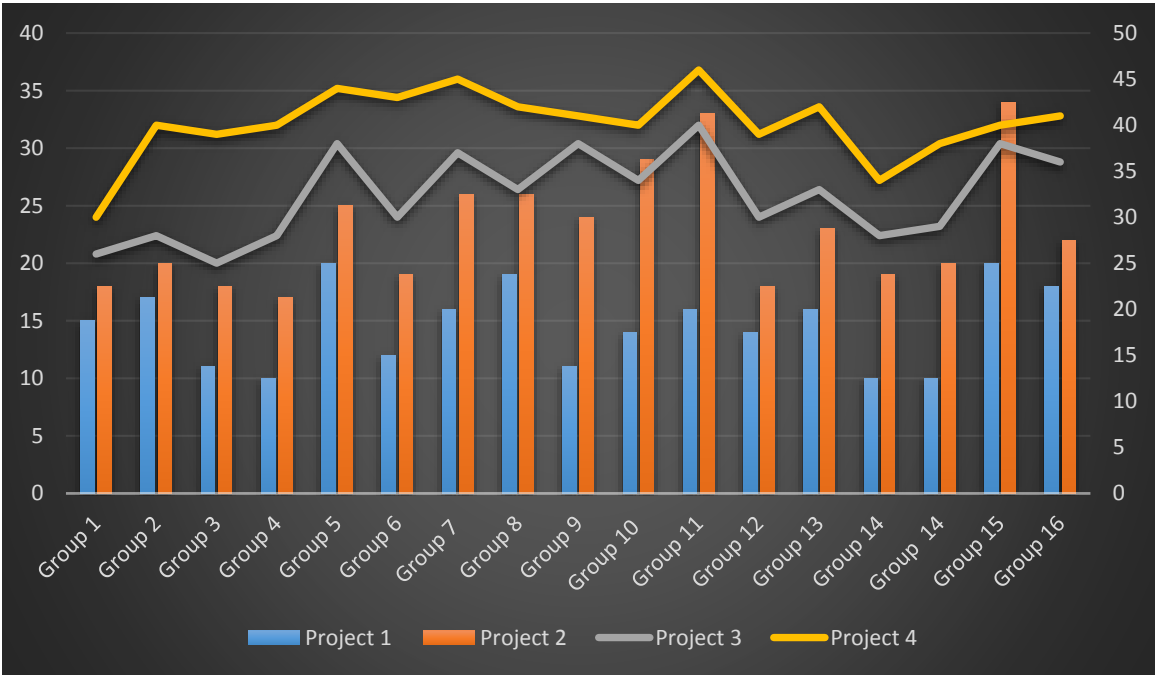
<i>Did the learners...</i>	No (1pt)	Slightly (2pts)	General (3pts)	Mostly (4pts)	Yes (5pts)
<i>1. Do independent research to collect information for their project?</i>					
<i>2. Divide the tasks among them?</i>					
<i>3. Work on their project as a group (enthusiasm, social skills)?</i>					
<i>4. Apply, analyze, synthesize, and evaluate somehow process the information?</i>					
<i>5. Support their work with the use of CDs, DVD, pictures, drawings, photographs...?</i>					
<i>6. Correctly use the target language forms (Grammar &amp; vocabulary)?</i>					
<i>7. Prepare a project that is interesting for their classmates?</i>					
<i>8. Use ICT to present their work, a film or a documentary...?</i>					
<i>9. Use good command of the language (accuracy and fluency)?</i>					
<i>10. Convince the audience in the discussion phase?</i>					

Mark: Learners' total score ...../

It is worthy noted that the total score is 50 points, the lowest score is 1 point, and the average score is 25points. Here is a table that mirrors all groups ‘scores in the four projects.

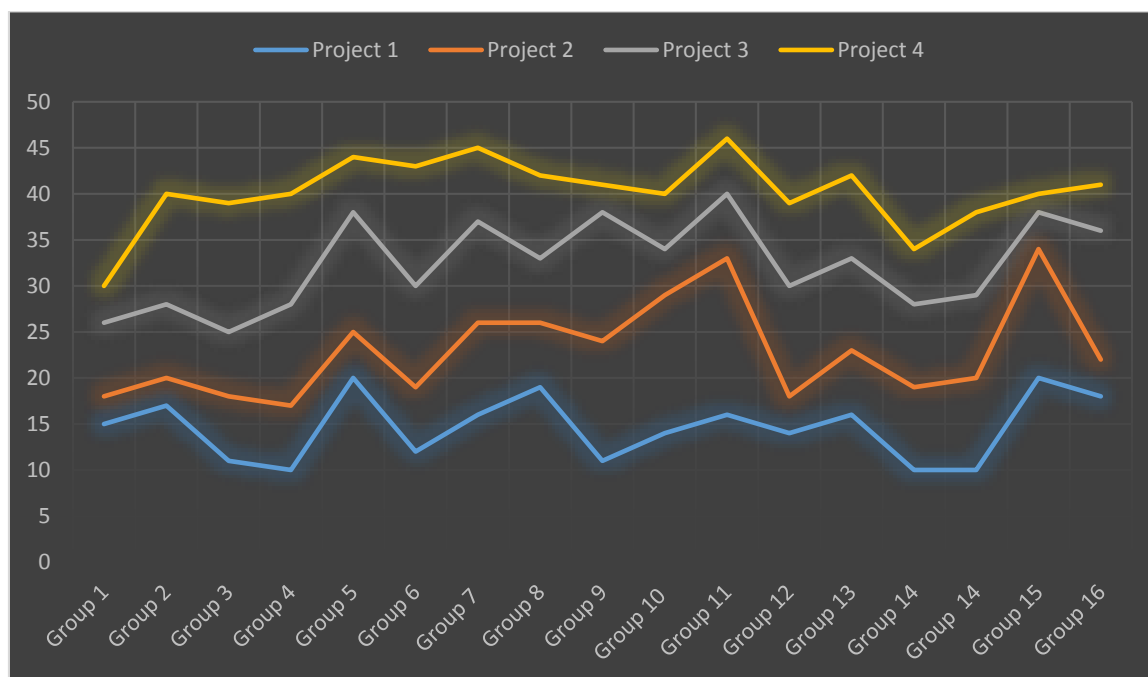
Options	Project 1	Project 2	Project 3	Project 4
Group 1	15	18	26	30
Group 2	17	20	28	40
Group 3	11	18	25	39
Group 4	10	17	28	40
Group 5	20	25	38	44
Group 6	12	19	30	43
Group 7	16	26	37	45
Group 8	19	26	33	42
Group 9	11	24	38	41
Group 10	14	29	34	40
Group 11	16	33	40	46
Group 12	14	18	30	39
Group 13	16	23	33	42
Group 14	10	19	28	34
Group 14	10	20	29	38
Group 15	20	34	38	40
Group 16	18	22	36	41

*Figure: Learners’ Scores in Presenting Projects*



Remarkably, learners' score in the first projects differ completely from the fourth

project. A significant noticeable improvement is scored in various aspects including: using good command of language, using ICT's, doing interesting projects, supporting the project with videos as well as recording and photographs.



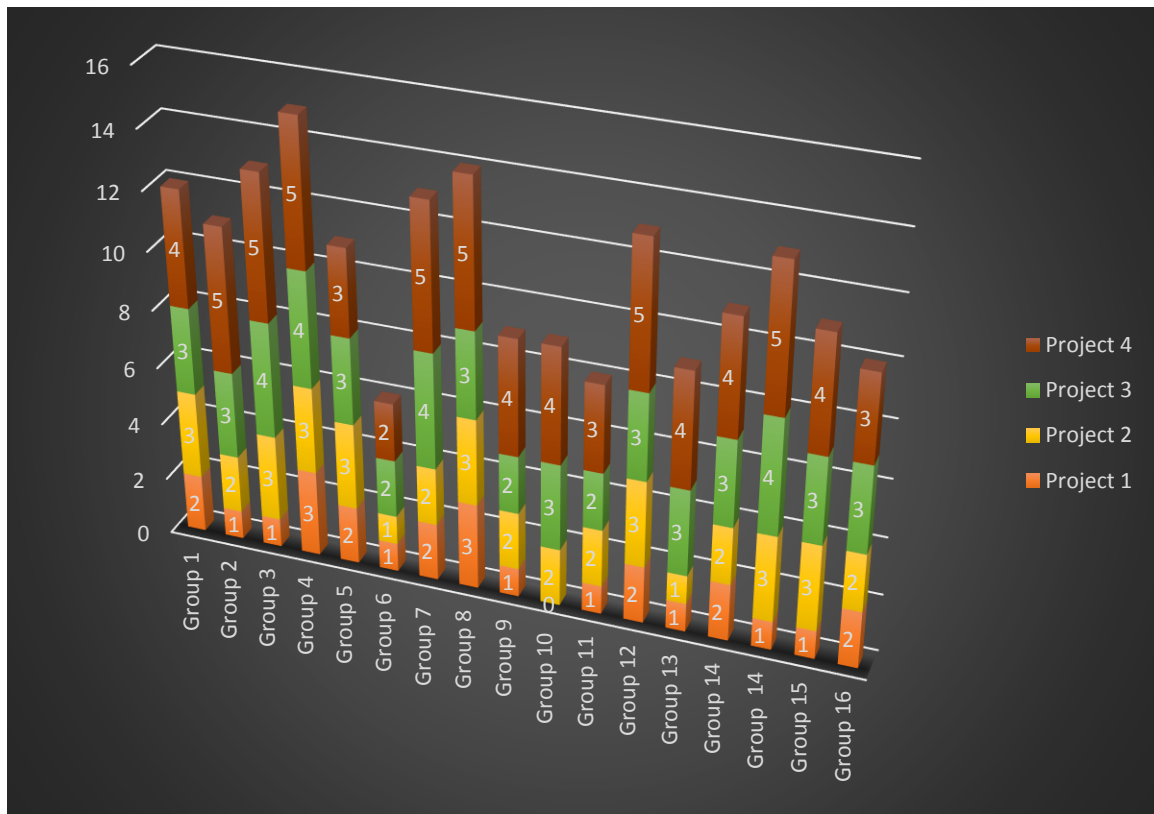
**Figure: Learners' Scores in Presenting Projects**

As it is clearly shown in the figure above, there is a remarkable significant change in learners' scores in presenting projects. Via the whole process of incorporating ICT's and PjBL in current instructional practices, learners' results are affected throughout the whole process.

**Table: Use ICT to present their work, a film or a documentary...?**

Options	Project 1	Project 2	Project 3	Project 4
<b>Group 1</b>	02	03	03	04
<b>Group 2</b>	01	02	03	05
<b>Group 3</b>	01	03	04	05
<b>Group 4</b>	03	03	04	05
<b>Group 5</b>	02	03	03	03
<b>Group 6</b>	01	01	02	02
<b>Group 7</b>	02	02	04	05

<b>Group 8</b>	03	03	03	05
<b>Group 9</b>	01	02	02	04
<b>Group 10</b>	00	02	03	04
<b>Group 11</b>	01	02	02	03
<b>Group 12</b>	02	03	03	05
<b>Group 13</b>	01	01	03	04
<b>Group 14</b>	02	02	03	04
<b>Group 14</b>	01	03	04	05
<b>Group 15</b>	01	03	03	04
<b>Group 16</b>	02	02	03	03



**Figure 8: Use ICT to present their work, a film or a documentary**

The primary concern of the observation is to deduce whether learners do use digital tools and resources in their project or no. The table and the figure identify that learners are using ICT's in the project presentation. A significant incorporation of digital resources is marked. The excessive use of ICT's will have resulted in enhancing learners' digital skills, competencies and abilities.

Project based learning is a learner centered approach, it systematically allows learners to solve real life problems in cooperative environment. It includes the use of surveys, e-

questionnaires, field trips, posters, video recording and numerous classroom interactive humanistic activities. The merits of PjBL lies in that it is an ongoing process, thus the researcher cannot rely only the final project presentation step. As a result, the general observation starts at the level of project launching phase reaching project assessment.

### **Phase One: Planning for Projects in Unit Preview**

The primary basic step in implementing project based learning is project launching, wherein the teacher engaged learners, posed a problem and learners started planning to solve real life problem critically and collaboratively. Learners were divided to groups, they chose their own groups and assigned group representatives, and decided upon how to present the project, the representatives asked them to bring information as essential step to outline the project. In the next sessions, I observed some learners who brought data while others do not. The learners declared that there are various informational resources they were used by them (parents, friends, teachers, internet, google searching engine, books, e-books as well as peers). The majority of learners mentioned ICT's, indirectly the researchers questioned representatives from each group about the used resources, Google search engine was essentially named for gathering data, and secondary google photo for providing some visual platforms, canve for generating media as well as other digital resources such as mobiles, camera for shooting and recording, and computers. The representatives assigned specific tasks for each learners. In fact, the environment on which learners are planning is a supportive setting. The teacher observed learners' willingness to do projects, they were highly motivated to start doing their projects.

### **Positive General Remarks:**

- ✚ Learners are highly motivated to do projects.
- ✚ Learners work in supportive collaborative groups; groups compete each other's creatively.

✚ Learners feel ownership of the project.

✚ Learners used ICT's in the first step (e-learning outside the box).

**Negative General Remarks:**

Some learners are intrapersonal learners; they want to work individually.

Some learners are shy to talk about their projects.

The teacher uses ordinary activities to engage learners.

**CHAPTRE SIX : CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS**

**Introduction** .....

Synthesis of the Results .....

Main Conclusions .....

Pedagogical Implications .....

Recommendations for Educators .....

Recommendations for Future Research .....

**Conclusion** .....

## **Introduction**

Through this study the researcher scrutinized the effectiveness of PjBL in fostering learners' digital literacy of Algerian secondary school learners (basically 1<sup>st</sup> year learners). After the implementation of PjBL in EFL classrooms, and based on the analysis of the obtained data, this chapter endeavours systematically to introduce some recommendations and implications that had better sustain secondary school teachers and school staff. The chapter presents the final conclusions of the research paper, and propose set of recommendations to achieve HQ education, it ends with some recommendations for future further research.

## **Recommendations for Educators**

The primary concern of the recommendations is to guide Algerian authorities, syllabus designers, inspectors, headmasters in SE, teachers, parents, learners, as well as science computing teachers to implement high quality projects to boost learners' digital literacy. the more or the less PjBL is incorporated effectively, the more or the less learners' digital literacy is maximized clearly. Digital skills have penetrated all domains of modern life, Consequently, it is recommended that:

- EFL teachers had better encourage learners to share their content knowledge with peers, as well as encourage the competitive spirit between learners.
- EFL Teachers need to believe in learners' abilities and reward digital use.
- Administration staff had better schedule more time for science computing sessions, worthy noted that only 1<sup>st</sup> year learners are in charge of studding science computing module, additionally the hours devoted are not enough, they had one hour for theory, and another hour for practice, 2 hours per a week are not really enough. While the 2<sup>nd</sup> and 3<sup>rd</sup> years do not study it though it is basic module for learner's career.

- Create digital space well framed to boost learners' 21<sup>st</sup> century skills and competencies and to maximize their digital literacy. The e-space need to regard learners' interests, needs, and learning styles, as it needs to be managed and directed by educational experts.
- EFL teachers should not accept readymade printed copies of projects, accepting them is killing learners' active cooperative learning, therefore EFL monitors must engage learners via e-learning to boost their digital abilities.
- EFL teachers must give learners enough time to plan, prepare, and present the project, they need to provide comprehensive positive summative feedback concerning the efficient use of digital resources.
- EFL teachers must teach via digital ICT's, indirectly learners will be motivated too to use digital resources.
- EFL teachers can create a competitive classroom for the best projects that incorporate digital resources, the aim is to push learners to use digital tools to foster their digital soft skills and abilities. Creating a competition and rewards will motivate learners to do their best to be the star of the project.
- EFL teachers had better celebrate the success of projects that incorporate digital tools, learners at this age (15 to 18) like rewarding and celebrations, therefore they will work hard to participate, motivation is a key success in ensuring HG PjBL.
- EFL monitors have to use ICT's both inside and outside the classroom settings, letting learners to use them too, teachers can create virtual space for their learners (see appendices)
- EFL teachers are advised to gather the project team representatives regularly to schedule presenting E-PjBL or a digital based projects. The aim is to combine the merits of incorporating PjBL and techno pedagogy.

- EFL monitors had better not follow blindly the prescribed chosen projects in the textbooks, therefore they must regard learners needs and interests and adapt whenever it is necessary prioritizing learners' digital literacy as well as 21<sup>st</sup> century skills and competencies.
- EFL teachers had better document learners' improvements via the use of formative assessment's checklist.
- Inside the classroom, teachers had better use various applications and devices to ensure that digital contents will meet the needs of learners, as well as their various learning styles.
- Interestingly, Headmasters in secondary schools had better check the frequency of incorporating ICT's via regular attendance in all modules, it must be ongoing learning opportunity to maximize learners' digital literacy.
- Headmasters had better equip the schools with digital resources, and use them instead of putting them in stocks. Headmasters are advised to allocate financial resources to acquire digital tools and devices
- Headmasters should be using digital technological means available in school concerts and honours.
- Headmasters had better programme awareness days on the importance of digital skills in the age of modern technologies.
- Programming orientation sessions and visits to learners to inform them about the importance of digital literacy.
- Asking science computing teachers to devote more times to learners to practice digital skills in science computing laboratory.

- Use (all aboard) map that illustrates effective HQ framework of digital literacy in education. (See appendices). In fact, it is a metro map that aims to increase complex digital landscape for learners and teacher, an ICT's journey progress.
- EFL teachers had better ensure that all EFL learners are engaged in PjBL to foster their DL skills and competencies, no learner should be left behind. Teachers must make sure that learners from various socioeconomic backgrounds have equal accessibility to ICT's, the rationale is to fill in the socioeconomic gaps.
- Educators and syllabus designers had better ensure a consistent PjBL to the provision of digital literacy and skills throughout all Algerian levels of education from the primary education level to high education.
- Inspectors are asked to plan for professional development training opportunities for EFL teachers to go digital while instructing, evaluating and assessing educational outcomes. Providing training programs of digital skills at the national level to ensure high quality education.
- EFL teachers are advised to ask regularly for peer learning/ feedback, join platforms to exchange teaching/learning materials and practices, coordinate whenever possible, both inside and outside the school.
- EFL teachers had better expand the cross curricular approach in all sectors, address the famous challenging barriers.
- Provide enough digital resources so that all learners will have an equal opportunity to maximize their digital literacy.
- Promote and inspire the mobility of teaching staff.
- Adapt where necessary to design strategies that address a particular digital skill or competence.

- EFL teachers are asked to plan worksheets, design lesson plans, and implement strategies that address particular digital gap in learners' digital profile.
- Parents had better support developing their kids' safe digital skills.
- Parents had better chose relevant opportunities to tell their kids about both merits and opportunities of ICT's respecting age appropriate activities.
- Syllabus designers had better programme opportunities for schools and teachers' to attract learners' attention to the unparalleled merits of PjBL in digital age via programming open days, seminars, conferences, gallery talks...etc.
- Algerian national ministry of education leaders had better provide a full funding for digital resources, the aim is to enhance learners' digital skills.
- Authorities are advisable to accept and encourage national private schools' investments in developing learners' digital competencies.
- Inspectors had better support informatics teachers to organize seminars to all teachers to develop their abilities regularly.
- EFL teachers may promote accessible digital literacy courses, they should create digital network sites to easily cooperate, coordinate and exchange practices with peers.

- Algerian authorities have to design carefully a detailed catalogue, that includes top effective classroom and blended practices to boost learners' digital skills and share it freely.
- EFL learners' evidence to digital skills and abilities had better implemented effectively.
- Experts had better design collaboratively a holistic interventions and a clear framework to ensure learners 'digital literacy enhancement.
- EFL teachers must consider effective empirical implementation of digital resources as well as learners' level, cause "one size fits all" is not recommended solution, high quality digital literacy development goes beyond putting learners in the laboratory of science computing in front of generic programs. "Practice is needed in real life situation".
- EFL inspectors are recommended to use daily checklists to identify clearly and precisely the digital skill to be maximised. After identifying the skills, modify them to generic curriculum resources, and train teachers to use them, to leverage tools to boost the educational process.
- Actually designing a HQ PjBL syllabus is a daunting task and a tall order since syllabus designers need to regard boosting learners' 21<sup>st</sup> skills, digital literacy, as well as information media literacies.

- Syllabus designers ought to choose meaningful real life problems and connections, grounding units based on reality and whereby digital literacy skills are needed.
- Syllabus designers have to locate enough time for experiential learning by doing projects, whereby learners will acquire the necessary skills and abilities to prepare the project from each step in PjBL, learners are enhancing their abilities, consequently building appropriate time is vital aspect in enhancing their skills.
- EFL teachers ought to provide opportunities for project team representatives, the primary aim is to boost the communicative skills and competencies via class connectedness and engagement of learners.
- EFL teachers had better prioritize digital literacy in classrooms, adapt whenever it is necessary, and use teachers' journals to mark changes in learners' level and interest.

### **Recommendations for Future Research**

Purposefully, this research paper proposed several areas whereby further work would be useful.

- ✓ The research population does not need to be limited to first year learners of English at Arab Messoud Secondary School.
- ✓ Outside the research area, similar research should be conducted in higher education in Abbas Lghour University as well as other universities, so that a full ample image concerning the impact of PjBL in maximizing learners' digital skills can be emerged, which will guide syllabus designers basically for the development of learning and teaching materials that serve learners' needs.



- ✓ As far as the research sample is concerned, this research is limited to the implementation of PjBL to foster digital skills of learners only with first year scientific stream, further research had better engage other learners from other streams.
- ✓ This research examined the impact of implementing PjBL to foster learners' digital literacy, it had be better to examine the effectiveness of incorporating PjBL in maximizing teachers' digital abilities too especially novice teachers, actually this investigation is necessary in order to achieve better understanding about the integration of digital devices and resources in current classrooms.
- ✓ Future research had better be taken to examine whether variables such as age, socioeconomic backgrounds and studying science computing module affect learners' digital skills, engagement and motivation in learning via implementing PjBL or no.

## **Conclusion**

Doubtlessly, this research paper highlights the impact of PjBL in fostering learners' digital skills in Algerian Secondary Education level, actually this section is devoted to the main conclusions, which were drawn from the findings, additionally some recommendations for both educators and for further researchers were added, unquestionably PjBL plays a vital valuable role in maximizing learners' digital literacy, soft skills and information literacy if implemented effectively.

## **General Conclusion**

All in all, this research paper attempted to examine carefully the impact that PjBL plays in maximizing learners' digital literacy efficiently. Interestingly, It was critically agreed that many researchers have conducted splendid studies concerning PjBL and rethinking pedagogy that combine it with digitalization of education, and yet PjBL gains widespread credence as a beneficial instructional educational approach. Based upon findings of this study, we conclude

that the more or the less EFL teachers implement high quality PjBL, the more or the less EFL learners maximize their digital soft skills and gain effectively more insights. Therefore, we deduce that the expectations linked to PjBL are so realistic. Worthy noted that encyclopedic pedagogical depends on the superior quality of PjBL, thus EFL teachers and EFL learners must collaborate as team to face up critically the challenging problems met while implementing PjBL. It's high time we revolutionized the role of the current school and go down with its passiveness towards more active cooperative creative education. Objectively, High Quality PjBL (HQ PjBL) requires meticulous planning, open communication, and a cooperative cohesive team, besides clear well planned learning objective, interesting goals as well as well-defined roles streamline efforts, whereas formative progress tracking ensures firm timely adjustments. Flexibility, accountability and adaptability to challenges.

**Our Learners are our outstanding lifelong project, work on it insightfully**

1. A. Blumentfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, "Motivating project-based learning sustaining the doing, supporting the learning. *Educational Psychologist*, 26(3-4), 369-398," 1991.
2. Abidin, Z., Utama, Herman, T., Jupri, A., Farokhah, L., Apuanor, & Sonedi. (2021). GiftedChildren's Mathematical Reasoning Abilities on Problem-Based Learning and Project- Based Learning Literacy. *Journal of Physics: Conference Series*, 1720(1), 12018. <https://doi.org/10.1088/1742-6596/1720/1/012018>.
3. Almanasef, M., Almaghaslah, D., Portlock, J., & Chater, A. (2020). Qualitative investigation of the flipped classroom teaching approach as an alternative to the traditional lecture. *Pharmacy Education*, 20, p142-150.
4. Annahita, B. Hillary, D.J, & Dawn, A.B., 2016. Exploring 21st Century Skills and Learning Environments for Middle School Youth *International Journal of School Social Work* vol 1 no 1 1-15
5. B. A. Land, S. M., & Greene, "Project-based learning with the world wide web: a qualitative study of resource integration. *Educational Technology Research andDevelopment*, 48(1), 45-66," 2000.
6. Bali, M. 2016, Feb. "Knowing the Difference Between Digital Skills and Digital Literacies, and Teaching Both." Retrieved from <https://literacyworldwide.org/blog/literacy-daily/2016/02/03/knowning-the-difference-between-digital-skills-and-digital-literacies-and-teaching-both>
7. Barak, M. (2012). From "doing" to "doing with learning": reflection on an effort to promote self-regulated learning in technological projects in high school. *European Journal of Engineering Education*, 37(1), 105-116.

8. Baş, G. (2011). Investigating the effects of project-based learning on students' academic achievement and attitudes towards English lesson. TOJNED : The Online Journal of New Horizons in Education, 1(4), 1–15.  
<http://www.ncbi.nlm.nih.gov/pubmed/4666639>.
9. Bazalgette, C. (1988). « ‘They changed the picture in the middle of the fight’: new kinds of literacy», in M. Meek, & C. Mills (eds.) Language and Literacy in the Primary School London: Falmer.
10. Bell, S. (2010). Project Based Learning for the 21st Century: Skills for the Future. Clearing House , 83(2) , 39\_50. Doi: 10.1080/00098650903505415.
11. Bell, S. (2010). Project-based learning for the 21<sup>st</sup> century: Skills for the future. The clearing house, 83(2), 39-43.
12. Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. The Clearing House, 83 (2), 39–43.
13. Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. The
14. Benson, V. and Kolsaker, A. (2015) “Instructor Approaches to Blended Management Learning: A Tale of Two Business Schools”, The International Journal of Management Education, Vol. 13, No. 3, pp. 316-325.
15. Bezon, J. (2007) A Qualitative study using project based learning in a mainstream middle school. Improving Schools, 10(2) , 150- 161. Doi: 10.1177/1365480207078048. BF02905780.
16. Bibi, S., & Nawaz, M. H. (2020). A study on the effect of emerging technology on students' academic achievements at secondary level. Journal of Business and Social Review in Emerging Economies, 6(1),365-378.  
<https://doi.org/10.26710/jbsee.v6i1.1088>

17. Bie. /Project-based learning Handbook (on line). (Quoted 2007-11-02) Available from: <<http://www.bie.org>>
18. Blumenfeld, P. C., Krajcik, J. S., Marx, R. W., & Soloway, E. (1994). Lessons learned: How collaboration helped middle grade science teachers learn project-based instruction. *Elementary School Journal*, 94, 5,539-551.
19. Blumenfeld, P., Soloway, E., Marx, R., Krajcik, J., Guzdial, M., & Palincsar, A. (1991). Motivating project- based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26 (3&4), 369-398.
20. Blumenfeld, P., Soloway, E., Marx, R., Krajcik, J., Guzdial, M., and Palincsar, A., (1991). Motivating Project based learning: Sustaining the doing, supporting and learning. *Educational Phycologist*, 26(3 and 4), 369 <http://dx.doi.org/10.1080/00461520.1991.9653139> (Access Date: 04/09/ 2023).
21. Booth, W. C., Colomb, G. G, & Williams, J. M. (2003). *The craft of research*. (2nd ed). Chicago: Chicago University Press.
22. British Film Institute (2000). *Moving Images in the Classroom: A Secondary Teacher's Guide to Using Film and Television* London: British Film Institute.
23. Britt, A.M., Rouet, J.F., & Durik, A.M. (2017). *Literacy Beyond text comprehension: A theory of purposeful reading*. New York, NY: Routledge
24. Bruce, C. (1997). *The Seven Faces of Information Literacy* Adelaide: Auslib Press.
25. Bryman, A. (2012). *Social research methods* (4th ed.). Oxford university press.
26. Buckingham, D. (1993b). *Children Talking Television: The Making of Television Literacy* London: Falmer.
27. Chai, C.S., Koh, J.L.H.L.& Tsai, C.C. (2013). A review of technological pedagogical content knowledge. *Educational technology & society*, vol.16, no.2. pp.31-51.

28. Chalmers, D.J., Manley, D. & Wasserman, R. (2005). *Metametaphysics: New Essays on the Foundations of Ontology*. Oxford University Press. Dorr, C.
29. Chang, C., (2008). Engaging the disengaged: Using learning clubs to motivate struggling adolescents' readers and writers. *Journal of Adolescent and Adult Literacy*, 52 (4), 284-294. Doi: 10.1598/JAAL.52.4.2.
30. Chelghoum, A. (2017). Promoting Students' Self-Regulated Learning Through Digital Platforms : New Horizon in Educational Psychology, *American Journal of Applied Psychology* 6(5) :123.
31. Chesebro J L and McCroskey J C 2001 *Communication Education* 50(1) 59-68
32. Chew E., Jones N., Turner D. (2008). Critical Review of the Blended Learning Models Based on Maslow's and Vygotsky's Educational Theory' in *Hybrid Learning and Education*. Berlin, Springer Verlag Publ., pp. 40–53. DOI : 10.1007/978-3-540-85170-7\_4
33. Chun Meng Tang, c., & Lee Yen Chaw, c. (2016). Digital literacy: a prerequisite for effective learning in a blended learning environment?. *Electronic Journal Of E-Learning*, 14(1), 54-65.  
  
Clearing House, 83, 39-43.
34. Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education*. New York: Routledge.
35. Colis, B., and Mooner, J. (2001). *Flexible Learning in a Digital World : Experiences and Expectations*. London : Kogan-page.
36. Concetta A. DePaolo and Kelly Wilkinson (2014). *Get Your Head into the Clouds: Using Word Clouds for Analyzing Qualitative Assessment Data*. Indiana State University. P1.

37. Cordes, S., 2009. Broad horizons: The role of multimodal literacy in 21st century library instruction. In World library and
38. Coufalová, J. (2006). Projektové vyučování. Praha: Nakladatelství Fortuna.  
counts. In E. Elstad (Ed.), Educational technology and poly contextual bridging (pp. 149–161). Springer.
39. Creswell, J.W. (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications. Creswell, J. W. (2007). Qualitative Inquiry and Research Design: Choosing Among Five Approaches. Sage Publications. Creswell, J. W. (2015). A concise Introduction to Mixed Methods Research. Sage Publications Ltd. Creswell, J. W., & Plano Clark, V. L. (2011). Designing and Conducting Mixed Methods Research. Sage Publications. Creswell, J. W., & Plano Clark, V. L. (2018). Designing and Conducting Mixed Methods Research (3rd ed.). Sage Publications.
40. Creswell, J.W. and Plano Clark, V.L. (2011) Designing and Conducting Mixed Methods Research, 2nd edition, Sage, Thousand Oaks, CA.
41. Creswell, J.W. and Plano Clark, V.L. (2011) Designing and Conducting Mixed Methods Research, 2nd edition, Sage, Thousand Oaks, CA.
42. Cucinotta, D.; Vanelli, M. (2020). WHO Declares COVID-19 a Pandemic. Acta Bio Med. Atenei Parm. P. 91, 157–160
43. D. Synteta, P., & Schneider, “EVA\_pm: how XML can scaffold project-based learning. In Proceeding of the 4<sup>th</sup> international conference on new educational environments (ICNEE“02),” 2002.
44. Dahlgren, M., Castensson, R., and Dahlgren, L. (1998). PBL from the teachers’ perspective. Higher Education. 36(4), 437-447.
45. Danford, G. L. (2006). Project-based learning and international business education. Journal of Teaching in International Business, 18(1), 7–25.

46. Deady, K. (2017). Preparing students for a digital future: How teachers can bring digital literacy into the classroom. Teachaway. Available at: <https://www.teachaway.com/blog/preparing-students-digital-future-how-teachers-can-bring-digital-literacy-into>. (Date accessed: 4.4.2020).
47. Dewey, J. (1897). My Pedagogic Creed. *The School [9]Journal*, Vol. LIV, No. 3, pp. 77-80. Available at: [http://playpen.meraka.csir.co.za/~acdc/education/Dr\\_Anvind\\_Gupa/Learners\\_Library\\_7\\_March\\_2021/Resources/books/readings/17.pdf](http://playpen.meraka.csir.co.za/~acdc/education/Dr_Anvind_Gupa/Learners_Library_7_March_2021/Resources/books/readings/17.pdf) [Accessed 25 June, 2021].
48. Dewey, J. (1916). *Democracy and Education: An introduction to the philosophy of*
49. Dewey, J. (1917) *Creative Intelligence: Essays on the Pragmatic Attitude*, Henry Holt, New York.
50. Dewey, J. (1920) *Reconstruction in Philosophy*, Beacon Press, Boston, MA.
51. Dewey, J. (1922) *Human Nature in Conduct*, Henry Holt, New York.
52. Dewey, J. (1925) *Experience and Nature*, Kessinger, Whitefish, MT.
53. Dewey, J. (1929) *The Quest for Certainty*, GP Putnam, New York.
54. Dewey, J. (1938) *Logic: The Theory of Inquiry*, Henry Holt, New York.
55. Dewey, J. (1938), (1997 edition) *Experience and Education*, New York: Touchstone.
56. Dewey, J. (1938). *Experience and education*. New York, NY: Macmillan
57. Dhawan S. 2020. "Online Learning: A Panacea in the Time of COVID-19 Crisis". *Journal of Educational Technology Systems*, vol. 91, no.1, pp. 5–22. digital competence in Europe. Publications Office of the European Union. education. New York: Macmillan.
58. endangered species/environmental education to primary school students. *Journal of Information Technology Education: Research*, 19, 427–450. <https://doi.org/10.28945/4612>

59. Ernest, P. (1996). Varieties of constructivism: A framework for comparison. In D. K. Ishii, Constructivist views of learning in science and mathematics. Retrieved from <http://www.ericdigests.org/2004-3/views.html>.
60. Ferrari, A. (2013). DIGCOMP: A framework for developing and understanding Findings. Vancouver, B.C.: National Council on Measurement in Education.
61. Fokides, E., & Kefallinou, M. (2020). Examining the impact of spherical videos in teaching
62. Frank, M., & Barzilai, A. (2004). Integrating alternative assessment in a project-based learning course for pre-service science and technology teachers. *Assessment & Evaluation in Higher Education*, 29(1),41–61
63. French, G. (2015). Teaching in blended learning environments: creating and sustaining communities of inquiry. *Alberta Journal Of Educational Research*, 61(4), 518-520.
64. Friedman, A.M., Heafner, T. L. (2008). Wikis and constructivism in secondary social studies: Fostering a deeper understanding. *Computers in the schools*, 25 (3-4), 288-302.doi.10.1080/07380560802371003.
65. G. Solomon, “Project-based learning: a primer. *Technology & Learning*, 23(6), 20,” 2003.
66. Gall, M.D, J.P. & Borg, W.R. (2003). *Education and research: an introduction* (7<sup>th</sup> ed). Boston, MA: Pearson.
67. Garmston, R., & Wellman, B. (1994). Insights from constructivist learning theory. *Educational Leadership*, 51(7), 84-85.
68. Gholami, M., Moghadam, P. K., Mohammadipoor, F., Tarahi, M. J., Sak, M., Toulabi, T., & Pour, A. H. H. (2016). Comparing the effects of problem-based learning and the traditional lecture method on critical thinking skills and metacognitive awareness in nursing students in a critical care nursing course. *Nurse education today*, 45,16-21.

69. Glistler, P. (1997). *Digital Literacy*. Wiley Computer Pub., New York, 1997.
70. Graham, C.R. (2006) *Blended Learning Systems: Definition, Current Trends, and Future Directions*. In: Bonk, C.J. and Graham, C.R., Eds., *Handbook of Blended Learning: Global Perspectives, Local Designs*, Pfeiffer Publishing, San Francisco, 3-21
71. Grant, M. M. (2002). Getting a grip on project-based learning: theory, cases and recommendations. *Meridian*, 5(1), 1-17. Retrieved in 10 October 2016, from <https://www.ncsu.edu/meridian/win2002/514/project-based.pdf>
72. Graves, K, 2003. "Coursebooks." In D. Nunan (Ed.) *Practical English Language Teaching*. New York: McGraw-Hill.
73. Graves, K. (2000). *Designing language courses: A guide for teachers*. Boston, MA: Heinle, Cengage Learning.
74. Gregorius, R. M. (2017). Performance of underprepared students in traditional versus animation-based flipped-classroom settings. *Chemistry Education Research and Practice*, 18(4), 841-848.
75. Grix, J. (2004). *The foundation of Research*. New York, NY: Palgrave Macmillan.
76. Gutek, Gerald L. (2009). *New Perspectives on Philosophy and Education*. Pearson Education, Inc. ISBN 978-0-205-59433-7.
77. Habok and Nagy ( 2016) in-service teachers' perceptions of project – based learning. *Institute of Education, University of Szeged, Petőfi S. sgt. 30-34, Szeged 6722, Hungary*
78. Haines, S. (1989). *Projects for the EFL classroom, Resource material for teachers*. Hong Kong: Nelson House. In Kalabzová, M. (2015) *the application of project based learning in the English classrooms Phd thesis* . University of West Bohemia.

79. Halvey, M. J., & Keane, M. T. (2007). An assessment of tag presentation techniques. WWW '07 Proceedings of the 16th international conference on World Wide
80. Hancock, D. R. & Algozzine, B. (2006). Doing case study research: A practical guide for beginning researchers. New York: Teachers College Press (C U).
81. Harmer, J. (2001). Coursebooks: A human, cultural and linguistic disaster? *Modern English Teacher*, 10(3), 5-10.
82. Harmer, J. (2007). *The practice of English language teaching* (4th ed.). Pearson.
83. Harmer, N. and Stokes, A. (2014) The benefits and challenges of project-based learning. School of Geography, Earth and Environmental Sciences. Plymouth University
84. Harmer, N., & Stokes, A. (2014). The benefits and challenges of project-based learning: A review of the literature. Plymouth: PedRIO.
85. Harwood, N. (2021). Coda: An expanding research agenda for the use of instructional materials. *Modern Language Journal*, 105(1), 175–184. <https://doi.org/10.1111/modl.12683>
86. Hasniza, N., D & Tengku, F.T.A., (2013). A case study of Secondary Pre service Teachers' technological and learning and content knowledge mastery level. *Procedia social and behavioural sciences*, vol.103, no.1.pp. 1-9.
87. Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research*, 60(4), 549-571.
88. Holm, M. (2011). Project-based instruction: A review of the literature on effectiveness in prekindergarten through 12th grade classrooms. *InSight: Rivier Academic Journal*, 7(2), 1–13.
89. Horwitz, E.K., 1987. Surveying students beliefs about language learning. In : Wenden, Anita. L.(ED.), *Learner Startegies in Language Learning* Prentice-Hall, NJ, pp.119-129.

Information and Communication Technologies”, *Computers & Education*, Vol. 54, pp. 1202-1211.

information congress: 75th IFLA general conference and council.

90. Ishii, D. K. (2003). Constructivist views of learning in science and mathematics. Retrieved from <http://www.ericdigests.org/2004-3/views.html>.
91. J. . David, “What Research Says About/Project-Based Learning. *Education al Leadership Teaching Students to Think*, 65, 5, 80-82,” 2008.
92. J. . Myers, R.J., & Botti, “Exploring the Environment: Problem-Based Learning in Action,” 2000.
93. John Larmer, John R. Mergendoller, and Suzie Boss, *Setting the Standard for Project Based Learning: A Proven Approach to Rigorous Classroom Instruction* (Alexandria, VA: ASCD, 2015). 54-65.
94. Johnson, D & Johnson, R. (1989) *cooperation and competition, theory and research, interaction Book Copany, Edina, MN.*
95. Johnson, R. B.B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14–26. <https://doi.org/10.3102/0013189X033007014>
96. Joy, E. and Garcia, F. (2000) “Measuring Learning Effectiveness: A New Look at No-Significant-Difference Findings”, *Journal of Asynchronous Learning Networks*, Vol. 4, No. 1, pp. 3-39.
97. K. H. Koch, Chlosta. S, “Project Seminar Business Plan Development-An Analysis Of Integrative Project-Based Project-Based Entrepreneurship Education. *Journal of Asia Entrepreneurship and Sustainability*. Volume II(2). May. Page 1-16,” 2006.

98. Kabir, S. M. S. (2016). *Methods Of Data Collection Basic Guidelines for Research: An Introductory Approach for All Disciplines* (first ed., pp. 201-275).
99. Kaeophanuek, S., Jaitip, N.-S., & Nilsook, P. (2018). How to Enhance Digital Literacy Skills among Information Sciences Students. *International Journal of Information and Education Technology*, 8(4), 292–297. <https://doi.org/10.18178/ijiet.2018.8.4.1050>
100. Kaeophanuek, S., Jaitip, N.-S., & Nilsook, P. (2018). How to Enhance Digital Literacy Skills among Information Sciences Students. *International Journal of Information and Education Technology*, 8(4), 292–297. <https://doi.org/10.18178/ijiet.2018.8.4.1050>
101. Kearney, A (2020) the Asean Digital Revolution. URL:// <https://www.kenyon.edu/web/guest/digital.transformation/article/?a/the-asean-digital-revolution/>.
102. Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10, Article 2. <https://doi.org/10.1007/>
103. Kerlinger FN (1986), *Foundations of Behavioral Research*, 3rd ed. New York: Holt, Rinehart & Winston
104. Kilpatrick, William Heard (1918). *The Project Method*. Teachers College Record. the project method.
105. Kuhn, T. S. (1970) *The Structure of Scientific Revolutions* (2nd Edition) University of Chicago Press. Section V, pp. 43-51
106. Kuzu, E. B. (2014). Use of social networks for educational purposes among pre-service IT teachers. (Unpublished doctoral dissertation, Graduate School of Educational Sciences). Anadolu University, Eskişehir, Turkey.

107. Ladewski, B. G., Krajcik, J. S., & Harvey, C. L. (1994). A middle grade science teacher's emerging understanding of project-based instruction. *The Elementary School Journal*, 94, 5, 498-515.
108. Lai, E.R., & Viering, M. 2012. *Assessing 21st Century Skills: Integrating Research*
109. Larmer, J., & Mergendoller, J. R. (2010). Seven essentials for project-based learning. *Educational leadership*, 68(1), 34–37.
110. Larmer, J., Mergendoller, J., & Boss, S. (2015). *Setting the Standard for Project Based Learning: A Proven Approach to Rigorous Classroom Instruction*. Alexandria, VA: ASCD.
111. Lau, W.W.F. & Yuen, A.H.K. (2014). Developing and validating of a perceived ICT literacy scale for junior secondary school students: Pedagogical and educational contributions. *Computers & Education*, 78(1), 1-9. Elsevier Ltd. Retrieved June 1, 2023 from <https://www.learntechlib.org/p/201068/>.  
learning. Singapore: Springer.
112. Lee, H. C., & Blanchard, M. R. (2018). Why teach with PBL? Motivational factors underlying middle and high school teachers' use of problem-based learning. *Interdisciplinary Journal of Problem-Based Learning*, 13(1).  
<https://doi.org/10.7771/1541-5015.1719>.
113. Lenz, B., Wells, J., and Kingston, S., (2015). *Transforming schools: Using project based learning, performing assessment, and common core standards*. San Francisco, CA: Jossey-Bass
114. Maley, A. (1992). An open letter to 'the profession'. *ELT Journal*, 46(1), 96-99.

115. Maley, A. (1998). Squaring the circle – reconciling materials as constraint with materials as empowerment. In B. Tomlinson (ed.), *Materials development in language teaching* (pp.279-294). Cambridge: Cambridge University Press.
116. Maley, A. (2011). Squaring the circle – reconciling materials as constraint with materials as empowerment. In B. Tomlinson (Ed.), *Materials development in language teaching* (2nd ed.; pp.357–378). Cambridge University Press.
117. Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., Blunk, M., Crawford, B., Kelley, B., &
118. Marx, R. W., Blumenfeld, P. C., Krajcik, J. S., Blunk, M., Crawford, B., Kelley, B., & Meyer, K. M. (1994). Enacting project-based science: Experiences of four middle grade teachers. *Elementary School Journal*, 94, 517-538.
119. Maxwell, J. A. (2016). Expanding the history and range of mixed methods research. *Journal of Mixed Methods Research*, 10(1), 12–27.  
<https://doi.org/10.1177/1558689815571132>
120. McGrath, I. (2013). *Teaching materials and the role of EFL/ESL teachers*. Bloomsbury.
121. McGrath, I. (2014). "Adapting Course books to the Needs of Teachers and Learners". *ELT Journal*, Volume 58, Issue 4, October 2004, Pages 312–318.DOI: 10.1093/elt/58.4.312.
122. McGrath, I. (2016). *Materials evaluation and design for language teaching* (2nd ed.). Edinburgh University Press.
123. McNaught, C., & Lam , P. (2010). Using wordle as a supplementary research tool. *The Qualitative Report*, 15(3), 630-643. <http://www.nova.edu/ssss/QR/QR15-3/mcnaught.pdf>

124. McQuiggan, S., McQuiggan, J., Sabourin, J., & Kosturko, L. (2015). *Mobile Learning: A Handbook for Developers, Educators, and Learners*. John Wiley & Sons.
- Meyer, K. M. (1994). Enacting project-based science: Experiences of four middle grade teachers. *Elementary School Journal*, 94, 517-538.
125. Mills, K. A. (2010). A review of the “digital turn” in the New Literacy Studies. *Review of Educational Research*, 80(2), 246–271.  
<https://doi.org/10.3102/0034654310364401>
126. Molbaek, M. (2018). Inclusive teaching strategies—dimensions and agendas. *International Journal of Inclusive Education*, 22(10), 1048-1061.
127. Moore, D. & Dwyer, F. (1994). *Visual Literacy: A Spectrum of Visual Learning*. Englewood Cliffs, NJ: Educational Technology Publications.
128. Morgan, D. L. (2014). *Integrating qualitative and quantitative methods: A pragmatic approach*. Sage Publications
129. Morgan, D.L. (2007) ‘Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods’, *Journal of Mixed Methods Research*, Vol. 1, No. 1, pp.48-76.
130. Morgan, D.L. (2007) ‘Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods’, *Journal of Mixed Methods Research*, Vol. 1, No. 1, pp.48-76.
131. Nancy, B, Grove .S.K. (2007) *Understanding Nursing Research*. 4 edition. Missouri: Elsevier Publication; 2007. p 125-129.
132. Nassir, S. M. S. (2014). The effectiveness of project-based learning strategy on ninth-graders’ achievement level and their attitude towards English in governmental

schools-north 59 | V o l. 1, No. 2, D e c e m b e r 2 0 2 0 governorate. Master's thesis.  
Gaza: The Islamic University of Gaza.

133. Nizwardi, J. (2017). (The Seven Steps of Project Based Learning Model to Enhance Productive Competences of Vocational Students, Copyright © 2017, the Authors. Published by Atlantis Press. This is an open access article under the CC BY-NC license(<http://creativecommons.org/licenses/by-nc/4.0/>). Advances in Social Science, Education and Humanities Research, volume 102. 1st International Conference on Technology and Vocational Teachers (ICTVT 2017).
134. Noor-Ul-Amin, S. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research and experience: ICT as a change agent for education. Scholarly Journal of Education, vol. 2, no.4, pp.38-54.
135. Northstar basic computer skills certificate: Assessment homepage. (2012). Retrieved from [www.digitalliteracyassessment.org](http://www.digitalliteracyassessment.org).
136. Northstar basic computer skills certificate: History and purpose. (2012). Retrieved August 30, 2013, from <https://www.digitalliteracyassessment.org/history.php>.
137. Northstar basic computer skills certificate: Standards. (2012). Retrieved November 11, 2013, from <https://www.digitalliteracyassessment.org/standards.php>.
138. Northstar basic computer skills: Sponsoring sites. (2012). Retrieved November 11, 2013, from <http://www.digitalliteracyassessment.org/sponsoringsites.php>.
139. Northstar digital literacy project: Administrative web-portal. (2012). Retrieved November 11, 2013, from <https://www.digitalliteracyassessment.org/adminstaff/>.
140. Ornstein, A. C., & Hunkins, F. P. (2004). Curriculum foundations, principles and issues (4<sup>th</sup> ed.) Boston, MA: Allyn & Bacon.

141. Papert, S. (1980). *Mindstorms. Children, computers and powerful ideas*. New York: Basic Books, INC.
142. Papert, S. (1980). *Mindstorms-Children, Computers and Powerful Ideas*. New York: Basic Books, Inc.
143. Patton, M. (2002). *Qualitative Research and Evaluation Methods*. 3<sup>rd</sup> ed. Thousand Oaks, CA: Sage.
144. Payton, S., Hague, C. (2010) 'Digital literacy in practice : case studies of primary and secondary classrooms', Futurelab, Retrieved July 27, 2020 from [http://www2.futurelab.org.uk/resources/documents/project\\_reports/digital\\_literacy\\_case\\_studies.pdf](http://www2.futurelab.org.uk/resources/documents/project_reports/digital_literacy_case_studies.pdf)
145. Phillips, et al. (1999) *Projects with young learners*. Oxford: Oxford University Press.
146. Phuapan, P., Viriyavejakul, C., & Pimdee, P. (2016). An analysis of digital literacy skills among Thai university seniors. *International Journal of Emerging Technologies in Learning*, 11(3), 24–31. <https://doi.org/10.3991/ijet.v11i03.5301>
147. Pithouse-Morgan, K., Muthukrishna, N., Pillay, D., Van Laren, L., Chisanga, T., Meyiwa, T., Stuart, J. (2015). Learning about co-flexivity in a transdisciplinary self-study research supervision community. In K. Pithouse-Morgan, & A. P. Samaras (Eds.), *Polyvocal professional learning through self-study research* (pp. 145-171). Sense.
148. Posch, A., Scholz, R., Stauffacher, M., Walter, A., Lang, D., Wiek, A., et al. (2006). Learning to research environmental problems from a functional socio-cultural constructivism perspective: the transdisciplinary case study approach. *International Journal of Sustainability in Higher Education*, 7(3), 252–275.
149. Railean, E. A. (2017). User interface design of digital textbooks: How screens affect

150. Rais, M. 2010. Project-Based-Learning: Inovasi Pembelajaran yang Berorientasi Soft Skill. Seminar Nasional Pendidikan Teknologi dan Kejuruan Fakultas Teknik Universitas Negeri Surabaya. Surabaya: Universitas Negeri Makasar.
151. Rene, C.J. and Valdes, C.M.E. (2007). "Are you ready for mobile learning?", *Educase Quarterly*, 2(1).
152. Rescher, N. (2000) *Realistic Pragmatism: An Introduction of Pragmatic Philosophy*, State University of New York, Albany, NY.
153. Richards, J. C. (2001). *Curriculum Development in Language Teaching*. Cambridge: Cambridge University Press.
154. Richards, J. C. (2017) *Curriculum development in language teaching* (2nd ed.). Cambridge University Press
155. Richards, K. (2003). *Qualitative inquiry in TESOL*. New York, NY: Palgrave Macmillan.
156. Rosen, D. L. (2010). *Rewired: Understanding the iGeneration and the Way They Learn*. New York, NY: St. Martins Press LLC.
157. Rubdy, R. & Saraceni, M.(2001). "Teachers' adaptation of published materials: A Singapore case study". *Language and Education*, Volume 15, Issue 1, 2001, Pages 40-55. DOI: 10.1080/09500780108666717.
158. S. Gaer, "What is Project-Based Learning? <http://members.aol.com> Hung, D.W., & Wong, A.F.L. 2000. Activity Theory as a Frame work for Project Working Learning Environments. *Educational Technology*, 40 (2), 33-37," 1998.
159. Salomon, G. (2016). It's not just the tool but the educational rationale that

160. Savignon, S.J., Wang, C.2003. Communication language Learning using EFL contexts : Learner Attitudes and Perceptions. *International Review of Applied Linguistics* 41, 223-249.
161. Senthamarai, S. (2018). Interactive teaching strategies. *Journal of Applied and Advanced Research*, 3(1), S36-S38.
162. Shaffer, S. (2001). Using ICT for quality teaching, learning and effective management Report. Seventh UNESCO-ACEID International Conference on Education. UNESCO Asia and Pacific Regional Bureau for Education.
163. Sharp, L. A. (2018). Collaborative digital literacy practices among adult learners: Levels of confidence and perceptions of importance. *International Journal of Instruction*, 11(1), 153–166. <https://doi.org/10.12973/iji.2018.11111a>
164. Shopova, T. (2014). “Integrating of ICT’s in Education and Raising the Digital Literacy of Students in the University Environment”.
165. Shopova, T. (2014a) ‘Integration of ICTs in Education and Raising the Digital Literacy of Students in the University Environment’, In: Proceedings of 11th Conference on Efficiency and Responsibility in Education (ERIE 2014), Praha: CULS, pp. 703-711.
166. Silvi Yulia Sari et al 2022 *J. Phys.: Conf. Ser.* 2309 012061
167. Singh, Y. K. (2006). *Fundamentals of research methodology and statistics*. New Delhi: New Age International (P) Ltd.
168. Smolin, L., & Lawless, K. (2007). Technologies in schools: Stimulating a Dialogue. In L. Smolin, K. Lawless & N. C. Burbules (Eds.), *Information and Communication Technologies: Considerations of Current Practice For Teachers and Teacher Education (Vol. 2)*. Massachusetts: Blackwell Publishing Malden.

169. So, H. J. & Brush, T. A. (2008). Student perceptions of collaborative learning English Writing? Integrating Facebook and peer assessment with blended learning. *Australasian Journal of Educational Technology*, 27(5), 829-845.
- Spencer, M. (1986). «Emergent literacies: a site for analysis», *Language Arts* 63(5):442–53.
170. Susi, E.(2021).Electronic Project Based Learning a literature Review. Published by Atlants Press International B.V. Distributed under the CC by –NC4.0 License. <http://creativecommons.org/licenses/by-in/4.0/>
171. Sylvester, A. (2007). An investigation of project-based learning and computer simulations to promote conceptual understanding in eighth grade mathematics. Doctoral dissertation. Kansas: Kansas State University.
172. Taherdoost, H. (2021). Data Collection Methods and Tools for Research; A Step-by-Step Guide to Choose Data Collection Technique for Academic and Business Research Projects Authors. *International Journal of Academic Research in Management (IJARM)*, 2021, 10 (1), pp.10-38. ffhah-03741834f
173. Tamim, S., and Grant, M., (2013). Definitions and Uses:Case study of teachers implementing Project-based learning. *The Interdisciplinary Journal of Problem-Based Learning*, 7(2), 72-101. <https://doi.org/10.7771/1541-5015.1323> (Access Date: 30 September, 2015).
174. Tanner, R. & Green, C. (1998). *Tasks for teacher education: A reflective approach*. Coursebook. Harlow: Pearson.
175. Tashakkori, A., & Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Sage Publications

176. Tavoozy, Y., & Jelveh, R. (2019). Language teaching strategies and techniques used to support students learning in a language other than their mother tongue. *International Journal of Learning and Teaching*, 11(2), 77-88.
177. Taylor, L. (2005). Washback and Impact, *ELT Journal*, 59(2), 154.
178. Teddlie, C. and Tashakkori, A. (2009) *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences*, Sage, Thousand Oaks, CA.
179. Teddlie, C., and A. Tashakkori. 2003. Major issues and controversies in the use of mixed methods in the social and behavioral sciences. In *Handbook on mixed methods in the behavioral and social sciences*, ed. A. Tashakkori and C. Teddlie, pp. 3–50. Thousand Oaks, CA: Sage.
180. Thomas, J. W. (2000). A Review of Research [30]Project-Based Learning. Report Prepared for The Autodesk Foundation. [online]San Rafael, California: Autodesk Foundation, pp. 1-45. Available at:<https://www.asec.purdue.edu/lct/HBCU/documents/AReviewofResearchofProject-BasedLearning.pdf> [Accessed 22 Mar. 2019].
181. Thomas, J. W. (2000). A review of research on project based learning. Retrieved from: [http://www.bobpearlman.org/BestPractices/PBL\\_Research.pdf](http://www.bobpearlman.org/BestPractices/PBL_Research.pdf)
182. Thomas, J. W. (2000). A review of research on project-based learning. Retrieved from [http://www.bobpearlman.org/BestPractices/PBL\\_Research.pdf](http://www.bobpearlman.org/BestPractices/PBL_Research.pdf).
183. Thomas, J. W. (2000). A review of research on project-based learning. San Rafael, CA: The Autodesk Foundation.
184. Thomas, J.W. 2000. A review of research on Project Based Learning. <http://www.bobpearlman.org/BestPractices/PBL.Research.pdf> (accessed 13/10/2017).

185. Thorne, K. (2003). *Blended learning: How to integrate online and traditional learning*. London : Kogan Page.
186. Tomlinson, B. (1998). *Materials development in language teaching*. Cambridge: CUP.
187. Tomlinson, B. (2004). "Teacher adaptation to course book use". *ELT Journal*, Volume 58, Issue 3, July 2004, Pages 244–255. DOI: 10.1093/elt/58.3.244.
188. Tomlinson, B., & Masuhara, H. (2004). *Developing language course materials*. SAEMO Regional Language Centre
189. Tomlinson, B., & Masuhara, H. (2018). *The complete guide to the theory and practice of materials development for language learning*. Wiley Blackwell
190. Tyner, K. (1998). *Literacy in a Digital World* Mahwah, NJ: Erlbaum.
191. Ur, P. (1991). *A course in language teaching: Practice and theory*. Cambridge: Cambridge University Press.
192. Ur, P. (2015). Using the course book: A teacher's perspective. *The European Journal of Applied Linguistics and TEFL*, 4(2), 1–17.
193. Van Dijk, J., (2005). *The deeping divide: Inequality in the information society*. Thousand Oaks: Sage.
194. Van Joolingen, W. (2004) "The PISA framework for assessment of ICT literacy" Powerpoint presentation Online at: <http://www.ictliteracy.info/rf.pdf/PISA%20framework.ppt>
195. Vanek, J. (2013). "Northstar Digital Literacy Assessment Project: A community Engagement Initiative". University of Minnesota Twin Cities. pp 01-05.
196. Vidal, D. (2020). *From dysfunction to innovation in technology: Overcoming critical infrastructure and organizational dynamics in education*. Lanham, MD: Rowman & Littlefield Publishers.

197. Viégas, F. B., & Wattenberg, M. (July/August 2008). Timelinestag clouds and the case for vernacular visualization. *Interactions*, 15(4), 49-52.  
<http://doi:10.1145/1374489.1374501>
198. Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Processes* MA: Harvard University Press.
199. Walliman, N. & Baiche, B. (2001). *Your research project: A step-by-step guide for the first-time researcher*. London: SAGE Publications.
200. Waycott, J., Bennett, S., Kennedy, G., Dalgarno, B. and Gray, K. (2010) "Digital Divides? Student and Staff Perceptions of
201. Wilson, K. (2007) *Smart Choice Student Book 1*. Hong Kong: Oxford University Press
202. Wolpert-Gawron, H. (2016). *DIY project based learning for math and science*. New York and London: Routledge and Taylor and Francis Group.
203. Wolverton, C.C., & Tanner, J.R. (2019). Teaching Public Speaking to Business Students in the Digital Age: Updating Our Methods. *International Journal of Education and Development using Information and Communication Technology*, vol. 15, pp. 22-33.
204. Wu, K. & Krajcik, J. (2006). Exploring middle school students use of inscriptions in project based science classroom. *Wiely interscience*, doi: 10.1002/sce.20154.
205. [www. Educatorstechnology.com](http://www.educatorstechnology.com). (2023) *educators Technology*.
206. Y. Doppelt, "Implementation and assessment of project based learning in flexible environment. *Instructional Journal of Technology and Design Education*. Volume 13 Page 255-272," 2003.
207. Yalçın, S. A., Turgut, Ü., & Büyükkasap, E. (2009). The effect of project based learning on science undergraduates' learning of electricity, attitude towards physics and

scientific process skills. *International Online Journal of Educational Sciences*, 1(1), 81–105.

208. Yudha, C. B., Supena, A., Yufiarti, Nurfatana, & Iasha, V. (2020). Use Brain Based Learning During The Covid-19 Pandemic. *Proceedings of the 4th International Conference on Learning Innovation and Quality Education*, 1–11. <https://doi.org/10.1145/3452144.3453741>.

209. Zhang D and Nunamaker J F 2003 *Information systems frontiers* 5(2) 207-218

210. Zohrabi, M. & Abedini, A. (2014). "Teachers' Voices on the Selection and Adaptation of Textbooks: A Case Study". *Journal of Language Teaching and Research*, Volume 5, Issue 5, September 2014, Pages 1053-1061. DOI: 10.4304/jltr.5.5.1053-

## **List of Appendices**

- 1- PjBL in 1st Year SE Course Book “AT The Crossword”
- 2- PjBL in 2nd Year SE Course Book “Getting Through”
- 3- PjBL in 3rd Year SE Course Book “New Prospects”
- 4- Towards Adapting Algerian Course Books’ Projects (Examples)
- 5- NORTHSTAR Digital Literacy Assessment Project
- 6- Teachers’ Questionnaire
- 7- Learners’ Questionnaire
- 8- Learners’ Experiment Photos
- 9- Project Evaluation Observation Grid
- 10- Learners’ photos in PjBL
- 11- Ethical Approval Letters
- 12- Certificate of Seminar Meeting on Maximizing Learners’ Digital Literacy Via PjBL
- 13- Project-based Learning Essential Elements Checklist
- 14- Metro Map All Aboard



The screenshot shows the top portion of a website. At the top left is the Northstar logo, which consists of a stylized 'N' inside a diamond shape with orange, blue, and teal colors. To the right of the logo is the word 'NORTHSTAR' in white, bold, uppercase letters. Further right is a hamburger menu icon (three horizontal lines) inside a dark grey circle. Below the header is a large blue section with white text. The text reads: 'Learn it, know it, show it.' followed by a paragraph: 'Northstar Digital Literacy tests your computer skills. You can build skills in key areas, and demonstrate your knowledge by earning certificates and badges. Prepare for your future now!'. At the bottom of this section, it says 'Northstar is a program of' followed by the 'Literacy Minnesota' logo, which features the words 'Literacy Minnesota' in white text next to a stylized outline of the state of Minnesota in yellow and red.



## **Test Your Digital Literacy**

Complete any of the online assessments to see what



Public Version [?](#)



# Microsoft Excel

Number of Questions: 31

Start Now



## How It Works

**Northstar Digital Literacy** defines the basic skills needed to use a computer and the internet in daily life, employment, and higher education.



**WATCH THE VIDEO**



# About Northstar

Northstar Digital Literacy defines basic skills needed to perform tasks on computers and online. Online, self-guided modules assess the ability of individuals to perform tasks based on these skills.

Included are [basic computer digital literacy standards](#) and modules in three main areas:

- **Essential Computer Skills** - Basic Computer Skills, Internet Basics, Using Email, Windows OS, Mac OS
- **Essential Software Skills** – Microsoft Word, Excel, PowerPoint, Google Docs
- **Using Technology in Daily Life** - Social Media, Information Literacy, Career Search Skills, Accessing Telehealth Appointments, Supporting K-12 Distance Learning, Your Digital Footprint.

Northstar was developed in response to the needs of job seekers who may lack the



Northstar was developed in response to the needs of job seekers who may lack the digital literacy skills needed to seek, obtain, and retain employment, as well as to perform other tasks in daily life. Northstar allows end users to freely take the assessments from anywhere via our homepage, but individuals can instead go to an approved Northstar location and obtain the Northstar Digital Literacy Certificate when they pass assessments. Certificates provide an important credential for employment, as even entry-level jobs increasingly require basic computer skills. Certificates also certify end user ability to complete computer skills needed in higher education, and demonstrate their ability to use social media and online information thoughtfully.

---

## Northstar Features

Northstar provides assessments, instructor-led curricula and self-directed online learning for basic digital literacy skills. Subscribing organizations can use Northstar resources to determine needs, provide relevant instruction, and track results.

## What are the Northstar assessments?



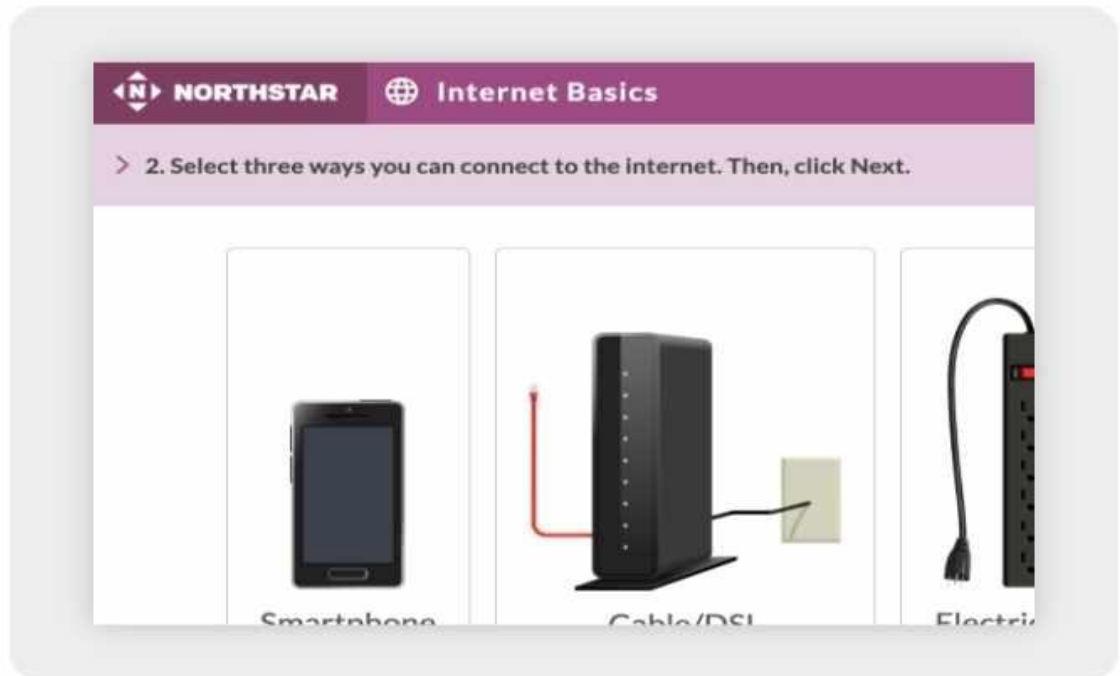


# What are the Northstar assessments?



Interactive digital literacy tests, taken online



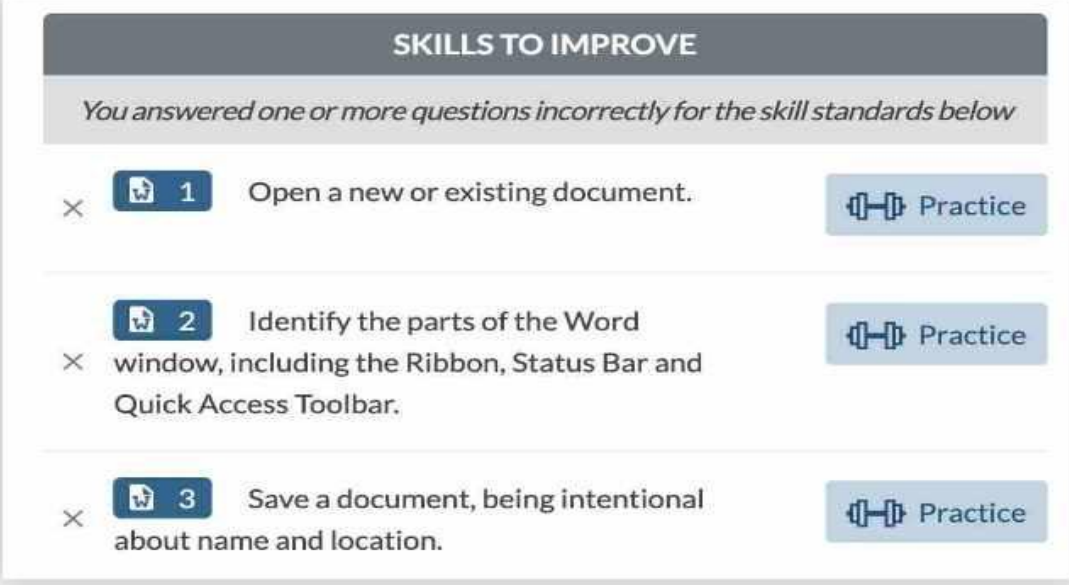


Allow test takers to demonstrate basic computer & digital literacy skills






Provide a report of areas mastered and areas needing improvement

Provide a report of areas mastered and areas needing improvement



**SKILLS TO IMPROVE**

*You answered one or more questions incorrectly for the skill standards below*

- ×  **1** Open a new or existing document. [Practice](#)
- ×  **2** Identify the parts of the Word window, including the Ribbon, Status Bar and Quick Access Toolbar. [Practice](#)
- ×  **3** Save a document, being intentional about name and location. [Practice](#)

Integrated with Northstar Online Learning (NSOL) resources when working with a subscribing Northstar location; learners can access practice resources to build their digital literacy skills





**CERTIFICATE OF COMPLETION**

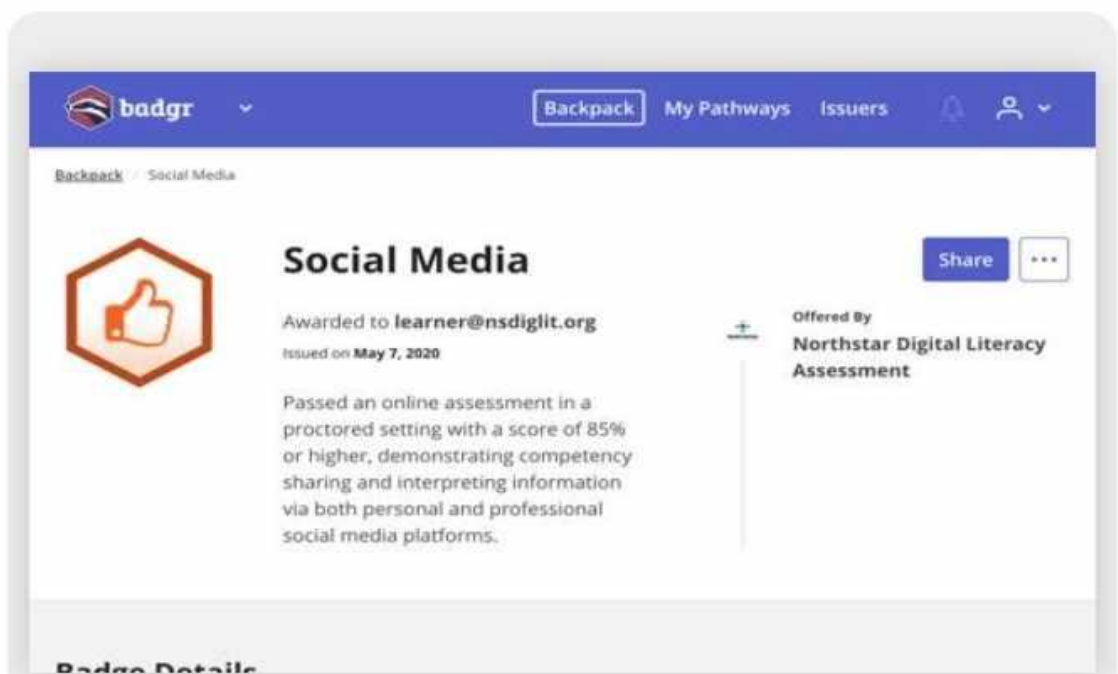
IS HEREBY AWARDED TO

**Imeda Rusudan**


build their digital literacy skills




Test takers earn certificates when assessments are passed and proctored through a Northstar subscriber, either virtually or in person at the location




## 1. Basic Computer Skills








**NORTHSTAR**




Language: English ▾



### Essential Computer Skills

-  [Basic Computer Skills](#)
-  [Internet Basics](#)
-  [Using Email](#)
-  [Windows](#)
-  [Mac OS](#)





Audio Setup



## Do you hear the music?

This assessment uses audio. Please turn on your speakers or put on headphones.

Click the **Next** button below to continue when you're ready.

I Don't Have Sound

Next



Public Version [?](#)



# Basic Computer Skills

Number of Questions: 38

[Start Now](#)



1. Click on the desktop computer.





2. Click on the laptop computer.





3. Click on the touch screen in the picture.



I Don't Know





4. Click on the home button in the picture.





5. Click on the USB port.





6. Click on the computer's camera.



I Don't Know





7. Click on the charging port.



I Don't Know





. Click on the system unit, or computer case.





9. Click on the monitor.



I Don't Know





10. Click on the button in the picture that turns on the computer.



I Don't Know





11. Click on the button in the picture that turns the monitor on and off.



I Don't Know





13. Press the key that makes all the letters you type capital letters until you press it again.





14. Press key that will start a new line or paragraph in your text.



I Don't Know





15. Press the key you need to use to type  instead of  .



I Don't Know





Not that one! That just types /.  
Click the other key that helps you.



I Don't Know



## 2. Internet Basics



Public Version 



# Internet Basics

Number of Questions: 34

[Start Now](#)



1. Select all of the internet browser icons. Then, click Next.



I Don't Know





2. Select three ways you can connect to the internet.  
Then, click Next.



Smartphone



Cable/DSL

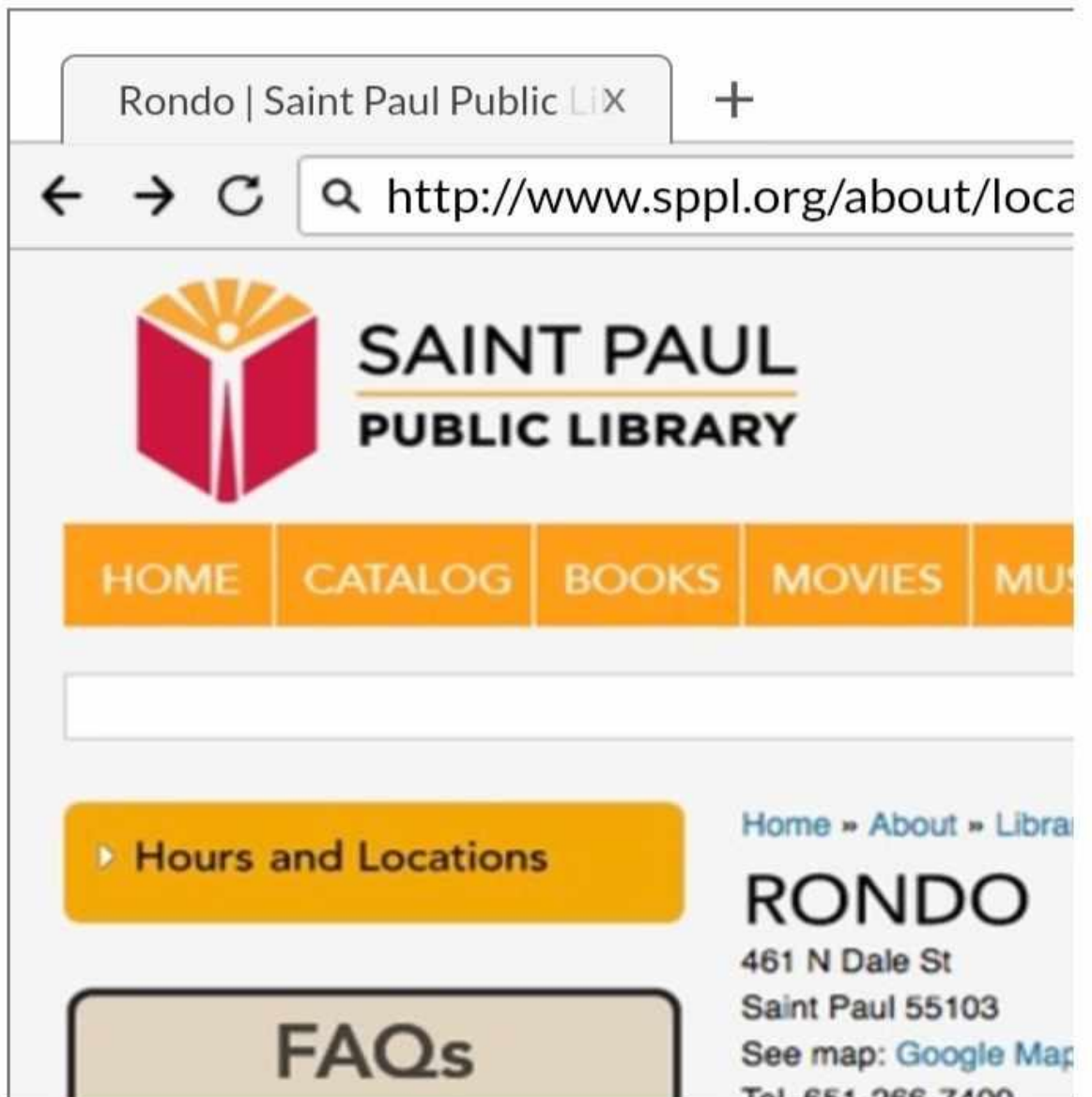
I Don't Know



Next

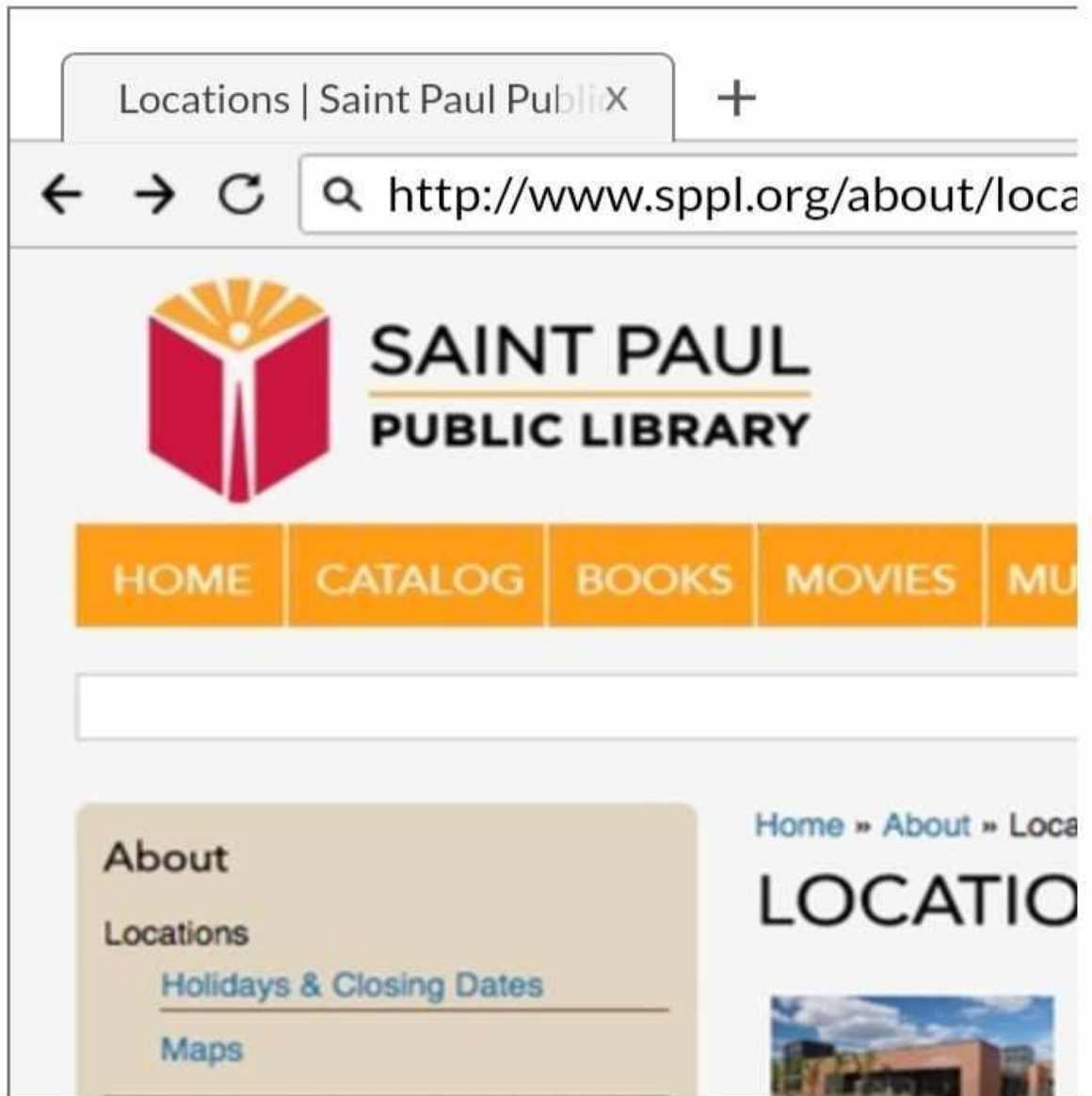


3. In the picture, click on the button in the browser window that takes you back to the last page you were on.



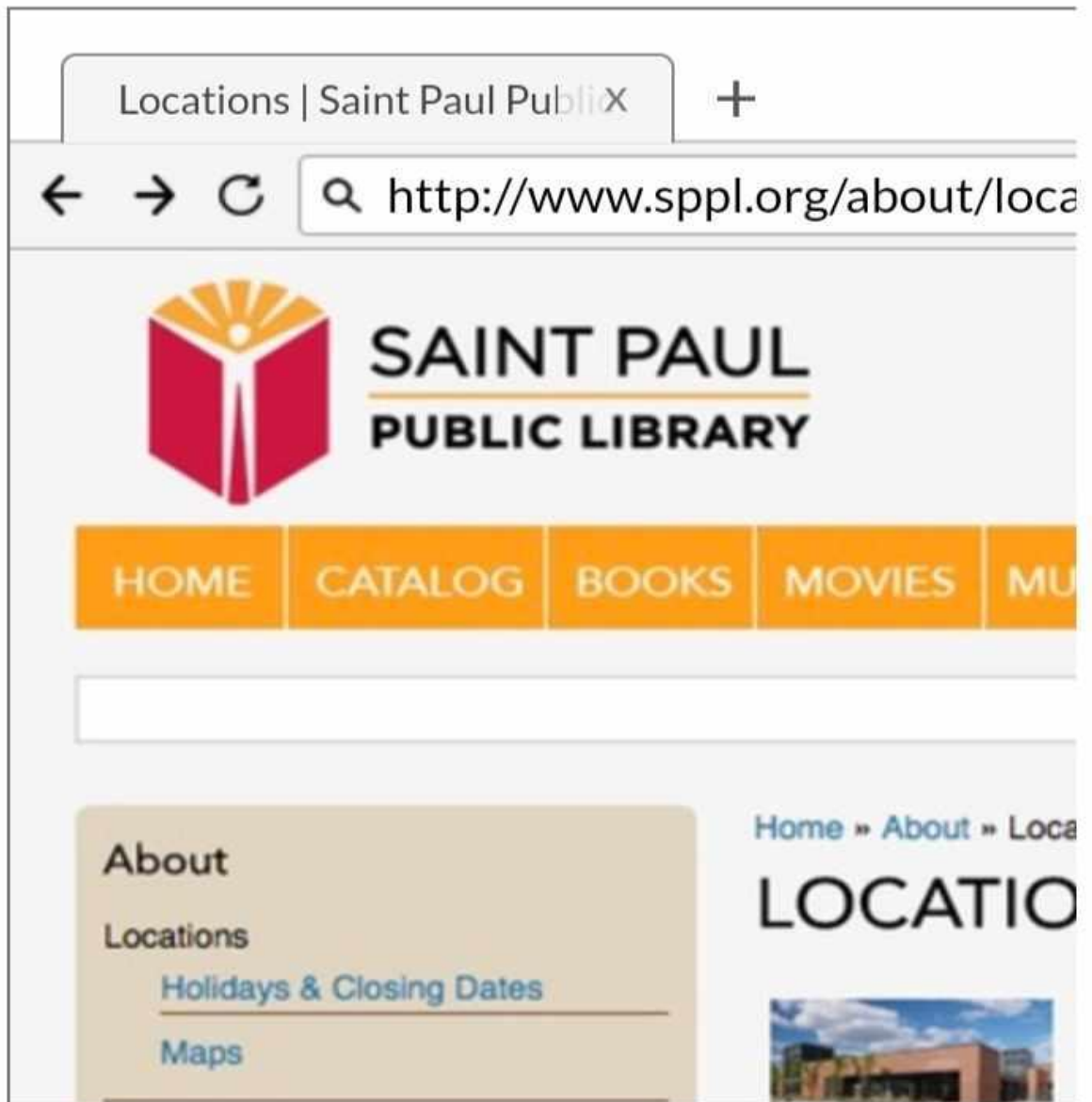


4. In the picture, click on the button in the browser window that refreshes that page.





5. In the picture, click on the button in the browser window that adds that page to your favorites.

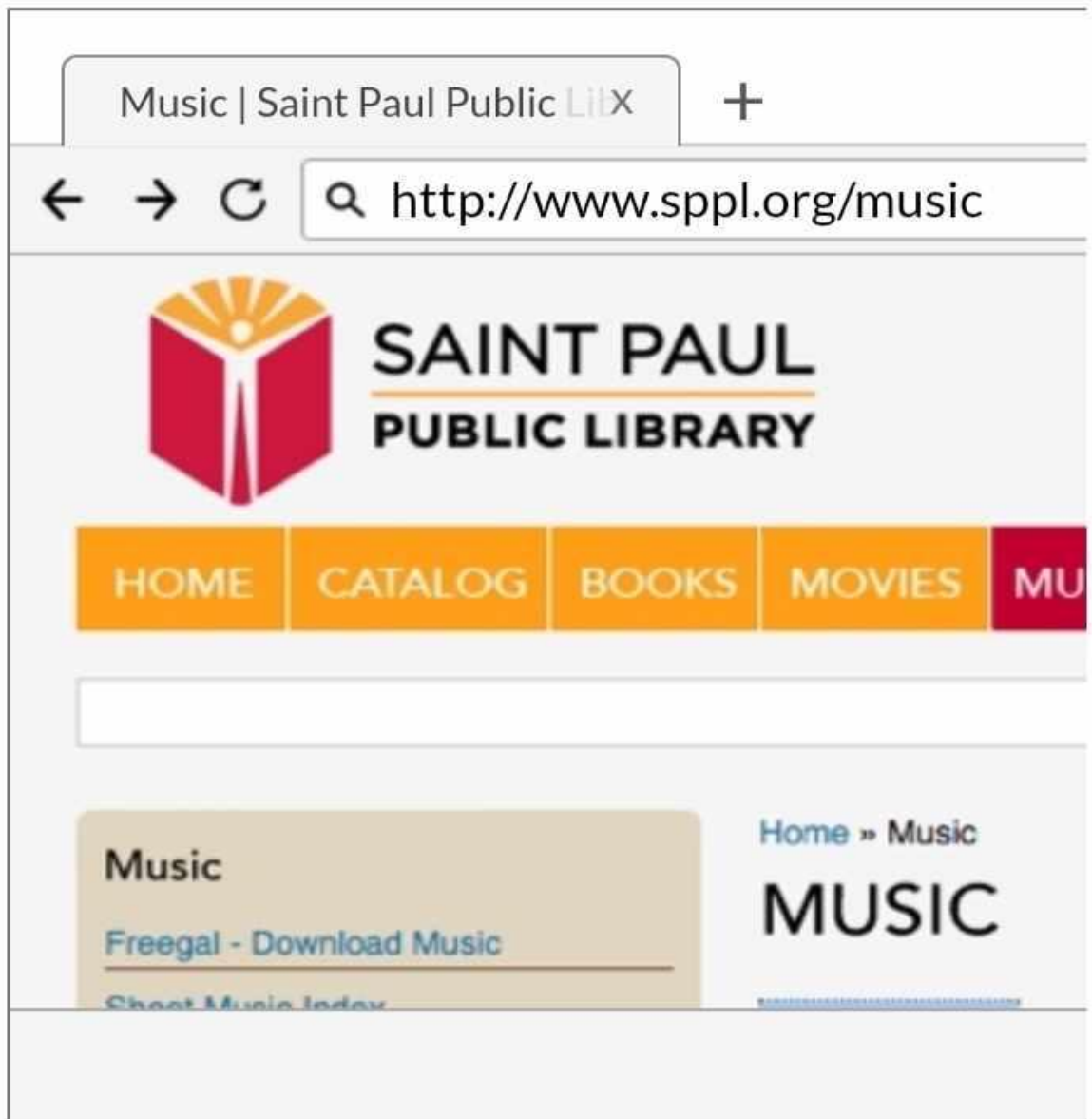


I Don't Know



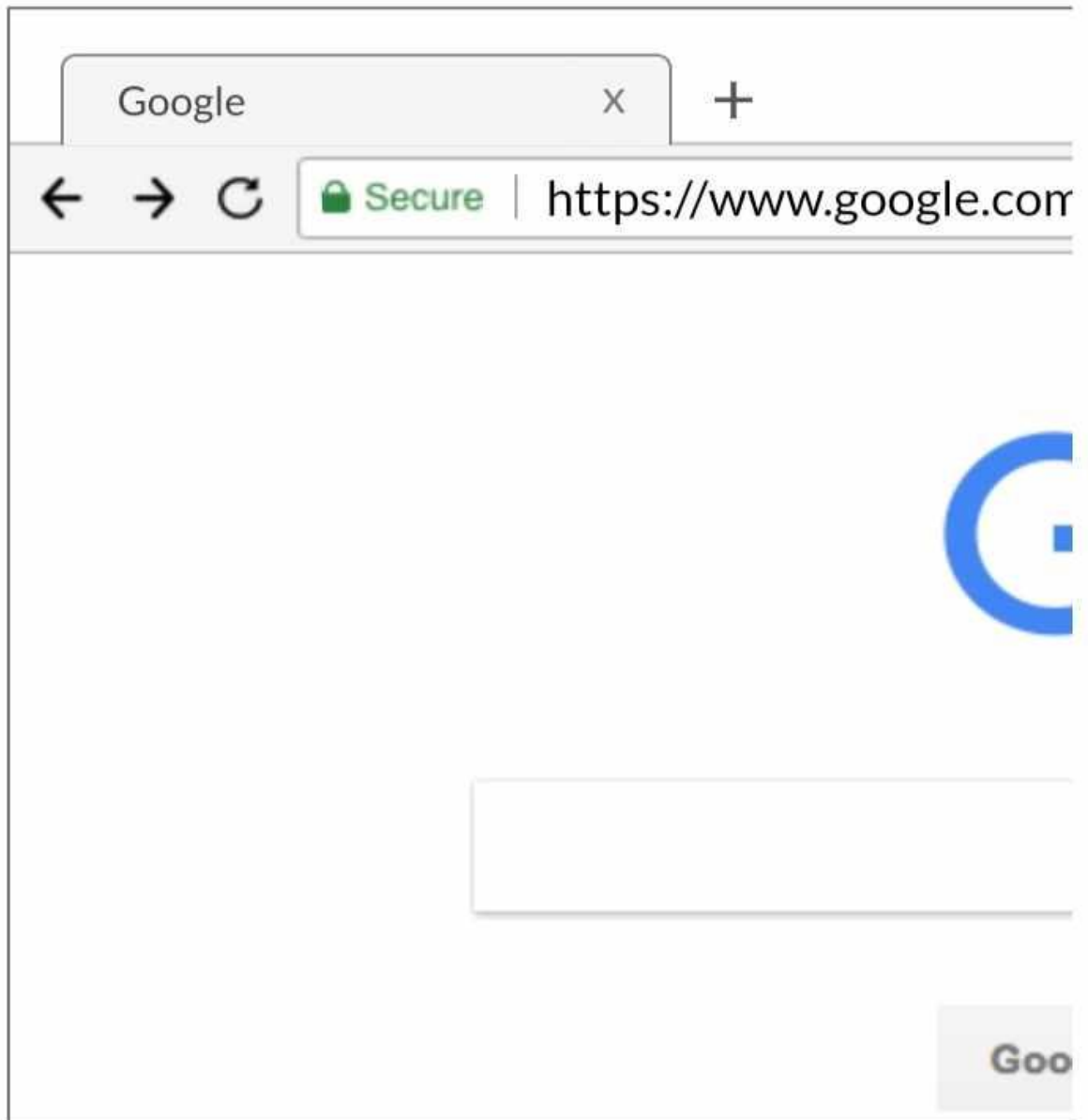


6. In the picture, click on the button in the browser window to find the files you've downloaded.



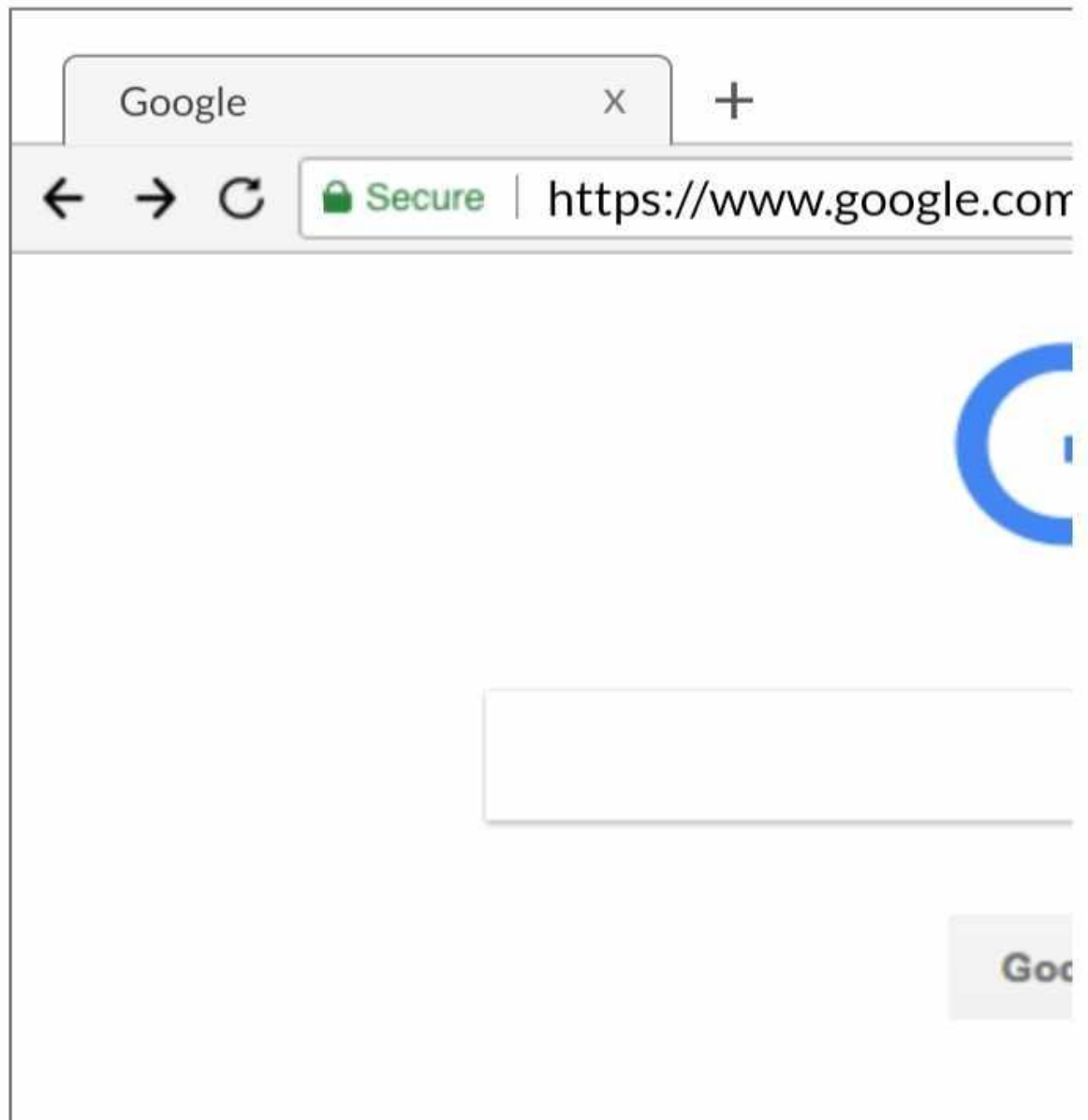


7. Click on the address bar.





8. Click on the places in the picture where you can type search terms. Then, click Next.





9. Select all of the correct answers. Then, click Next.



post office washington

Google Search

I'm Feeling Lucky

I Don't Know



Next

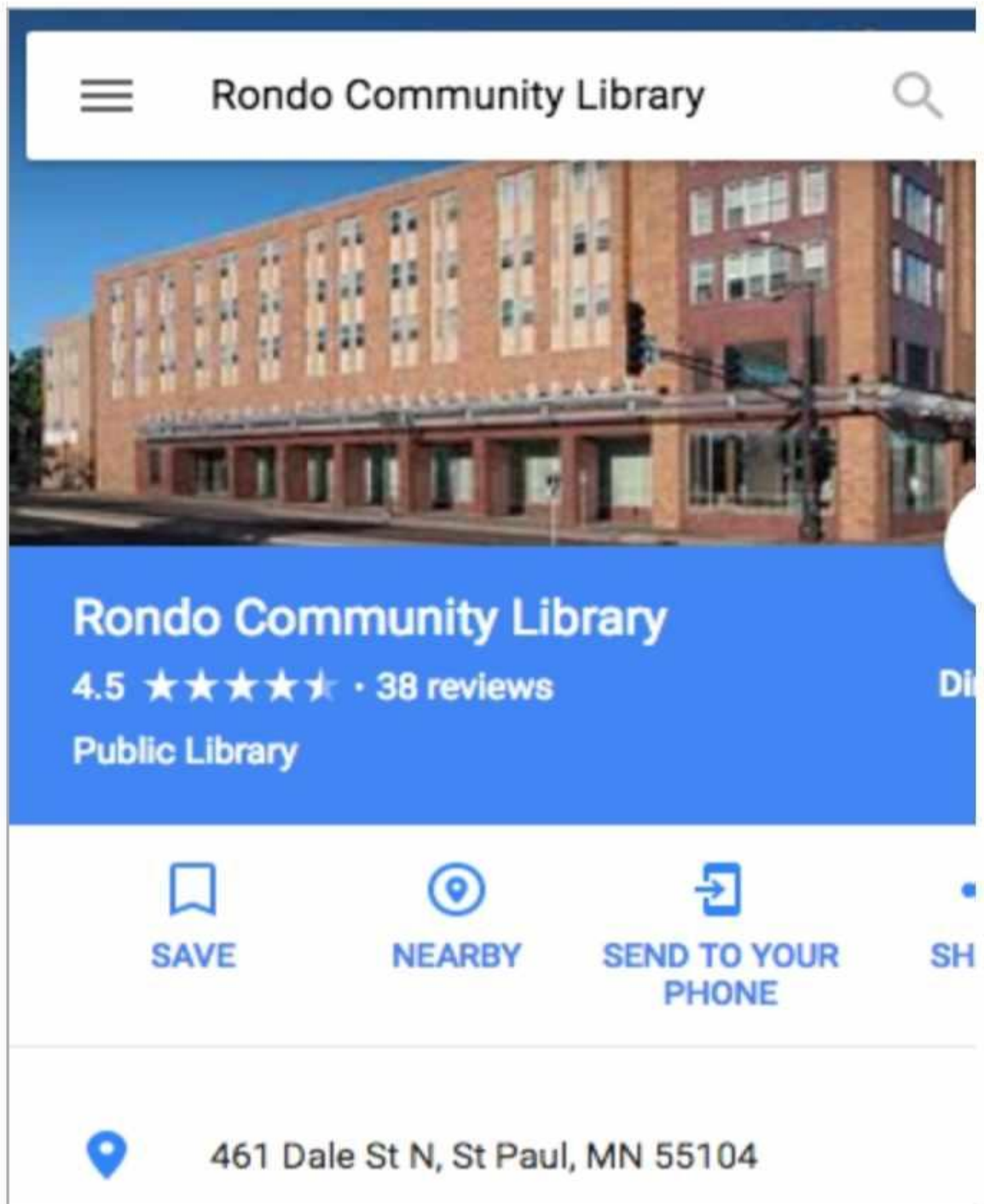


10. Click on the link that will allow me to search for pictures only.

The screenshot shows the Google search interface. The search bar contains the text "post office washington". Below the search bar, the "All" tab is selected, with "Maps", "News", and "Images" tabs visible. Below the tabs, it says "About 231,000,000 results (0.64 s)". Below the results, a map snippet is visible, showing "Theodore Wirth Regional Park" and "Basilica of Saint Mary". A red pin is located on the map near the top right corner.

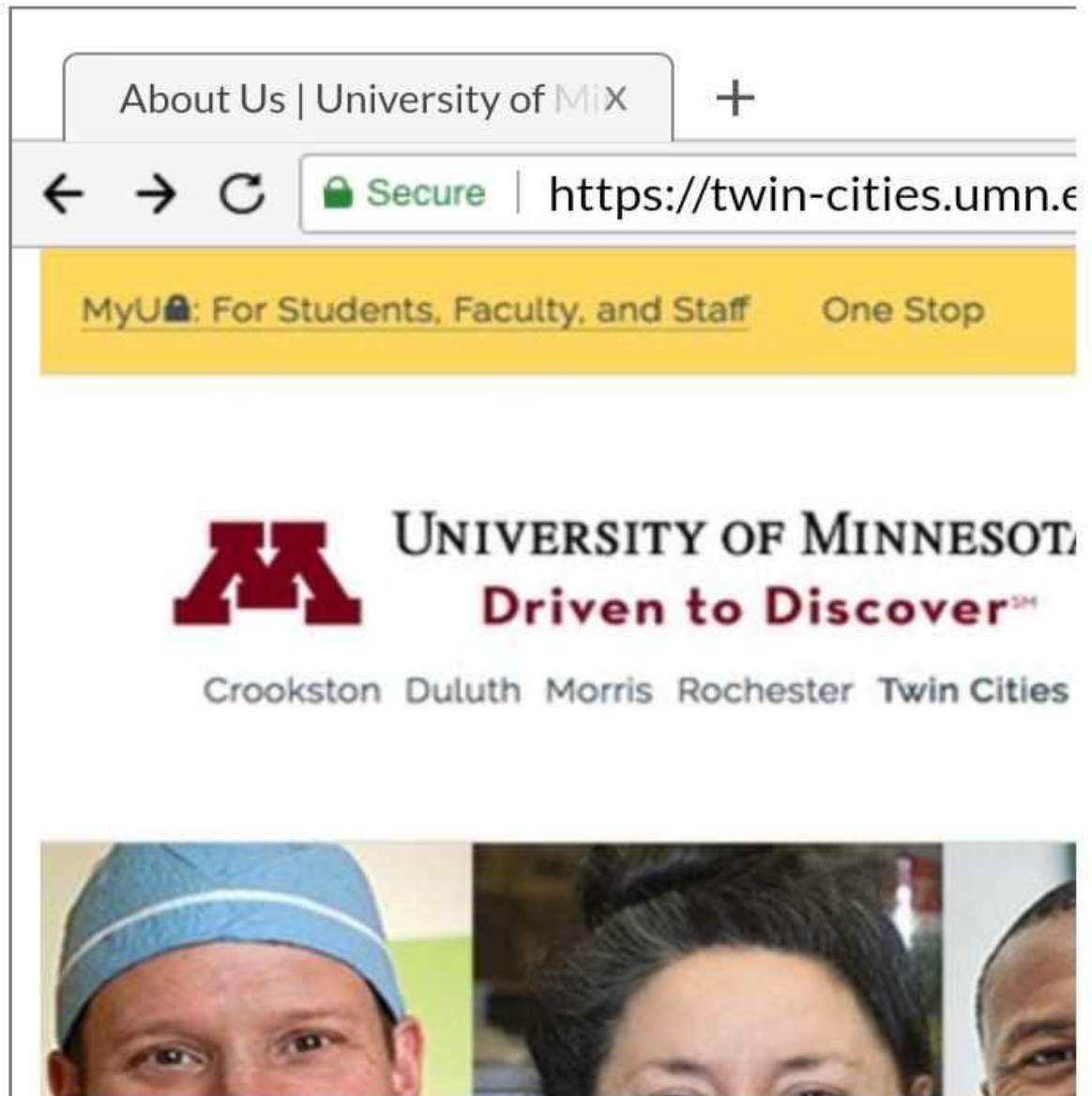


11. Click on the control in the picture that will zoom in the map for more detail.





12. Scroll down to the bottom of the page.



### 3. Email



Public Version [?](#)



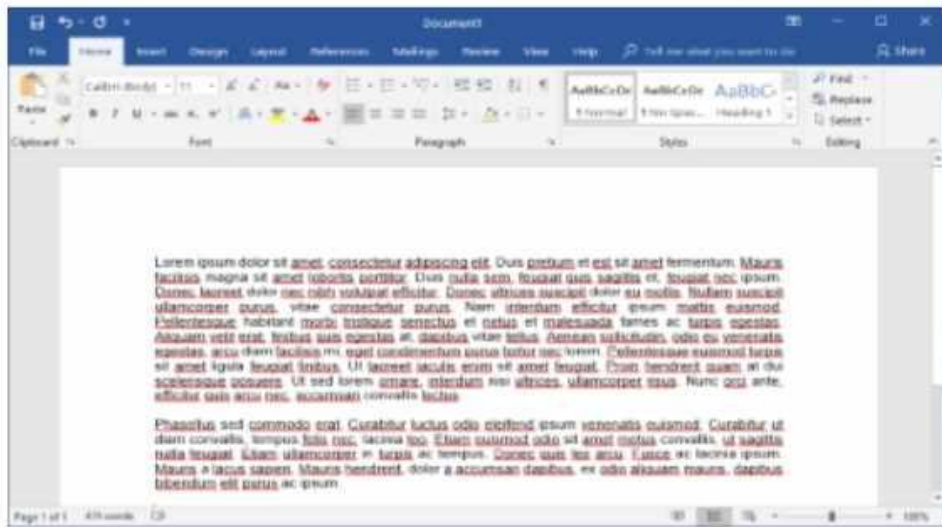
## Using Email

Number of Questions: 32

Start Now



# 1. Click on the picture of email.





2. Select the correct answer.

What is “email”?

A program where you can create docu

A way to talk to people on the comput

A place where you can write words th

A way to send letters across the interi

I Don't Know





3. Select all of the email icons. Then click Next.





Public Version ?

Order all of the email icons. Then click text.

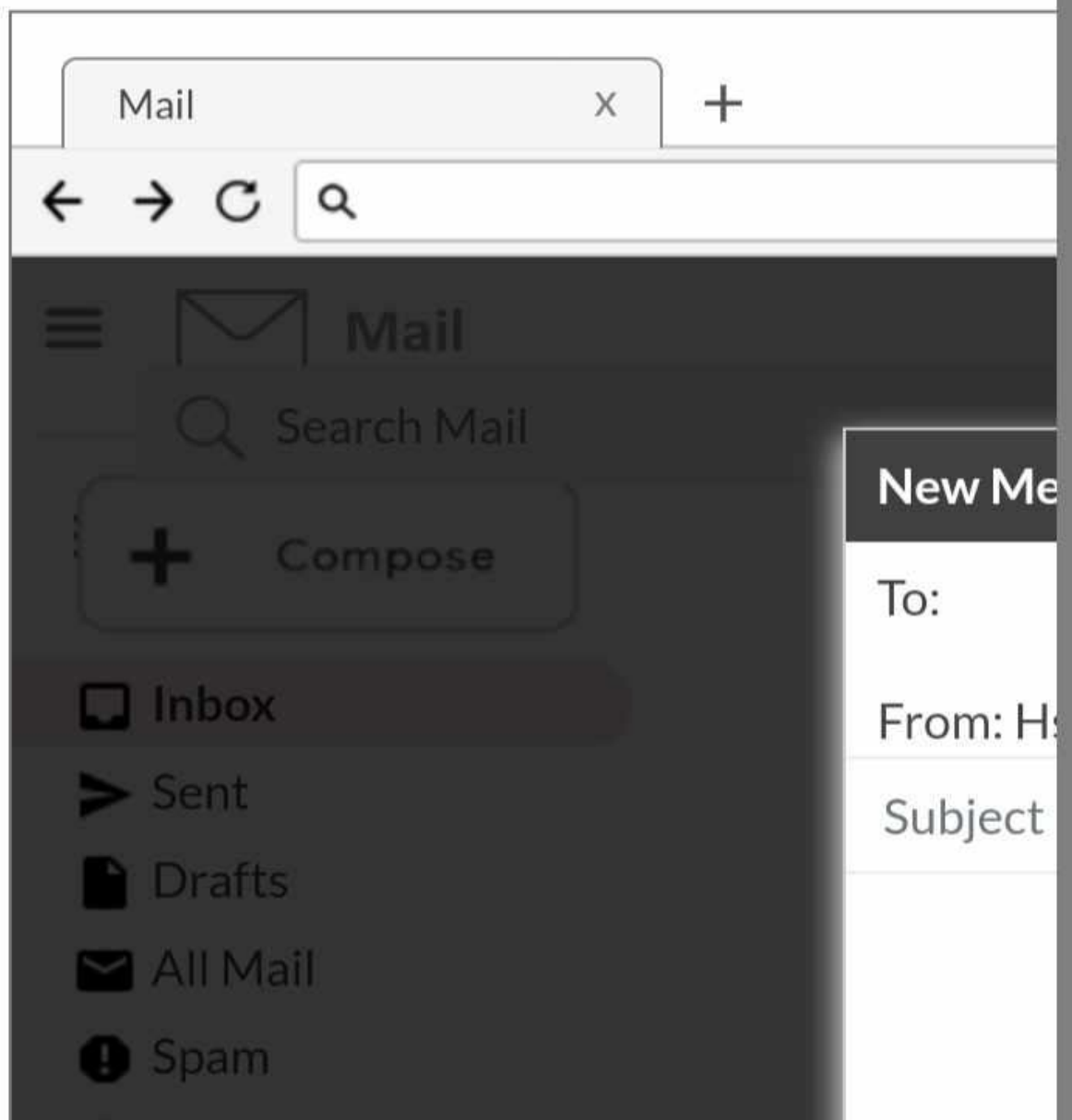


I Don't Know





4. Which field uses email addresses? Which one uses web addresses? Drag each term to the field where you can use it. Then, click Next.



Web Address »



#### 4. Microsoft Word



Public Version [?](#)



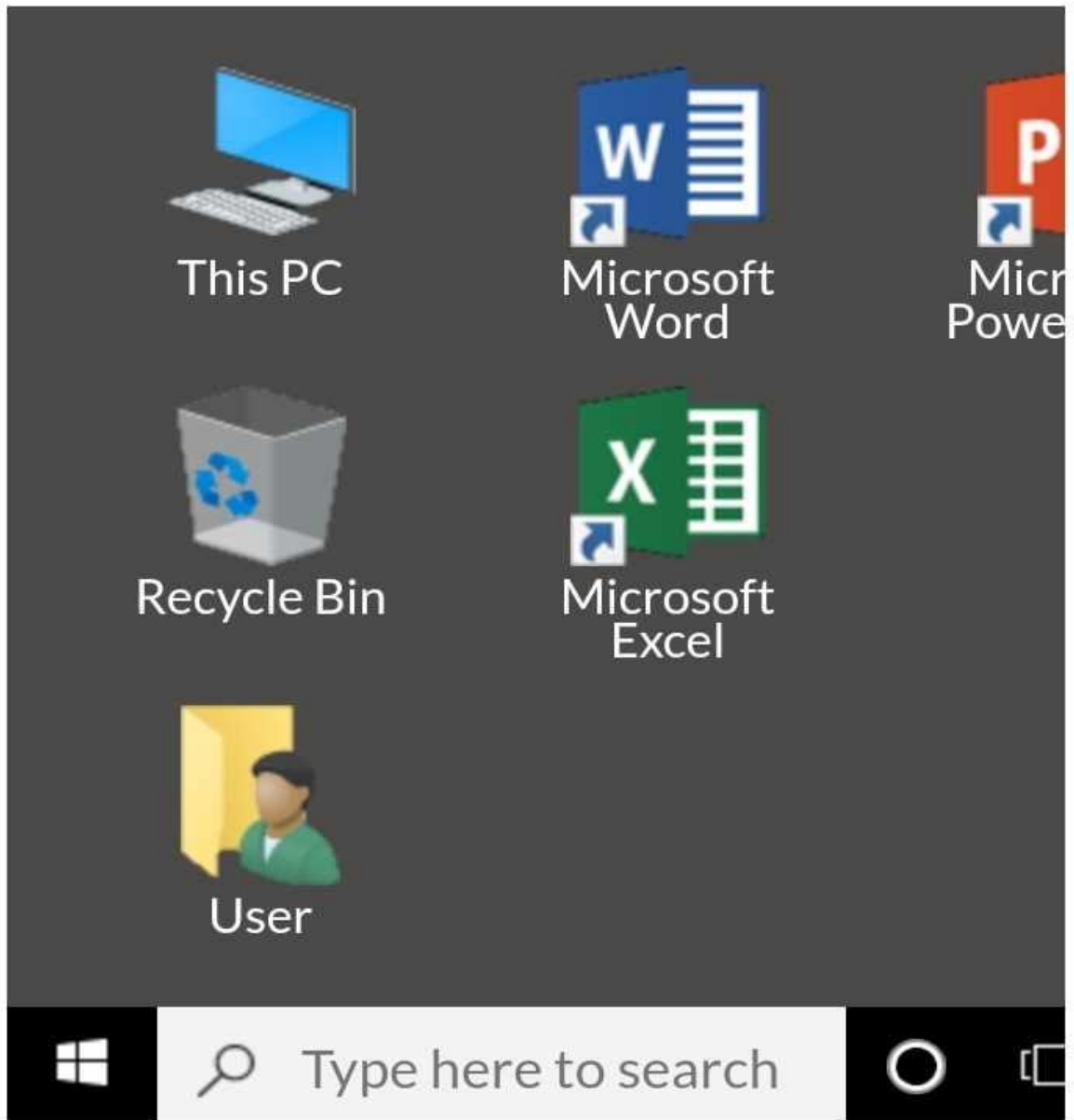
# Microsoft Word

Number of Questions: 26

Start Now



1. Create a new document.

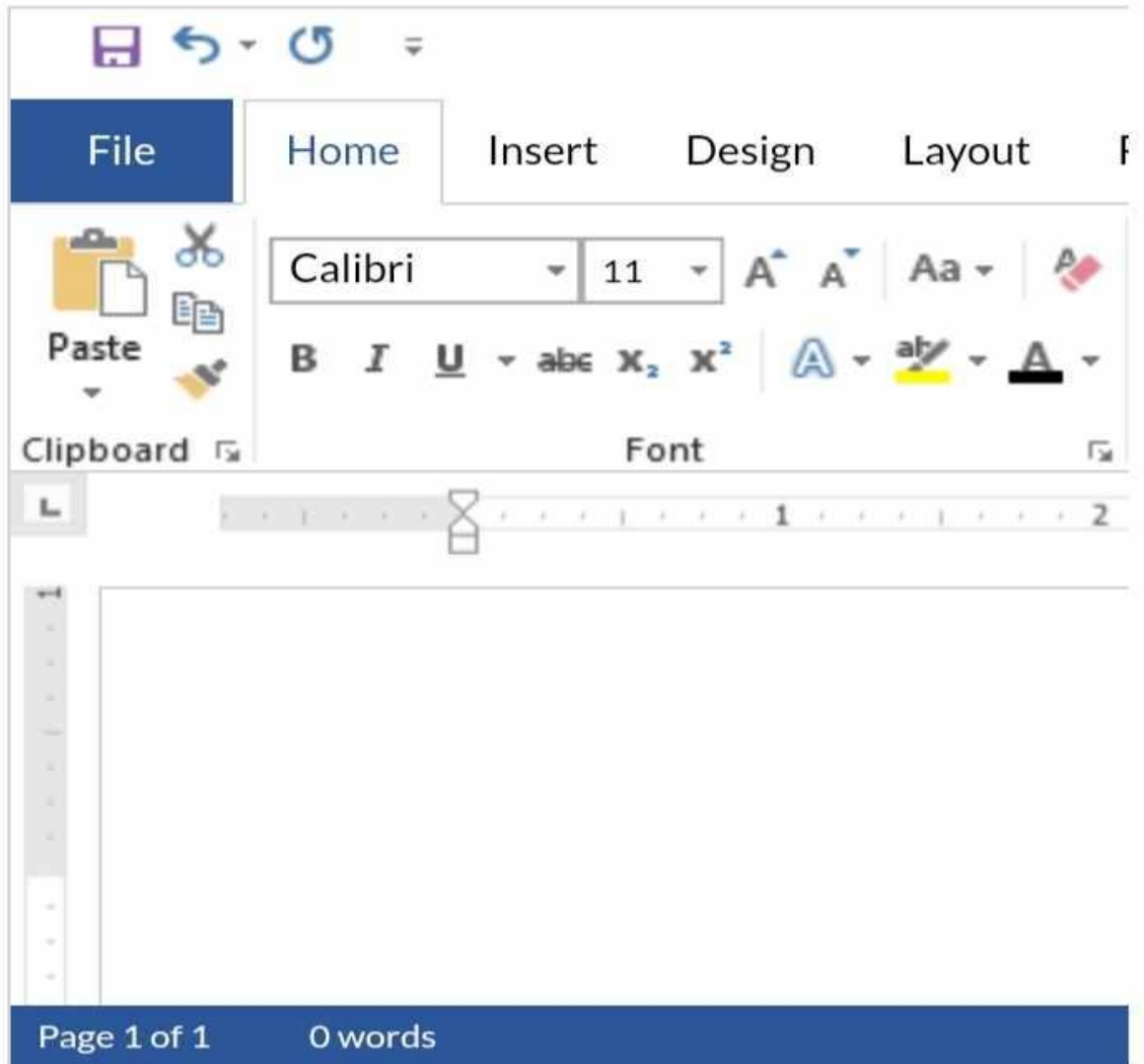


I Don't Know





2. Click on the Ribbon.



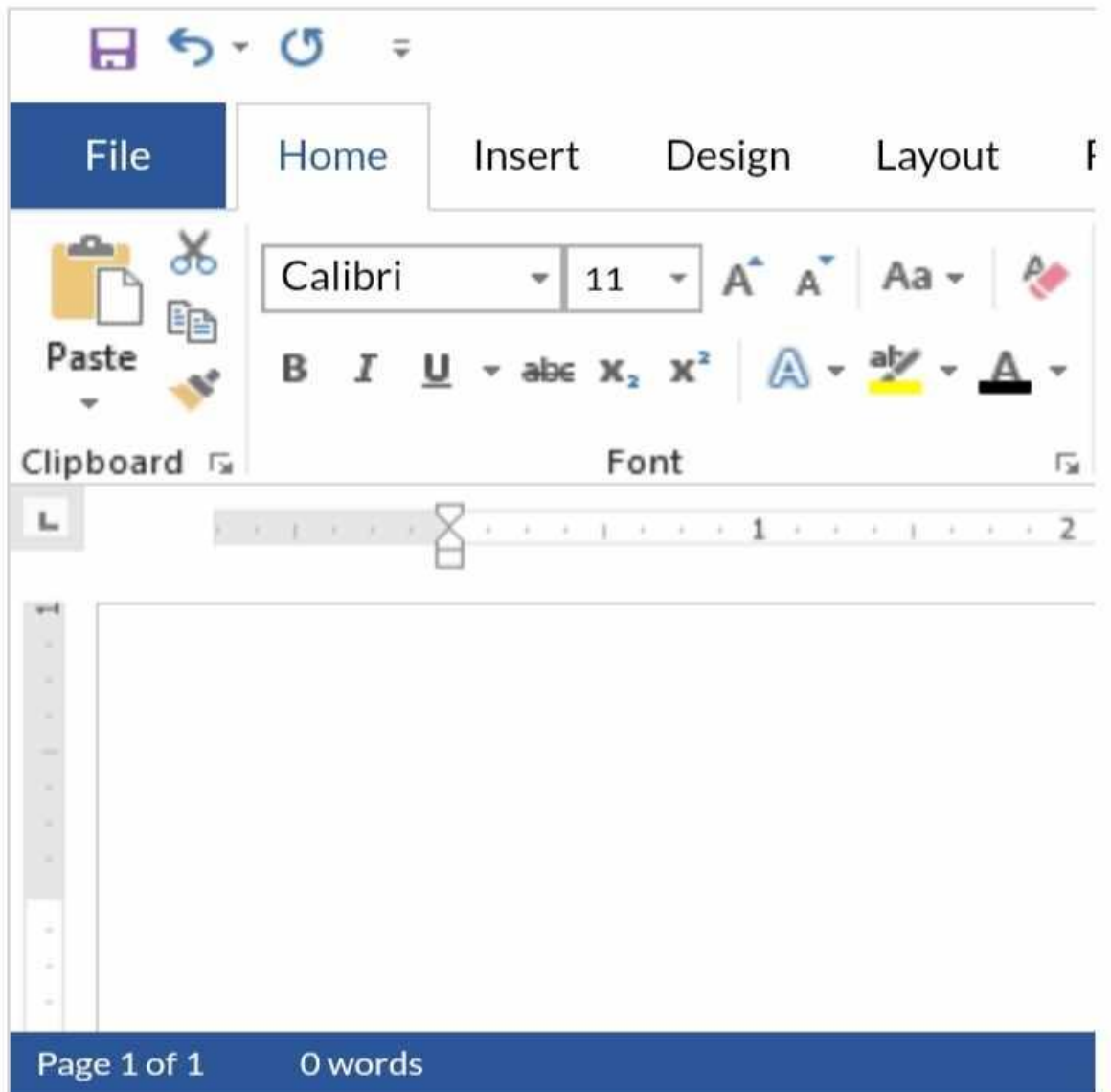
I Don't Know







3. Click on the Quick Access Toolbar.





4. Open the document named "2021 Resume".

# Word

## Recent

Today



References  
Desktop

Last Week



2021 Resume  
Documents » Work

Older



Latest resume  
Desktop



Open Other Documents



5. Select the correct answer.

You want to save the changes you made to the document, but you do not want to change the name of the document or the place where it is saved.

Save

Save  
As

Do you select "Save" or "Save As?"





6. Save this document as **2023 Resume** in the folder on the computer named "Employment."

The screenshot shows the Microsoft Word ribbon with the 'File' tab selected. The ribbon includes 'Home', 'Insert', 'Design', 'Layout', and 'References'. The 'Font' group is expanded, showing 'Calibri' font, size '11', and various formatting options like bold, italic, underline, and text color. The document content is as follows:

1030 University Avenue, Saint Paul, MN 55104

Joshua Garcia

---

Seeking a project management position with lea

Page 1 of 1      70 words



8. Check the spelling in the resumé.

The screenshot shows the Microsoft Word ribbon with the 'File' tab selected. The 'Font' group is active, showing 'Calibri' font and size '11'. The 'Clipboard' group is also visible. The main text area contains a resume entry for '2005-present' with the job title 'Shift Mannager'. The word 'Mannager' is underlined with a red squiggly line, indicating a spelling error. The correction menu is open, showing 'Manager' as the suggested correction. Below the job title, there are four bullet points: 'Managed ten employees', 'Ensured a clean and safe restaurant', 'Controlled cash and deposits', and 'Completed General Education Deve...'. The status bar at the bottom indicates 'Page 1 of 1' and '70 words'.

2005-present  
Shift Mannager  
Managed ten employees  
Ensured a clean and safe restaurant  
Controlled cash and deposits  
Completed General Education Deve...

Page 1 of 1      70 words



## 5. Windows



Public Version [?](#)



# Windows

Number of Questions: 26

Start Now



1. Select the correct answer.

Which of these is an operating system?

 Outlook

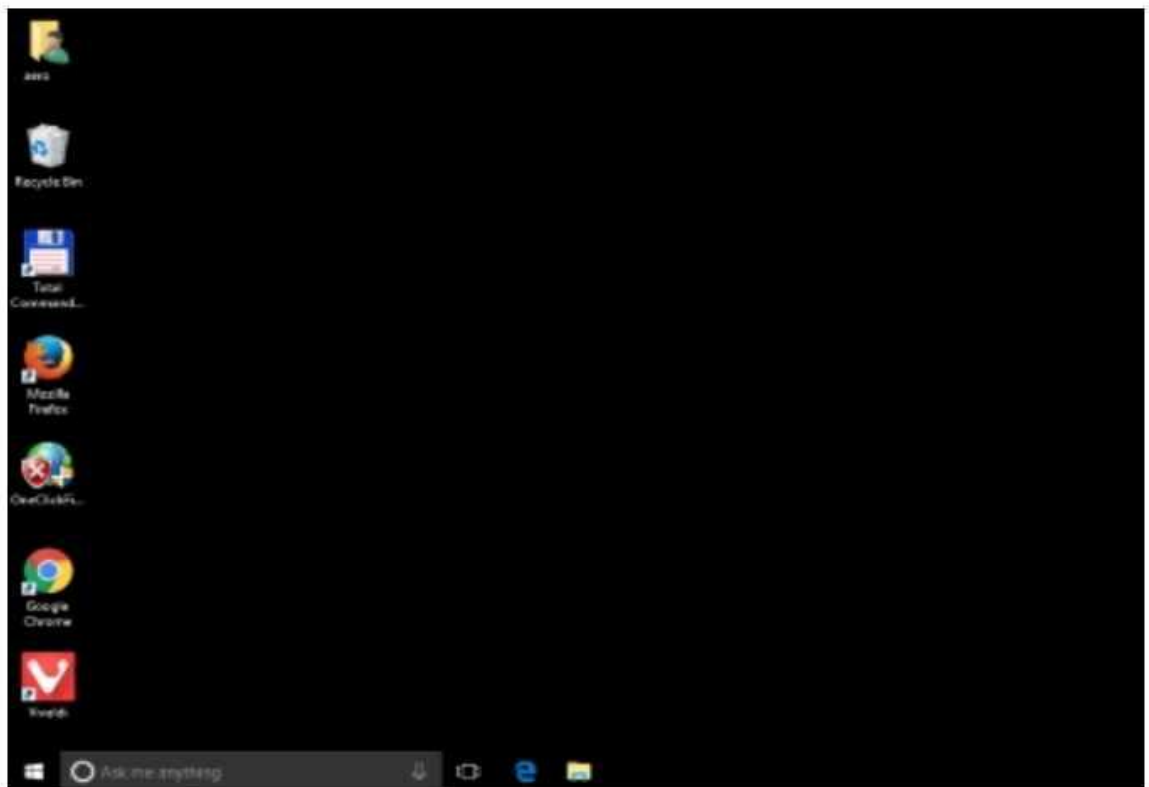
 Windows 10

 Microsoft Word 2016

 Microsoft Office



2. Select the picture of the computer that is using a Windows operating system.



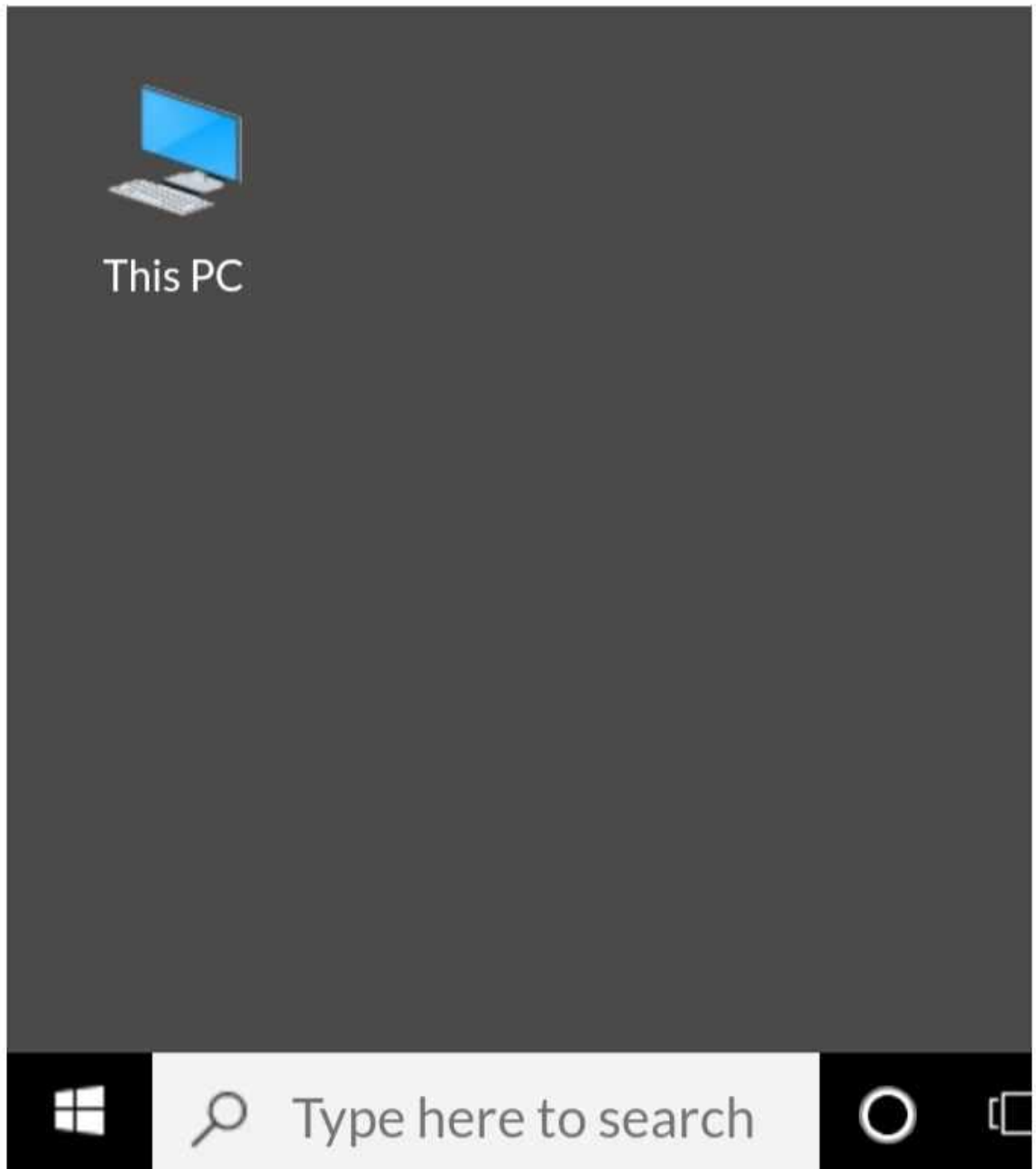
I Don't Know





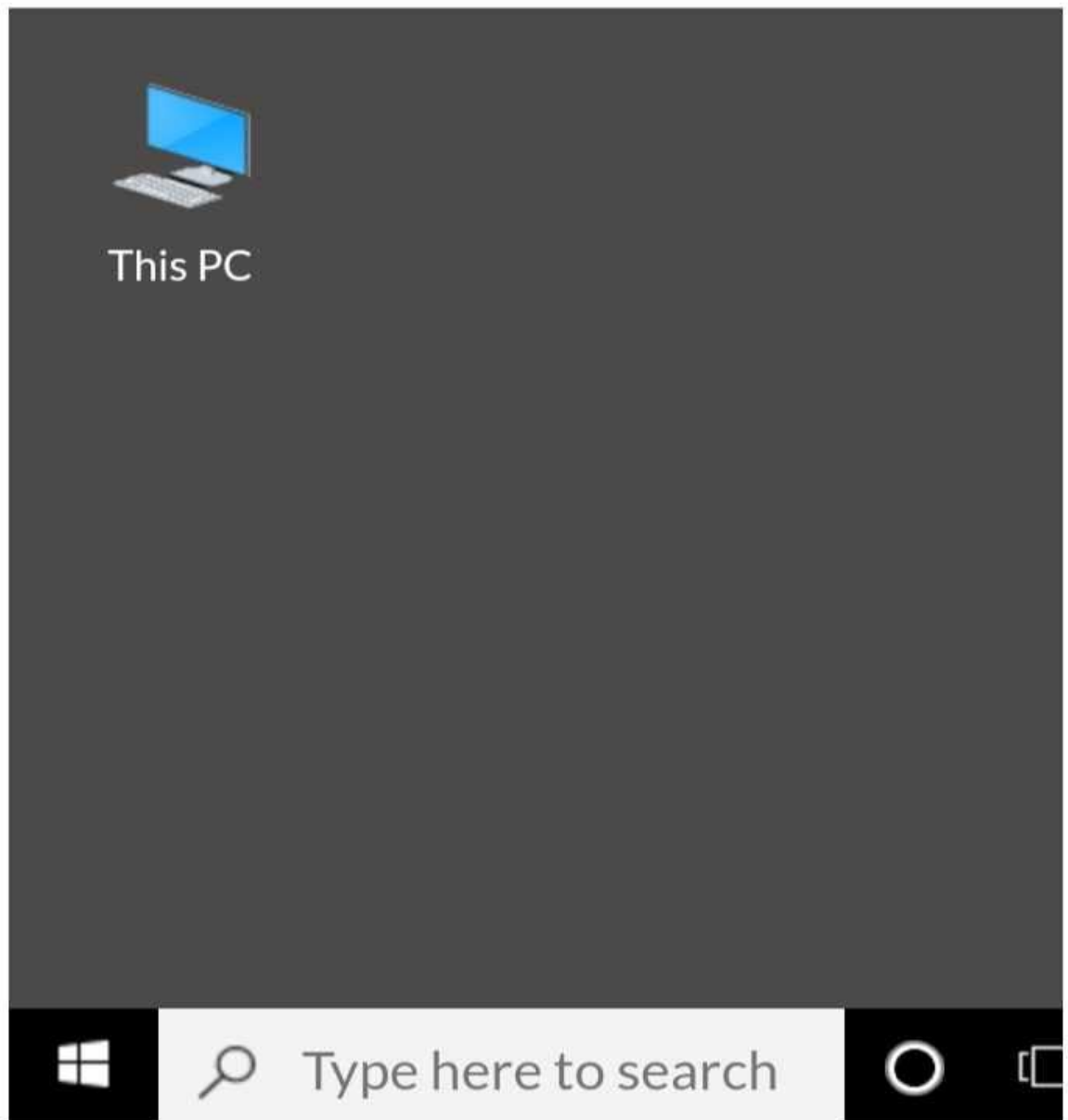
Public Version [?](#)

3. Open the application named, "Get Help."





4. Use the search box to find and open Skype.



**6. Microsoft Excel**



Public Version [?](#)



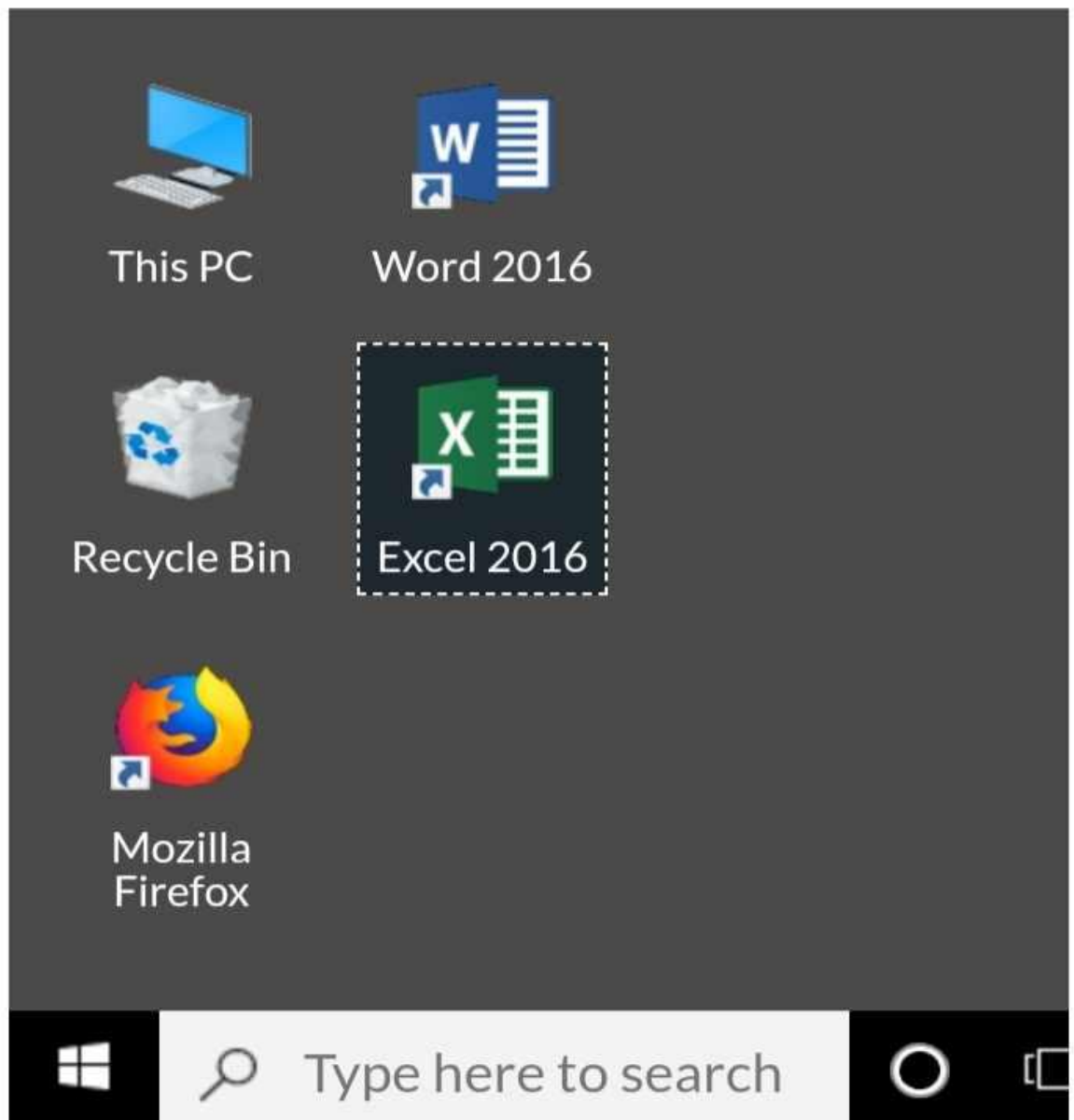
# Microsoft Excel

Number of Questions: 31

Start Now

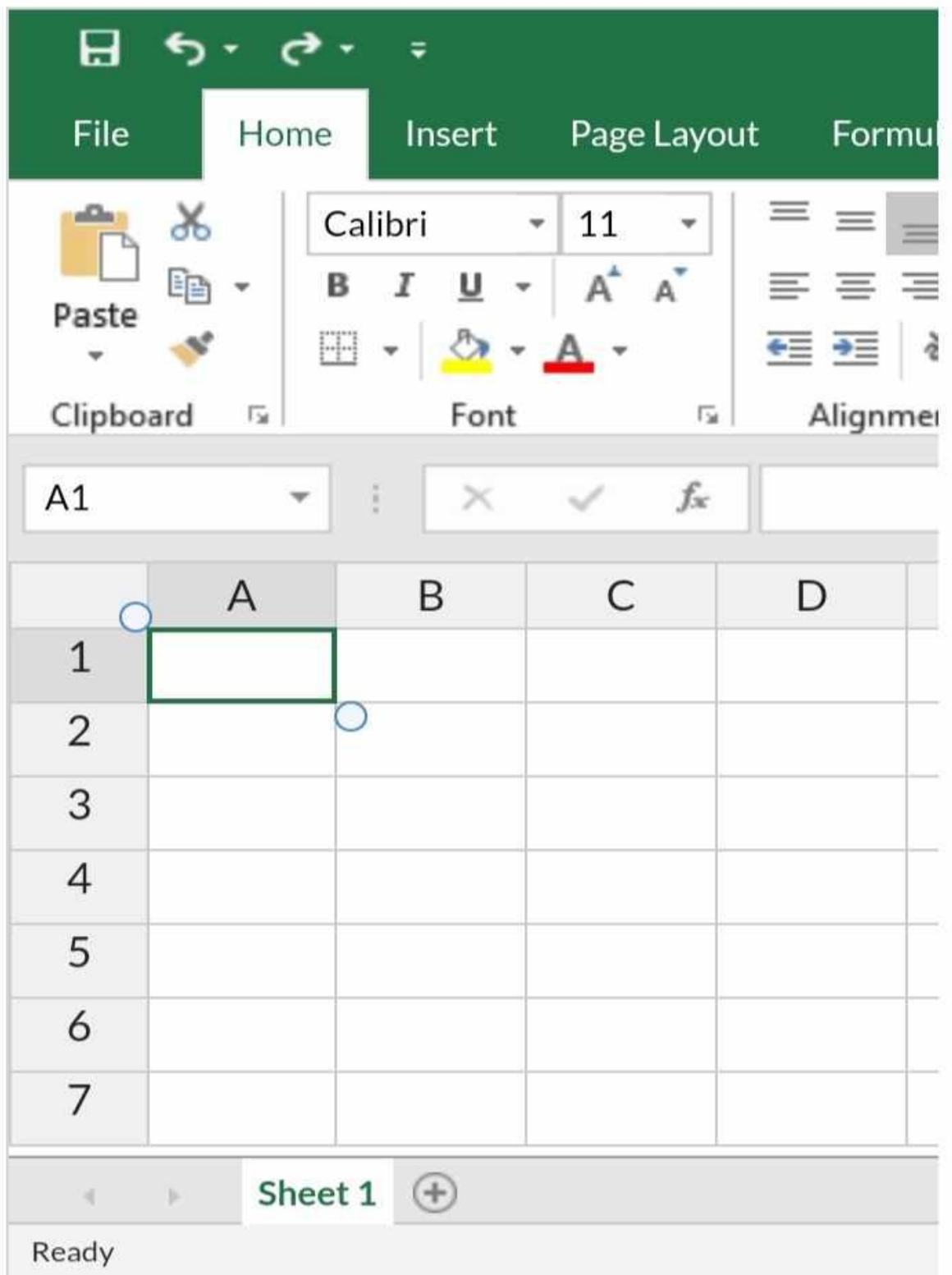


1. Open Microsoft Excel.





2. Where is the ribbon? Click on it.





3. Where is the formula bar? Click on it.

The screenshot displays the Microsoft Excel application interface. At the top, the ribbon is visible with tabs for File, Home, Insert, Page Layout, and Formulas. The Home tab is active, showing the Clipboard, Font, and Alignment groups. The formula bar is located below the ribbon, showing the active cell address 'A1' and a formula entry field. The grid below shows columns A, B, C, and D, and rows 1 through 7. Cell A1 is selected, and its border is highlighted in green. The status bar at the bottom indicates 'Ready' and 'Sheet 1'.





4. Where is the active cell? Click on it.

The screenshot shows the Microsoft Excel interface. The ribbon is set to 'Home'. The 'Clipboard' group contains icons for Paste, Cut, and Copy. The 'Font' group shows 'Calibri' font and size '11', with options for Bold (B), Italic (I), Underline (U), and text color. The 'Alignment' group has options for text alignment. The formula bar shows 'A1'. The grid has columns A, B, C, D and rows 1 through 7. Cell A1 is selected, indicated by a green border and a blue circle at the top-left corner. The status bar at the bottom shows 'Ready' and 'Sheet 1'.

I Don't Know



## **7. Microsoft PowerPoint**



Public Version [?](#)



# Microsoft PowerPoint

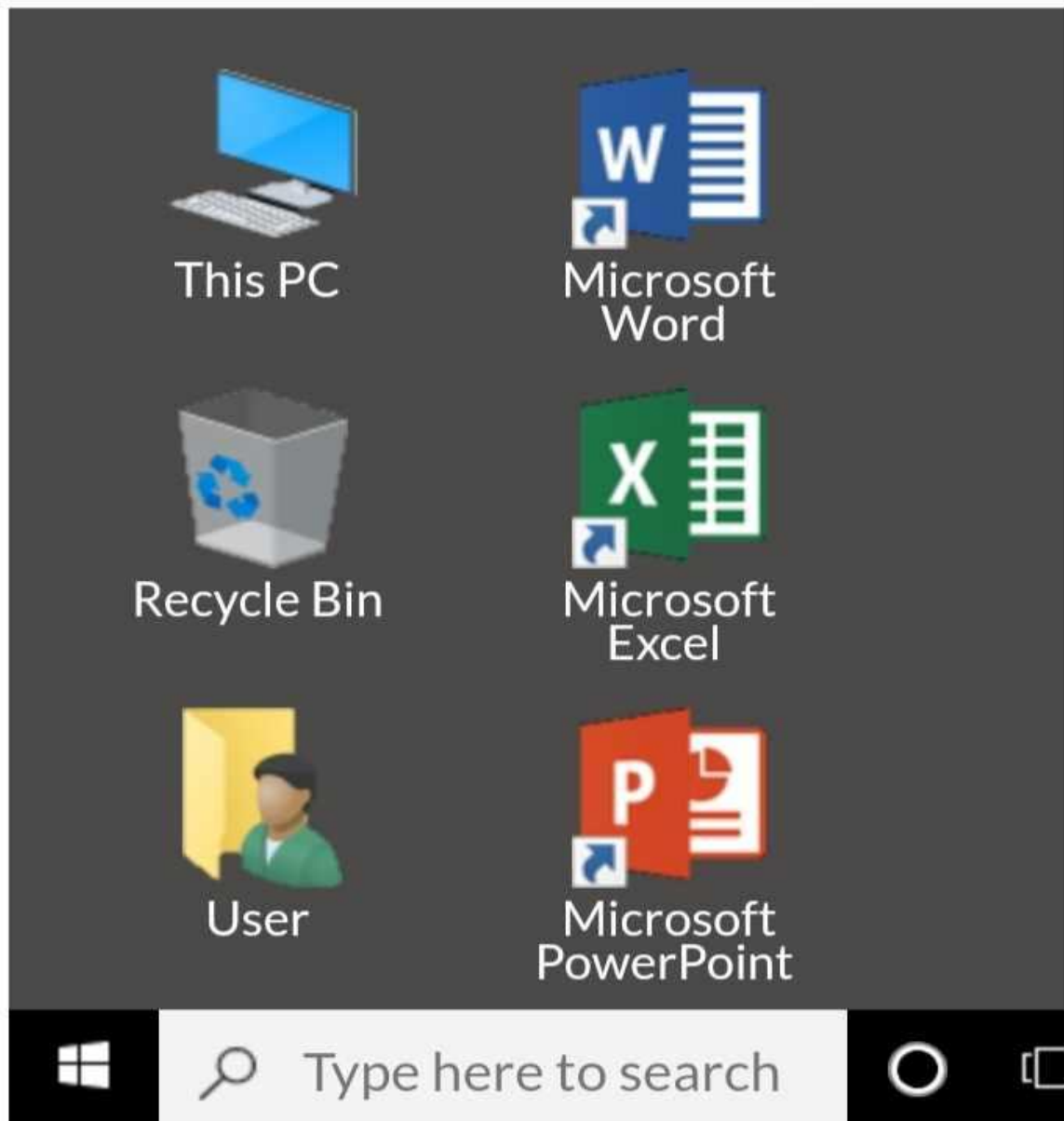
Number of Questions: 26

[Start Now](#)



Public Version 

1. Open PowerPoint.

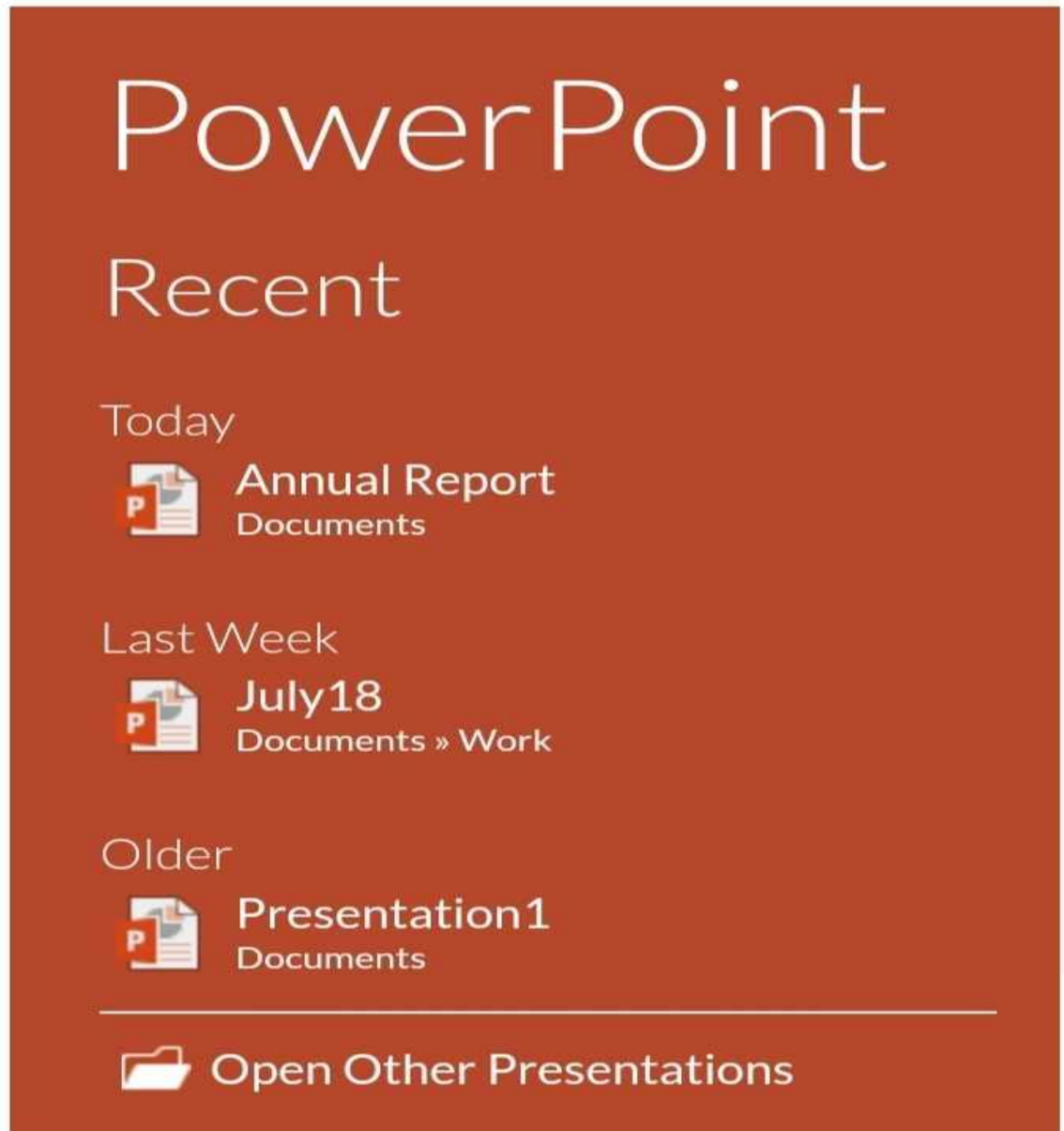


I Don't Know





2. Open the presentation called "Annual Report."

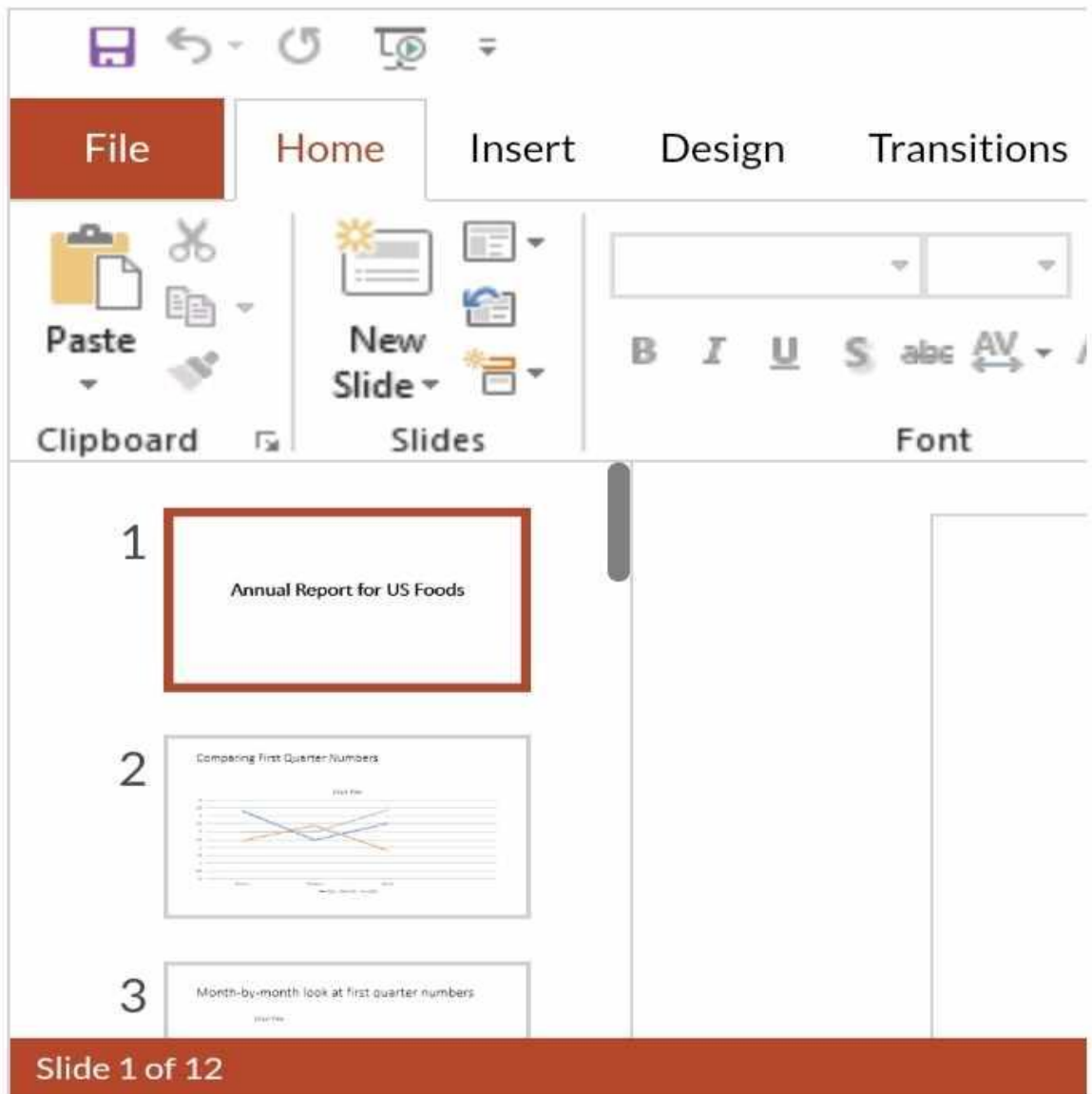


I Don't Know





3. Where is the ribbon? Click on it.



The screenshot shows the Microsoft PowerPoint interface. At the top, there is a ribbon with tabs for File, Home, Insert, Design, and Transitions. The Home tab is active, showing groups for Clipboard (Paste), Slides (New Slide), and Font (B, I, U, S, abc, AV). Below the ribbon, three slide thumbnails are visible, numbered 1, 2, and 3. Slide 1 is titled "Annual Report for US Foods" and is highlighted with a red border. Slide 2 is titled "Comparing First Quarter Numbers" and contains a line graph. Slide 3 is titled "Month-by-month look at first quarter numbers" and contains a table. At the bottom of the slide area, a red bar displays "Slide 1 of 12".





4. Where is the slide navigation pane? Click on it.

The screenshot displays the Microsoft PowerPoint interface. At the top, there is a ribbon with tabs for File, Home, Insert, Design, and Transitions. The Home tab is active, showing the Clipboard group (Paste, Copy, Paste and Combinations), the Slides group (New Slide, Duplicate Slide, Delete Slide, Hide Slide, Show Slide, Show All Slides), and the Font group (Font Face, Size, Bold, Italic, Underline, Strikethrough, Text Color, Font Color, Paragraph Spacing, Bullets and Numbering, Indentation, Text Alignment, Text Orientation, Language, Font Style Variants, Font Color and Highlighting, Font Effects, Font Size and Spacing, Font Color and Highlighting, Font Effects, Font Style Variants, Font Color and Highlighting, Font Effects, Font Style Variants). Below the ribbon is the slide navigation pane, which contains three slide thumbnails. The first slide is titled "Annual Report for US Foods" and is highlighted with a red border. The second slide is titled "Comparing first Quarter Numbers" and features a line graph. The third slide is titled "Month-by-month look at first quarter numbers" and features a line graph. At the bottom of the screen, a status bar indicates "Slide 1 of 12".



5. Where is the slide pane? Click on it.

The screenshot shows the Microsoft PowerPoint interface. The ribbon is visible with tabs for File, Home, Insert, Design, and Transitions. The Home tab is active, showing the Clipboard group (Paste) and the Slides group (New Slide). The Font group is also visible. The slide pane on the right shows three slides. Slide 1 is titled "Annual Report for US Foods" and is highlighted with a red border. Slide 2 is titled "Comparing First Quarter Numbers" and contains a line chart. Slide 3 is titled "Month-by-month look at first quarter numbers". The status bar at the bottom indicates "Slide 1 of 12".



6. Insert a new "Section Header" slide using the ribbon.

The screenshot displays the Microsoft PowerPoint interface. At the top, the ribbon is set to 'Home'. The 'Clipboard' group contains 'Paste' and 'New Slide' buttons. The 'Slides' group contains a 'New Slide' button with a dropdown arrow. The 'Font' group contains bold (B), italic (I), underline (U), strikethrough (S), and font color (abc) options. Below the ribbon, three slide thumbnails are visible: 1. 'Annual Report for US Foods' (highlighted with a red border), 2. 'Comparing First Quarter Numbers' (with a line chart), and 3. 'Month-by-month look at first quarter numbers' (with a line chart). The status bar at the bottom indicates 'Slide 1 of 12'.

## 8. Social Media



Public Version [?](#)



# Social Media

Number of Questions: 17

Start Now



1. Drag the name of each social media site to the matching description. Then click Next.

**facebook.** » **Link**

1. A social networking s  
updates called "Tweets"

2. A professional netwo

3. The world's largest sc

4. A social networking s  
smartphone.

Reset





Overview: Information Only

Anna wants to join a social networking site to stay in touch with friends and family.

She is also looking for a job, so she wants to see job posts or uploads gives a good impression.

**Click Next to continue to the first question.**



Next



2. Drag and drop the information below to the correct place to complete the form. Then click Next.

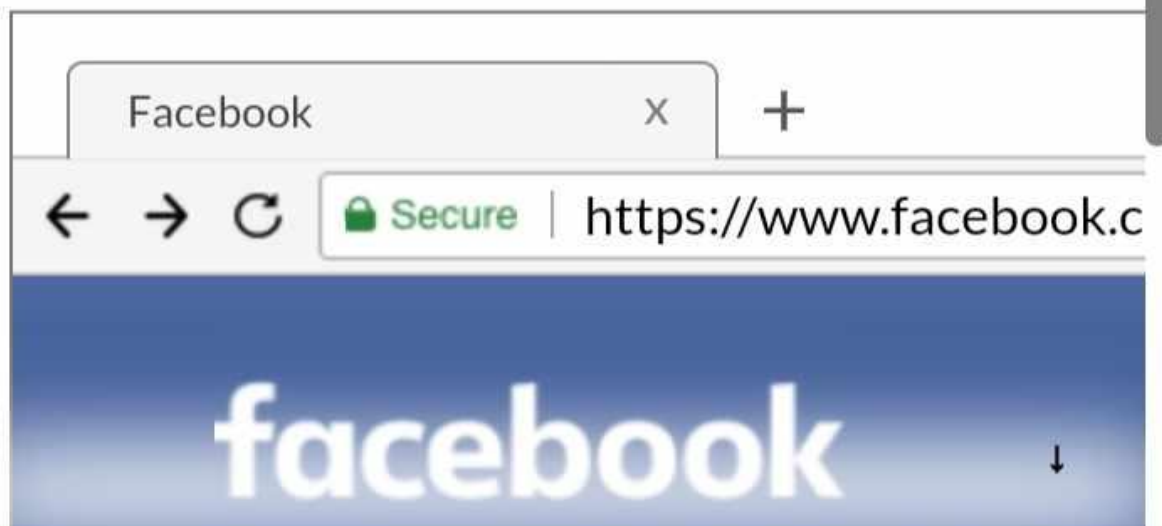
anna.g@mac.com »

Gimenez »

52\$Frn94#22 »

Anna »

Reset



## 9. Information Literacy



Public Version [?](#)



# Information Literacy

Number of Questions: 32

Start Now



## Overview: Information Only

What can you expect in this module? The module contains stories and problems. Each story has a problem and information in order to solve the problem.

Some slides only offer new information



**Story 1**



Next



ation Only

in this module? This module has three stories. The first story has a problem that requires you to use what you know to solve the problem.

For new information. You can click Next to



## Story 2



Next





as three stories with different characters  
as you to use technology to gather new

**Click Next to get to the question.**



**Story 3**



Next

## Appendice N° Northstar Standards for Essential Computer Skills



### STANDARDS FOR ESSENTIAL COMPUTER SKILLS

#### Basic Computer Skills

19. Distinguish between different types of devices (tablets, desktop and laptop computers).
20. Identify specific computer hardware (system unit, monitor, printer, keyboard, mouse or touchpad, ports, touchscreen).
21. Log on to and shut down a computer.
22. Demonstrate knowledge of keys on keyboard (Enter, Shift, Control, Backspace, Delete, Arrow Keys, Tab, Caps Lock, Number Lock). 5. Identify types of mice: mouse and touchpad.
23. Identify mouse pointer shapes and the functions they represent (spinning wheel (loading), iBeam (text), arrow (basic clicking), hand pointer (clickable links)).
24. Demonstrate knowledge and appropriate use of mouse clicks (right-click, left-click, and double click).
25. Drag and drop.
26. Utilize common controls for screen interaction (selecting check boxes, using drop-down menus, scrolling).
27. Access and control audio output features (volume, mute, speakers and headphones).
28. Identify icons on desktop.
29. Demonstrate ability to trash and retrieve items using the trash or recycle bin.

30. Demonstrate understanding that it is possible to customize a computer for increased accessibility (customizing a mouse for left-handed use and sensitivity, and changing screen resolution on a monitor).
31. Demonstrate understanding that software programs are upgraded periodically to fix bugs and increase utility, and that different versions may be installed on different computers.
32. Identify mechanisms for storing files (flash drives, hard drives, cloud-based storage).
33. Identify whether or not a computer is connected to the internet.
34. Identify and locate camera and mic on laptops, tablets.
35. Turn computer and monitor on and off.

### **Internet Basics**

1. Identify the different ways a person can connect to the internet.
2. Demonstrate knowledge of browsers and identify commonly used browsers.
3. Demonstrate familiarity with website structure (e.g., landing pages, internal pages).
4. Identify top-level domains (e.g., .edu, .com, .org).
5. Demonstrate understanding of how to use browser tools and settings to protect privacy (e.g., private browser windows, clearing search history, and declining to save passwords on shared computers).
6. Demonstrate understanding of when it's safe and appropriate to share personal, private, or financial information (e.g., recognizing phishing attempts, identifying unsecured websites).
7. Identify ways to protect your devices (e.g., anti-malware software, recognizing possible virus attacks).

8. Demonstrate to a website that you are a legitimate user using CAPTCHA or other verification methods.
9. Fill out an online form.
10. Identify address bar and demonstrate understanding of its functionality.
11. Identify common browser tools and icons (e.g., favorites, downloads, refresh, and back).
12. Perform internet search using clear parameters (terms and filters).
13. Demonstrate ability to scroll up and down a page and left and right on a page.
14. Identify and make use of common website interactions (e.g., play buttons, hyperlinks).
15. Identify and work with tabs and windows.
16. Enable a specific pop-up window.
17. Use shortcut keys, or menu or mousing equivalents, to support user experience on the web (e.g., zoom, find text). Identify and locate camera and mic on laptops, tablets.
18. Turn computer and monitor on and off.

### **3. Using Email**

1. Define email and identify common email clients.
2. Tell the difference between a URL and an email address.
3. Register for a new email account, using a professional user name and a strong password.
4. Log into email.
5. Create and send an email, including recipient address, subject, and message.
6. Open and reply to an email.

7. Understand why and how to reply, reply all, and forward an email.
8. Add an attachment to an email.
9. Open and download an email attachment.
10. Manage email: Delete and retrieve messages, identify spam, and unsubscribe from unwanted mailing lists.
11. Understand basics of email etiquette (using salutations and closings, avoiding all caps, making use of the subject line, understanding when it's ok to forward messages, knowing who to cc or bcc, etc.).
12. Use caution when opening or replying to an email from an unfamiliar source, downloading attachments, following links, or giving out personal information.
13. Sign out of email, especially when using shared computers.

### **Windows**

13. Identify the operating system used by a computer.
14. Identify the parts of the Windows 10 interface (desktop, taskbar, etc.).
15. Demonstrate knowledge of the Windows Start Menu, including Get Help.
16. Use Cortana to search for a file, program, or document.
17. Identify icons, functions, and any file extensions related to basic office software (Word, PowerPoint, and Excel) and default Windows programs (Microsoft Edge, Windows Defender, etc.).
18. Start and exit programs.
19. Minimize and maximize windows.
20. Open, close and switch between windows.

21. Demonstrate knowledge of Windows File Explorer and identify drives on the computer, as well as cloud storage services (e.g., OneDrive).
22. Move documents and files, including to and from Recycle Bin.
23. Log off, restart, and shut down a computer.
24. Use Settings to uninstall or modify apps.

### **Microsoft Word**

1. Open a new or existing document.
2. Identify the parts of the Word window, including the Ribbon, Status Bar and Quick Access Toolbar.
3. Save a document, being intentional about name and location.
4. Identify file extensions that can be opened by Microsoft Word.
5. Use Spelling and Grammar check.
6. Format text: size, color and font type.
7. Set text spacing and alignment.
8. Apply bullets and automatic numbering.
9. Undo the previous action.
10. Cut, copy and paste.
11. Modify page layout, including margins and orientation.
12. Print.
13. Close a document.

**14.** Insert objects into a document, including images, shapes, hyperlinks, and tables.

### **Microsoft PowerPoint**

- 1.** Open a new or existing PowerPoint presentation.
- 2.** Identify parts of the PowerPoint screen (slide navigation pane, slide pane, notes, the ribbon, quick access toolbar, and scroll bars).
- 3.** Insert new slides, duplicate, or reuse slides.
- 4.** Manage text (insert, delete, copy, cut and paste, drag and drop, format, and use spellcheck).
- 5.** Apply or change a theme.
- 6.** Use zoom control.
- 7.** Insert items into a presentation, resize, and adjust them (video, chart, pictures, clip art, screenshots).
- 8.** Add a textbox, adjust it, resize it, or delete it.
- 9.** Change the view (normal view, slide sorter, reading view, slideshow view).
- 10.** Insert, delete, and move slides using slide navigation pane.
- 11.** Use the quick access toolbar.
- 12.** Apply and customize slide transitions (select, preview, add sound, automatic advance).
- 13.** Understand the basics of PowerPoint etiquette (limited text, text that stands out on background, clear titles).
- 14.** Play a slideshow, advance through the slides, and end slideshow (using screen toolbar features).
- 15.** Save a presentation as a .ppt, .pdf, .png, etc.

16. Create handouts.

17. Print a presentation.

### **Social Media**

1. Identify different types of social media and their primary functions (especially Facebook, LinkedIn, Instagram, Twitter).
2. Create a new account on a social media network and log in.
3. Recognize information posted on social media networks that may present a risk to you (user as consumer of information).
4. Demonstrate knowledge of managing “friends” on Facebook: adding friends, accepting/declining “friend” requests, and the difference between that and “following” someone.
5. Understand and change privacy settings.
6. Demonstrate an understanding of the consequences of “liking” or commenting on something.
7. Share and delete content, including photos, videos, and links.
8. Identify information that is unwise to post and/or upload on a social media (too much personal sharing, inappropriate photos/comments).
9. Distinguish between public and private “spaces” on social media sites (e.g., Facebook messages vs. Facebook timeline).
10. Post, share, like, or comment on content.

**11. Demonstrate knowledge of the permanence of anything posted on the internet.**

### **Information Literacy**

- 1. Define a problem, formulate a question, or identify a decision that needs to be made.**
- 2. Identify the purpose for accessing information (how the information will help solve the problem, answer the question, make a decision, or accomplish a goal or objective).**
- 3. Define the kind of information needed to complete the task.**
- 4. Identify types and formats of information found online (articles, databases, images, videos, etc.).**
- 5. Plan steps required to solve the problem or accomplish the task.**
- 6. Recognize the costs, in time or money, and benefits of accessing different sources of information (article, newspaper, consumer reports).**
- 7. Demonstrate use of efficient search strategies to hone in on relevant information.**
- 8. Locate relevant information in media found online, including text, video, images, etc. Locate the source of the information.**
- 9. Make use of hyperlinks to follow desired/required path of information.**
- 10. Demonstrate basic understanding of use of non-Internet sources of information (personal documents, Excel spreadsheets, etc).**
- 11. Discern between relevant and non-relevant information in an information source and select the information that addresses the issue that motivated the search.**
- 12. Determine the quality of information by identifying bias, assessing the reliability of sources, and identifying the impact of context.**

13. File/store information in a format that facilitates ease of access for future use (e.g., file naming, folder organization, bookmarking, etc.)
14. Monitor extent to which information solves a problem and know when additional information is needed.
15. Synthesize relevant information from one or more sources.
16. Integrate new information into current knowledge and use it to support understanding, views, perspectives, or opinions.
17. Act on information to solve basic problems or answer a question.
18. Select appropriate format for sharing information, based on audience and purpose, and distribute to intended audience.
19. Evaluate the result of gaining/using the information. Was the question answered? Was the problem solved? Was a better decision made? Was a goal or objective met?

### **Teachers' Questionnaire**

*Dear EFL teachers;*

We appreciate your willingness to participate in this research study aimed at investigating the impact of PjBL in maximizing learners' digital literacy, Arab Messoud Secondary School (Chechar – Khenchela) as a case study, highlighting projects in the Algerian course books devoted for English language under the Competency-Based Teaching Approach integrated with Project Based Approach (CBA + PBL) that was implemented in the Algerian educational system under the reform movement of 2008. Your contribution will be of great importance for the validity of this research. So, we would be thankful if you could take a little of your time to read and answer the following statements by ticking (✓) your choices in the corresponding boxes or by completing your own information whenever necessary.

Please take your time to thoughtfully and honestly respond to each question in the questionnaire. Your insights are invaluable in helping us gain a comprehensive understanding of the impact of PjBL on learners' digital literacy skills. The questionnaire is divided into four sections, each focusing on various aspects of PjBL and digital literacy. Your participation is deeply appreciated, and your input will significantly contribute to the advancement of knowledge in the field of education.

Thank you in advance for your cooperation

### Section One: Teachers' Background Information

**Q1.** What is your gender?

Male

Female

**Q2.** What is your degree?

BA (Licence)

MA ( Master/Magister)

PHD ( Doctorate)

**Q3.** How long have you been teaching?

Less than Five years

From Five to Twenty Years

More than Twenty Years

**Q4.** Which level (s) do you teach?

1st year

2nd year

3rd year

### Section Two: Project Based- Learning (PjBL)

**Q5.** How do you define a project-based approach in education?

.....

**Q6.** How often do you implement PBL in your teaching?

Always

Frequently

Rarely

Never

**Q7.** What strategies do you use to ensure that learners are actively engaged and motivated throughout the project?

.....

**Q8.** Can you provide examples of successful projects you've implemented in your classroom?

.....

**Q9.** Q7. Decide upon the importance of PBL in teaching process?

Very important

Fairly important

Unimportant

**Q10.** What are the merits and key benefits of using a project-based approach in the classroom compared to traditional teaching methods?

.....

...

**Q11.** In your opinion what are the most challenging problems that may face your learners during project process?

.....

.....

**Q12.** How do you address challenges that may arise during the project, such as time management, group dynamics, or varying skill levels?

.....

....

**Q13.** How do you assess and evaluate student learning in a project-based environment? What criteria do you use?

.....

### **Section Three: Maximizing learners' Digital Literacy**

**Q14.** What does "digital literacy" mean to you?

.....


**Q15.** Do schools need to prioritize Digital literacy?

 Yes

 No

**Q16.** Are Digital skills important in Education?

 Extremely important

 Important

 Unimportant

 Extremely unimportant

**Q17.** How do you integrate digital literacy skills into your teaching to prepare learners for the digital age?

.....

**Q18.** What specific digital tools or technologies do you use to enhance students' digital literacy skills?

.....

...

**Q19.** What strategies do you employ to ensure that learners understand the ethical and responsible use of technology?

.....

**Q20.** How do you address the digital divide and ensure that all learners, regardless of their background, have access to digital learning resources?

.....

....

**Q21.** How do you measure and assess students' progress in developing digital literacy skills? Are there any specific criteria you use?

.....


### **Section Four: Maximizing Learners' Digital Literacy through PjBL**


**Q22.** Can you share examples of projects or activities that focus on developing digital literacy skills? What were the outcomes?

.....

...

**Q23.** In your opinion, do you think that PjBL foster learners' digital literacy?


 Strongly agree

 Agree

 Disagree

 Strongly Disagree

**Q24.** In what follows, a list of items indicating the difficulties that teachers may face when applying PjBL to enhance learners' digital literacy. To answer, please, tick (√) the appropriate box among the five (5) following possibilities:

 It is difficult to apply PjBL to enhance learners digital skills when teaching SE learners because :

<b>Difficulties that EFL teachers may encountered:</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Undecided</b>	<b>Disagree</b>	<b>Strongly Disagree</b>
Learners have poor communicative skills.					
Learners do not manage to relate meaning with structure.					
It is hard to implement PjBL in an over-crowded classroom.					
The syllabus is so loaded that it is unlikely to be finished implementing the PjBL principles.					
Learners use their mother tongues rather than English in their interactions.					
Learners seem not ready to accept learner-centered approach.					
Teachers face the problem of classroom and time management.					
Learners fear of negative evaluation and shyness prevent them from participation.					
Teachers need intensive training to get more familiar with its principles.					
The projects topics provided in the SE curriculum and textbooks do not fit the students' needs and interests.					
The large number of school subjects can constitute an obstacle to the success of implementing PBL to foster learners' digital literacy.					
Learners' individual differences constitute an obstacle in implementing PjBL.					
Teachers spend much more time completing administrative documents (the log book, the diary book, the sequence or file plans, the yearly distribution...etc) than on preparing effective PBL plans.					

Learners prefer not to participate because they lack their teacher's positive feedback.					
---	--	--	--	--	--

**Q25.** What do you recommend to foster learners' digital literacy through PjBL?  
 .....

**Q26.** What professional development opportunities do you pursue to stay up-to-date with the latest digital tools and trends in education?  
 .....

You have made a difference  
 Thank you for your time and contribution.

Sincerely

**Confidentiality:**

Remarkably, your contribution in this research is entirely voluntary, and all responses will remain strictly confidential. Ensuring that your anonymity will be completely preserved, and any data collected will be aggregated and reported in a manner that ensures your identity remains protected.

**Instructions:**

Doubtlessly, take your time to thoughtfully and honestly respond to each question in the questionnaire. Your insights are invaluable in helping us gain a comprehensive understanding of the effectiveness of PjBL in maximizing learners' digital literacy skills. The questionnaire is divided into four sections, each focusing on various aspects of PjBL and digital literacy. Your participation is deeply appreciated, and your input will significantly contribute to the advancement of knowledge in the field of educational sciences.

**Learners' Questionnaire**

*Dear EFL Learners;*

You are kindly requested to fill in this questionnaire which is designed to examine the impact of PjBL in enhancing learners' digital literacy, Arab Messoud Secondary School (Chechar – Khenchela) as a case study, taking the examples of projects in the Algerian course books devoted for English language under the Competency-Based Teaching Approach

integrated with Project Based Approach (CBA + PBL) that was implemented in the Algerian educational system under the reform movement of 2008.

Your contribution will be of great importance for the validity of this research. So, we would be so grateful if you could take a little of your time to read and answer the following statements by ticking (✓) your choices in the corresponding boxes or by completing your own information whenever necessary.

**Section One: Learners' Background Information**

15- What is your gender?

- Male
- Female

16- How old are you?

- Less than 15 years old
- 15 years old
- More than 15 years old

**Section Two: Project Based- Learning**

17- As a learner, are you interested in presenting projects?

Yes  No

18- Overall, are you satisfied with your experience using Project Based Learning, dissatisfied with it, or neither satisfied or dissatisfied with it?

Very satisfied

Neither satisfied nor dissatisfied

Very dissatisfied

19- What resources, tools, or materials do you need to complete your project successfully?

.....

20- Are there any specific skills or knowledge areas you need to develop to succeed in this project?

.....

21- How will you measure the success of your project?

.....

22- What suggestions do you have for improving the next project experience?

.....

**Section Three: Maximizing Digital Literacy in Teaching and Learning**

23- How would you define digital literacy?

.....

24- What types of Information & Communication Technologies (ICT) devices do you have at home?

Desktop computer

Laptop computer

- Smartphone device
- Tablet device
- Other ICT devices

25- How do you appreciate your level of knowledge in using a computer / laptop / tablet / other digital device?

- Very low
- Low
- Good
- High

26- How would you rate your Internet literacy (the ability to use the Internet)?

- Poor
- Acceptable
- Good

27- Please indicate your level of frequency of using each of the followings by putting a tick (☐) in the box

Options	Frequently	Occasionally	Rarely	Never
1 Word processor				
2 Email				
3 World Wide Web				
4 Language learning mobile app				
5 Blog				
6 Text chatting				
7 Voice chatting				
8 Video conferencing				
9 Computer game				
10 Electronic dictionary				

28- Have you ever encountered problems with digital devices or software? If so, how did you try to solve them?

.....  
 .....

**Section Four: Fostering Learners' Digital Literacy Via PjBL**

22) Have you participated in any Project-Based Learning activities that involved digital tools or technology? If so, could you describe your experience?

.....  
 .....

23) What specific digital skills have you acquired through Project-Based Learning? How do you see these skills being valuable in your academic or professional future?

.....

24) Reflecting on your PjBL experiences, how has your confidence in using various digital technologies evolved? Do you feel more comfortable now than before?  
.....

25) In your opinion, do you think that presenting projects foster your digital literacy?

Yes   
No

26) If yes, would you explain it briefly please?

.....  
.....  
.....  
.....

27) What are some online platforms, tools, or resources you've discovered through Project-Based Learning that you believe every digitally literate person should be aware of?

.....

28) Were there any challenges you faced during digital-focused project work, and how did you overcome them? What did you learn from these challenges?

.....  
.....  
.....

29) What do you recommend to foster digital literacy via PjBL?

.....  
.....  
.....

Thank you very much for your valuable contribution  
YOU ARE OUR PROJECT

### **In Depth Interview with Inspectors of National Education**

**Dear Inspector,**

Actually the present research paper aims to examine carefully the impact of PjBL in maximizing learners' digital literacy in the Algerian secondary schools. Consequently, the interview is meant to gather data as to foster learners' digital literacy.

**Q1.** What are the merits and repercussions of maximizing learners' digital literacy?

**Q2.** What are the signs of digital literacy/ digital illiteracy?

**Q3.** What suggestions to effectively train EFL teachers to incorporate digital technologies in their classes? And with the vast evolving ICT's what Professional Development Opportunities recommended for EFL teachers?

**Q4.** Do Algerian secondary schools need to prioritize an Equitable access to digital resources to all learners with various backgrounds?

**Q5.** Do you have any suggestions to foster learners' digital literacy via PjBL?

Miss BelhouchetKhawla  
Principal Secondary School EFL teacher  
250 Street Chechar, B.P. 34 Chechar  
Chechar, Khenchela  
[Khawla.Belhouchet@univ-khenchela.dz](mailto:Khawla.Belhouchet@univ-khenchela.dz)  
Messoud Arab Secondary School Chechar  
Chechar/ Khenchela

**Subject: Ethical Approval Letter**

Dear Members of the Ethics Review Board,  
Dear Headmaster, **Hadji Saber,**

Subject: Request for Ethical Approval for Research Project - [Title of the Research: **Enhancing Learners' Digital Literacy Via Project Based Learning**]

I am writing to request ethical approval for my research project titled "Enhancing Learners' Digital Literacy Via Project Based Learning" This research is being conducted as part of my PH D Degree, the study took place at **Arab Messoud Secondary School Chechar**, The primary aim of this study is to examine the impact of project based learning in maximizing learners' digital literacy.

Methodology: Extra Sessions in Foreign Languages Laboratory 1h per week for one year/ implementation of PjBL with learners/ Paired Sample T- Test/ Independent Sample T-Test/ Interview with Learners/ Taking pictures/ Recording videos. Participant Recruitment: 1<sup>st</sup> year learners. 80 learners that I am in charge of teaching this year, in the scientific stream classes (since the number of literary classes is not enough). No risks or discomfort will happen to participants, they will foster their skills and competencies. I understand and acknowledge my responsibility to adhere to the ethical guidelines and standards set forth by Messoud Arab School and any relevant regulatory bodies. I am committed to ensuring the safety, confidentiality, and well-being of all participants involved in this research.

I kindly request that you review this proposal and provide the necessary ethical approval for my research project. Your feedback and guidance are valuable, and I am open to making any adjustments to ensure the ethical integrity of this study. Thank you for your time and consideration.

Sincerely, BelhouchetKhaw



حاجي صابير

# Certificate

## OF ATTENDANCE

This certificate is proudly presented to:

*Belhouchet Khaoula*

As a participant in the seminar on project  
and ICTs in education  
held on February 21st, 2023

Inspector of National Education



OPPO A77s  
Khawla