A Comparative Study of Project-Based Learning in Traditional and Technology Integrated Classrooms: English Language Learners' Vocabulary Learning, Social Identity, and Ego Resiliency

Leili Palashi[1], Mehry Haddad Narafshan[*1], Leila Anjomshoa[1]

[1] Department of Foreign Languages, Ke. C., Islamic Azad University, Kerman, Iran

*Corresponding author's Email: haddad@iauk.ac.ir

ABSTRACT

Educational reform in the 21st century has led to an exploration of project-based learning. This type of learning allows learners to delve deeply into classroom topics and be more independent. Accordingly, the purpose of this quantitative quasi-experimental study was to investigate the impact of technology integrated project-based learning on vocabulary learning, social identity, and ego resiliency of English language learners. Over 6 months, three groups of 45 elementary level English language learners (15 female primary school students in each group) were exposed to two forms of project-based learning: traditional and technology integrated ones. And one group acted as the control group receiving no project-based learning as the treatment. The teaching of new words in both experimental groups was conducted using the stages of project-based learning: question, plan, research, produce, improve, present, and evaluate. Pre-tests and post-tests were used to measure participants' improvements in vocabulary learning, social identity (Bruner & Benson's 2018 questionnaire), and ego resiliency (Block & Kremen's 1996 questionnaire). The results revealed that the implementation of project-based learning in English language classrooms enhances students' vocabulary by actively involving them in the learning process. It also promotes their social identity by encouraging collaboration within project teams and cultivates their resilience by presenting them with challenging tasks. Furthermore, the integration of projects with technology leads to an enhancement in their effectiveness due to the engaging and captivating features offered by technology.

KEYWORDS: Ego Resiliency, Project-Based Learning, Social Identity, Technology Integrated Classrooms, Traditional Classrooms, Vocabulary Learning

INTRODUCTION

A key objective of primary education is to equip students with both academic knowledge and essential life skills to tackle various challenges (Hudáková & Papcunová, 2019). Classrooms can provide significant educational experiences, blending hard skills like cognitive knowledge and professional abilities with soft skills such as problem-solving and collaboration (Vogler et al., 2018). However, traditional teaching methods often hinder this goal, as educators are viewed as primary knowledge providers while students remain passive (Alorda et al., 2011). Additionally, schools tend to prioritize factual knowledge over practical skills, creating a disconnect between the curriculum and workforce competencies (Holmes, 2012). One potential solution is to provide students with opportunities to engage in real-world professional environments, enabling them to actively contribute to problem-solving and the construction of knowledge. Project-based learning is identified as a promising method to accomplish this goal.

Project-based learning is an instructional approach that prioritizes the learner's involvement. Instead of following a rigid lesson plan that dictates specific learning outcomes or objectives, project-based learning encourages a thorough exploration of a topic that holds educational value (Harris & Katz, 2001). By creating a personally meaningful artifact, such as a play, multimedia presentation, or poem, learners demonstrate their understanding of the subject matter. Furthermore, project-based learning grants learners a greater degree of

autonomy in determining what they learn, fostering sustained interest and motivating them to assume greater responsibility for their own learning (Worthy, 2000).

The school environment is crucial for children's development, as they spend much of their time there (Wei, 2010). Adapting to this setting is essential for socialization (Li & Ding, 2020) and significantly impacts their academic, physical, and psychological growth. A child's ability to adjust to a new educational context also affects their future educational and career opportunities (Akçinar, 2013). For younger children, ego resilience and tolerance for failure are vital for effective adaptation. Ego resilience refers to the ability to recover and adjust positively to challenges (Waller, 2001). Children with lower ego resilience are more sensitive to environmental changes (Shin, 2005). Adaptation serves as a protective mechanism, helping individuals mitigate challenges and boosting their motivation to face future obstacles (Hsieh et al., 2016).

Individuals' strong emotional attachment to a group and their adherence to its norms and values shape collective identity and influence members' behaviors and attitudes. Social identity, as noted by Maitland et al. (2021), involves the establishment of significant relationships among groups. In contrast, individuals with a weak sense of self may resort to devaluation strategies (Tajfel & Turner, 1979). Tajfel (1978) also distinguished minorities by social status rather than just numbers. Students from marginalized groups with low ego resiliency are particularly at risk of compromising their social identity. An individual's identification with a group is influenced by the group's visibility, meaning changes in circumstances can affect their connection to it. This aspect of social identity theory is particularly relevant for language learners transitioning from community students to investigators.

When discussing language learning, researchers commonly refer to four main skills: listening, speaking, reading, and writing (Cerezo, et. al., 2019). However, vocabulary plays a crucial and influential role in language acquisition. Without sufficient vocabulary, learners lack the necessary words to construct meaningful sentences and convey their thoughts effectively (Cakmak, 2019). The significance and importance of mastering vocabulary are also evident in the context of English as a Foreign Language (EFL) learning, where learners must develop the ability to choose and utilize appropriate words in their communication (Suhardiana, 2021).

The integration of technology significantly enhances children's vocabulary development by increasing motivation and addressing disengagement (Finnsson, 2015). It offers numerous opportunities for learning, social interaction, and personal expression (Hidalgo et al., 2020). To promote cognitive engagement, language learning materials should incorporate playfulness and enthusiasm, making the process more appealing. A blend of creativity and dynamism is vital for a positive educational experience (Yam, 2021). However, traditional teaching practices often hinder these goals, as educators are seen as primary knowledge providers while students remain passive (Alorda et al., 2011). Incorporating digital elements in education can effectively tackle these challenges, transforming English language classrooms into more engaging and interactive environments (Aeschlimann et al., 2020). Accordingly, the present research utilized a quantitative methodology to investigate the effects of implementing technology integrated project-based learning on vocabulary learning, social identity, and ego resiliency in three groups of 9-year-old school students learning the English language.

RESEARCH QUESTIONS

The present study was guided by the following research questions:

1. Does project-based learning have a significant effect on English language learners' vocabulary learning in traditional and technology integrated classrooms?

2. Does project-based learning have a significant effect on English language learners' social identity in traditional and technology integrated classrooms?

3. Does project-based learning have a significant effect on English language learners' ego resiliency in traditional and technology integrated classrooms?

THEORETICAL FRAMEWORK OF THE STUDY

This study is grounded in Constructivism, heavily influenced by John Dewey's Pedagogical Creed, which promotes "learning by doing." Dewey's early 20th-century ideas align with constructivist principles, emphasizing active learner engagement in knowledge construction through interactions with their environment. Each individual's knowledge journey is unique and shaped by participation in investigations and discussions. Constructionism builds on this by shifting from an instruction paradigm—where knowledge is transmitted from educators to learners—to a learning paradigm. In this model, educators act as facilitators, guiding students in constructing their own knowledge and enhancing their understanding (O'Connor, 2020).

Constructivism emphasizes the importance of customizing learning activities to fit individual learners' needs, creating a more personalized educational experience. The analyzed projects highlight this approach by addressing each student's unique attributes and learning styles. According to constructivist theory, learners actively interpret information, developing their own understandings through experiential learning, which is crucial for knowledge construction. In language acquisition, particularly for foreign languages, effective learning occurs through experiential engagement and practical application. Activities that require using the target language in meaningful contexts allow learners to immerse themselves and enhance their vocabulary. This methodology not only aids language acquisition but also empowers learners to take control of their education, fostering deeper connections and enhancing their social identity. Diverse hands-on projects can further enrich their understanding and proficiency, contributing to their overall resilience.

REVIEW OF THE LITERATURE

Project-based learning (PBL) is an innovative educational approach that emphasizes inquiry-based learning, focusing on key concepts across subjects. It engages students in real-world inquiry activities, aiming for comprehensive project outcomes while addressing interconnected challenges within a set timeframe (Jingfu & Zhixian, 2002). As a student-centered method, PBL fosters 21st-century skills, particularly higher-order thinking, through problem-solving tasks that present complex, real-life situations (Zhang & Ma, 2023). In the context of digital transformation, technologies like artificial intelligence and big data are reshaping education and posing challenges for talent development. Cultivating students with higher-order thinking skills to navigate future complexities is a key goal of global educational reform (Ma & Yang, 2021). PBL, as a modern instructional method, utilizes real-life contexts and practical challenges, integrates multiple disciplines, and promotes competencies such as creative thinking and problem-solving.

One perspective posits that project-based learning (PBL) can markedly enhance student learning outcomes, encompassing academic performance, motivation, and advanced cognitive skills. Karpudewan et al. (2016) investigated the potential for enhancing energy literacy among secondary school students through a project-based instructional framework. The quantitative findings indicated that students engaged in a PBL curriculum exhibited superior performance in energy-related knowledge, attitudes, behaviors, and beliefs compared to their peers who followed a traditional curriculum. Similarly, Zhang Ying's intrinsic motivation scale, administered to 21 private university students before and after their exposure to project-based learning, revealed significant improvements in students' interest, autonomy, and competence, thereby positively affecting their intrinsic motivation to learn (Zhang, 2022). Yun (2022) highlighted the "Searching for Roots: Xu Hui Yuan" project as an exemplar of how project-based, in-depth educational practices can cultivate students' core competencies. Furthermore, Biazus and Mahtari (2022) conducted a quasi-experimental study comparing project-based learning with direct instructional methods, concluding that the PBL approach significantly enhanced the creative thinking skills of secondary school students. Additionally, Parrado-Martínez and Sánchez-Andújar (2020) examined the impact of project-based learning on the writing skills of ninth-grade students, finding that collaborative efforts within PBL fostered critical thinking, communication, and teamwork skills, leading to notable improvements in middle school students' English proficiency.

An alternative view suggests that project-based learning may have effects similar to or even negative compared to traditional methods. García-Rodríguez et al. (2021) found no significant improvement in students' problem-solving and information management skills through a student-centered project-based learning model.

Gratchev and Jeng (2018) found that combining traditional teaching with project-based learning resulted in similar academic achievements, indicating a lack of motivation for innovative strategies. Parrado-Martínez and Sánchez-Andújar (2020) noted no significant change in students' perceptions of teamwork, communication, and creativity with project-based learning. Kızkapan and Bektaş (2017) reported no significant differences in seventh graders' post-test scores between project-based and traditional methods. Lastly, Sivia et al. (2019) concluded that project-based learning did not significantly enhance student engagement compared to non-project-based contexts.

DESIGN

In this quasi-experimental study, three intact classes participated, with two classes assigned to different variations of project-based learning in traditional and technology integrated classrooms. The control group did not receive any special treatment related to project-based learning, while the two experimental groups were exposed to project-based learning for the vocabulary section of the classroom. Initially, all participants were administered social identity and ego resiliency questionnaires to complete, followed by a vocabulary test. This quantitative quasi-experimental study employed the implementation of project-based learning in traditional and technology integrated environments as two levels of the independent variable, while learners' vocabulary, social identity, and ego resiliency served as the dependent variables of this study.

PARTICIPANTS

During the academic year 2022-2023, a private school in Kerman, Iran implemented a course on English conversation specifically designed for young learners. The course focused on vocabulary and grammar development. All participants reported having studied English for an average of one year at various registered English language institutes. To assess their language abilities and ensure homogeneity, Cambridge young learners' placement test was administered, revealing that all participants were at the elementary level. In each of the three groups, there were a total of 19 students. The first group consisted of 15 elementary students, the second group had 17 elementary students, and the third group had 16 elementary students. For data analysis, the researcher excluded any students who were not in the elementary level. Additionally, she excluded any extra students from the final data analysis, even though they were present throughout all stages of the study. As a result, each group consisted of 15 students. Accordingly, the research study involved 45 primary-school Iranian female students who were divided into three groups based on their English language proficiency level. The selection of female participants was primarily influenced by their accessibility, as the researcher had extensive experience collaborating with female students over an extended period.

Additionally, all participants were 9 years old and in the third year of their primary education. It is worth noting that they possessed sufficient technology literacy and were familiar with its usage. Prior to commencing the course, the researcher conducted individual interviews with each participant to gauge their level of technology knowledge, which was found to be relatively similar among all participants. The interview was done in Persian, and the main interview questions were: Do you possess computers in your household and are you familiar with technology usage? How frequently do you use a computer? Is technology integrated into your daily life, or does it seem unfamiliar to you? Despite differences in social and economic backgrounds, all families possessed a computer system with a broadband internet connection.

The course was conducted twice a week for 90 minutes over a period of six months, totaling 48 sessions. The students were divided into three groups: the Control Group consisting of 15 participants, and two Experimental Groups, each consisting of 15 participants. During the projects, the students in each of the experimental groups were divided into five subgroups, each composed of three members. Ethical approval for the study was obtained from the school administrators, and to ensure confidentiality and anonymity, pseudonyms were used for all participants. Furthermore, the collected data was not shared with anyone, including school administrators.

INSTRUCTIONAL MATERIAL

Throughout the course of this study, the instructional material utilized for all groups consisted of the English book "Family and Friends (3)" authored by Thompson & Simmons in 2009 and published by the esteemed Oxford University Press. The teacher employed this textbook to facilitate instruction on various aspects of language learning, including grammar, vocabulary, and language skills encompassing listening, speaking, reading, and writing. However, the primary emphasis of this course revolved around the aspects of grammar and vocabulary.

INSTRUMENTS

To gather the necessary data, the researcher employed a quantitative research approach, utilizing two questionnaires and a test. Prior to and following the intervention, the participants' social identity, ego resiliency, and vocabulary levels were evaluated. A comprehensive overview of each instrument is provided herein. The data was collected both at the beginning and end of the study.

CAMBRIDGE ENGLISH YOUNG LEARNERS PLACEMENT TEST

Cambridge English Young Learners Placement Test, developed by Cambridge Language Assessment, efficiently and accurately assesses a child's English proficiency in approximately 30 minutes. It is adaptable to various educational environments and is specifically tailored for English language learners between the ages of seven and twelve. The exams are in line with the Common European Framework of Reference for Languages (CEFR), which categorizes language skills from A1 for beginners to C2 for language mastery. For A1 (beginner) to A2 (elementary) levels, a 30-question test evaluates vocabulary, grammar, and fluency. Scores ranging from 21 to 30 indicate an A2 (elementary) level of proficiency. The test's validity is endorsed by the CEFR (Cambridge University Press & Assessment, 2024).

SOCIAL IDENTITY QUESTIONAIRE

In this study, the Persian translation of the Social Identity Questionnaire (Bruner & Benson, 2018) was utilized. To increase the validity of the translation, the back-translation method was used. The questionnaire was translated into the Persian language by one of the researchers and then it was translated back into the English language by another researcher. The 2 source-language versions were then compared. This questionnaire consisted of 9 items that aimed to assess the participants' level of social identity considering the group affiliations. Each participant was requested to rate each statement on a scale of 1 to 5, ranging from strongly disagree to strongly agree. To determine the reliability of the scale, Cronbach's alpha test was conducted, yielding a value of .89 for the translated version of the questionnaire in the current study. The items underwent a thorough evaluation by four experts from different fields, including English language teaching and research studies. The evaluation focused on assessing the redundancy, face validity, content validity, and language clarity of the items. The experts confirmed all items. Additionally, pilot testing was carried out with a sample of 10 learners to enhance the validity and reliability of the items. The feedback received from the pilot testing indicated that the scale was indeed valid.

VOCABULARY TESTS

The third instrument utilized in the present study was the vocabulary test. The development of participants' vocabulary was assessed through two vocabulary tasks: a receptive task and a productive task. During the intervention period, participants were required to complete vocabulary tasks to evaluate their understanding of the subjects and topics presented to them. A total of 48 words were selected, with six words chosen from each of the eight subject matters, representing three syntactic categories: nouns, verbs, and adjectives. These selected words were then evaluated in both a productive and receptive vocabulary task, using the same words. In the productive task, children were shown a picture of the target word and were asked to fill in the blanks in sentences where the target word was missing. Each correct answer was awarded one point, resulting in a maximum of 48 points for

the entire task. On the other hand, the receptive task involved learners being orally presented with one target word at a time. They were then required to select the picture that best corresponded to the target word from a set of four pictures. The same scoring procedure as the productive task was applied, with one point given for each correctly selected item, resulting in a maximum of 48 points for the entire task. These tests were developed by Oxford University Press based on the Family and Friends series and are available for teachers to assess students' progress within each unit or overall achievement. Further, Pearson's correlation coefficient was used to assess the test reliability coefficient value, which was reported as 0.96, which shows the test was consistent and reliable.

EGO RESILIENCY QUESTIONAIRE

The evaluation of ego resiliency in students was conducted using the Persian version of the ego resiliency questionnaire. To increase the validity of the translation, the back-translation method was used. The questionnaire was translated into the Persian language by one of the researchers and then it was translated back into the English language by another researcher. The 2 source-language versions were then compared. This questionnaire was originally developed by Block and Block (1980) and later modified by Block and Kremen (1996). It consists of 14 items, which the students were required to rate on a 4-point scale ranging from 1 = not at all to 4 = a lot. To assign numerical values to the participants' responses and calculate the test results, each option was assigned a specific value: does not apply at all=1, applies slightly=2, applies somewhat=3, and applies very strongly=4. To assess the reliability of the translated scale, Cronbach's alpha test was conducted, resulting in a value of .89 for the ego-resiliency questionnaire in the current study. To evaluate the instruments used in the study, three experts (two in English language teaching and one in research studies) examined them for redundancy, face validity, content validity, and language clarity. The experts confirmed all items. Additionally, pilot testing was conducted with a group of 8 learners to enhance the validity and reliability of the items. The feedback received indicated that the scale was indeed valid.

PROCEDURE

A total of 45 students, who enrolled in an English language course as an extra class alongside their usual courses during the academic year 2022-2023, were invited to participate. The research was carried out outside of normal school hours, serving as an extracurricular program. The primary aim of the course was to enhance the students' English language proficiency, with a particular emphasis on vocabulary and grammar development. To facilitate the instruction, the textbook "Family and Friends (3)" authored by Thompson and Simmons in 2009 and published by Oxford University Press was utilized for all groups. In each session, five new vocabulary words were introduced as part of the book unit presentation, covering a range of topics including family, countries, seasons, personal belongings, and hobbies. Notably, during the first session, the teacher introduced the project-based learning approach aim and stages in both experimental groups. All groups underwent a 24-week (48 sessions) vocabulary training, with each session lasting 90 minutes, but the instructional methods differed.

In the control group, the teacher presented and practiced the new words following three stages: presentation, practice, and production. The initial phase involved presenting the words within a familiar context for the students. The teacher utilized charts, examples, and pictures to help the students grasp the meaning of the words. In the subsequent stage, students engaged in practice activities that offered ample opportunities to practice the new words and gain familiarity with them while receiving guidance from the teacher. The final stage comprised production, during which the students applied the words in context within an activity facilitated by the teacher, with the necessary support provided to the students. The teaching of new words in both experimental groups was conducted using the pedagogical approach, which involved a series of activities aligned with the key processes of project-based learning. These activities included: Question, Plan, Research, Produce, Improve, Present, and Evaluate (Kovácsné Pusztai, 2021).

Question

In general, projects commence with a question, issue, or difficulty, which often triggers numerous follow-up inquiries. The focus of the present study revolved around uncovering the meaning of newly introduced words. In the traditional experimental group, the introduction of new vocabulary was done through a presentation on the class board, with each group tasked with determining and sharing the definitions of one word. Conversely, in the technology integrated group, the new vocabulary was displayed on computer screens, with each group equipped

with a computer for use. All groups had half an hour to search, discuss, and present the interpretations they had uncovered.

Plan

Projects typically have a set timeframe, making it crucial to strategize and schedule the approach. Each group was tasked with outlining their objectives within the given time. In the traditional group, learners began sketching tables and charts on paper, mapping out the process and stages they intended to undertake. Conversely, the technology integrated group utilized ChatGPT to create visual representations, such as tables and graphs, outlining the steps and stages of their project. ChatGPT also assisted in planning, considering the constraints of the limited time available.

Research

To understand the meaning of new words, individuals must embark on a thorough investigation encompassing a wide array of potential references. Within the context of the traditional classroom, students collectively delved into their textbooks, personal annotations, existing knowledge, and occasionally sought clarification from their teacher. Conversely, in the technology integrated setting, they harnessed the power of the internet as a tool to meticulously scrutinize various online platforms dedicated to word definitions.

Produce

Different outcomes are expected from every project. These outcomes can take various forms such as reports, artifacts, installations, or presentations. In the traditional group setting, the learners created games, role plays, drawings, and flashcards to convey the meaning of the new words. On the other hand, in the technology integrated group, the learners utilized digital drawings, short videos, paint, and digital flashcards to illustrate the meaning of the words.

Improve

An imperative phase in the project involves enhancing the initial iteration and implementing the required modifications. It is highly probable that this phase will be revisited multiple times during the project. During this stage, the teacher checked the students' output in both groups, aiming to highlight areas of improvement and help them in enhancing their work.

Present

The project is typically displayed as a written or oral presentation. In the traditional group, each group was given a five-minute time slot to present their work in front of the class. In the technology integrated group, students shared their work through a link that allowed other groups to view it on the computers provided.

Evaluate

The evaluation of the projects, which is the final stage, holds significant importance as it typically encompasses the project's brief requirements. The teacher assessed the participants' projects by conducting quizzes to gauge all students' comprehension of the new words. In the traditional group, the teacher administered paper-based quizzes in the form of matching, gaps, and choosing. Conversely, in the technology integrated group, the teachers employed digital quizzes in the form of digital games and quizzes.

FINDINGS

To test the research hypotheses, it was essential to first check the data distribution for normality. One way to do this is through the Shapiro-Wilk test, a statistical method used in this study. All variables had a statistical significance level above 0.05, indicating a normal distribution. This allowed for the use of parametric tests to investigate research questions.

Regarding the first null hypothesis, H01. Project-based learning has no statistical effect on English language learners' vocabulary learning in traditional and technology integrated classrooms. With appropriate consideration given to the successful establishment of the hypothesis concerning the homogeneity of variances among groups (P-Value of Test of Homogeneity of Variances = 0.72 > α = 0.05) as shown in Table 1, the researcher conducted a one-way ANOVA test to examine the research inquiry (Table 1). Based on the outcome derived from this analysis, and given that the P-value exceeds 0.05 (P-Value = 0.86), it can be confidently affirmed

with over 95% level of confidence that prior to the implementation of technology integrated project-based learning, there was no statistically significant disparity in the mean of learners' vocabulary across different groups they were categorized into (F(2,42) = 0.154, p > 0.05).

Table 1
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
re	0.338	2	42	.72

Table 2
ANOVA test of vocabulary Development in Pre-test

Model	Sum of Squares	f	Mean Square	Value	P-Value
Between Groups	0.358		0.179		
Within Groups	48.767	2	1.161	.154	0.86
Total	49.125	4			

Regarding the homogeneity of groups' variances in the post-test (P-Value of Test of Homogeneity of Variances = 0.54 > α = 0.05) as shown in Table 2, the researcher opted to utilize a one-way ANOVA test for the analysis of the research question (Table 4). Based on the obtained value from this test, and noting that the P-value is below 0.05 (P-Value = 0.00), it can be confidently asserted with over 95% confidence that subsequent to the implementation of technology integrated project-based learning, there exists a significant difference in the mean of learners' vocabulary development across the various groups they are categorized in (F(2,42) = 184.236, p < 0.01).

Table 3
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
ost	0.622	2	42	.54

Table 4
ANOVA test of vocabulary Development in Post-test

Model	Sum of Squares	f	Mean Square	F	P-Value
Between Groups	490.711		245.356		
Within Groups	55.933	2	1.332	184.236	.000
Total	546.644	4			

The statistical analysis results (Table 4) indicated an enhancement in vocabulary learning across all three groups. Pairwise comparisons further revealed significant disparities in improvement among the three groups in the post-test (Table 5). Consequently, the Bonferroni post hoc test was implemented. Table 5 illustrates that Experimental 1 (traditional classroom) and Experimental 2 (technology integrated classroom) surpassed the Control group in terms of vocabulary leraning. The Bonferroni test outcomes indicate that Experimental 2 performed better than Experimental 1 group (p<.05).

Table 5
Pairwise Comparisons of the Groups for Vocabulary Learning (Post-test)

Group			Mean Difference (I-J)	td. Error	S roni	Bonfer Sig.	95% Confidence Interval Lower	L	Upper
l	Contro	Experi mental2	-1.60	42	.	.000	-2.65	0.55	-
		Experi mental1	-7.67	42	.	.000	-8.75	6.62	-
mental2	Experi	Control	1.60	42	.	.000	ς	0.5	2.65
		Experi mental1	-6.07	42	.	.000	-7.12	5.02	-
mental1	Experi	Control	7.67	42	.	.000	ς	6.6	8.72
		Experi mental2	6.07	42	.	.000	2	5.0	7.12

Regarding the second null hypothesis, H01. Project-based learning has no statistical effect on English language learners' social identity in traditional and technology integrated classrooms. After carefully examining the success in establishing the hypothesis on the homogeneity of groups' variances (P-Value of Test of Homogeneity of Variances = 0.46 > α = 0.05) as shown in Table 6, the researcher conducted a one-way ANOVA test to address the research question (Table 7). Based on the obtained value from this test, where the P-value is greater than 0.05 (P-Value = 0.76), it can be confidently stated with over 95% confidence that prior to the implementation of technology integrated project-based learning, there was no significant difference in the mean of learners' social identity across the groups they were assigned to ($F_{(2,42)}$ = 0.272, p > 0.05).

Table 6
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
re	0.794	2	42	.46

Table 7
ANOVA test of Social Identity in Pre-test

Model	Sum of Squares	f	Mean Square	l Value	P-Value
Between Groups	0.311		0.156		
Within Groups	24.000	2	0.571	.272	0.76
Total	24.311	4			

Regarding the homogeneity of groups' variances in post-test (P-Value of Test of Homogeneity of Variances = 0.95 > α = 0.05) as shown in Table 8, the researcher conducted a one-way ANOVA test to address the research question (Table 9). The obtained P-value from this test was 0.00, indicating statistical significance (P-Value = 0.00). Therefore, with a confidence level exceeding 95%, it can be confidently stated that there is a significant difference in the mean of learners' social identity across the groups they are part of after implementing the project ($F_{(2,42)}$ = 547.946, p < 0.01).

Table 8
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
ost	0.051	2	42	.95

Table 9
ANOVA test of Social Identity in Post-test

Model	Sum of Squares	f	Mean Square	F	P-Value
Between Groups	215.244	2	105 7.622		
Within Groups	81.067	42	1.9 30	47.946	5 00 .0
Total	296.311	44			

The statistical analysIs results (Table 9) indicated an enhancement in social identity across all three groups. Pairwise comparisons further revealed significant disparities in improvement among the three groups in the post-test (Table 10). Consequently, the Bonferroni post hoc test was implemented. Table 10 illustrates that Experimental 1 and Experimental 2 surpassed the Control group in terms of group differences. The Bonferroni test outcomes indicate that Experimental 2 performed better than Experimental 1 group (p<.05).

Table 10
Pairwise Comparisons of the Groups for Social Identity (Post-test)

Group			Mean Difference (I-J)	Std. Error	Bonferroni Sig.	95% Confidence Interval	
						Lower	Upper
l	Control	Experimental	-3.80	.50	0 .000	-5.07	-2.54
		Experimental	-16.07	.50	0 .000	-17.33	-14.80
mental2	Experimental	Control	3.80	50	0 .000	2.54	5.07
		Experimental	-12.27	.50	0 .000	-13.53	-11.00
mental1	Experimental	Control	16.07	50	0 .000	14.80	17.32
		Experimental	12.27	.50	0 .000	11.00	13.53

Regarding the third null hypothesis, H01. Project-based learning has no statistical effect on English language learners' ego resiliency in traditional and technology integrated classrooms. After carefully establishing the hypothesis regarding the homogeneity of groups' variances (P-Value of Test of Homogeneity of Variances= 0.15 >α=.05) as shown in Table 11, the researcher conducted a one-way ANOVA test to address the research question (Table 12). The obtained P-value from this test is 0.39, which is greater than 0.05. Therefore, with a confidence level of more than 95%, it can be concluded that there is no significant difference in the mean of learners' ego resiliency based on the groups they belong to before implementing technology integrated project-based learning (F (2,42) =0.977, p>0.05).

Table 11
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
re	1.979	2	42	.15

Table 12
ANOVA test of Ego Resiliency in Pre-test

Model	Sum of Squares	df	Mean Square	F	P-Value
Between Groups	12.40		110 4.422		
Within Groups	266.40	2	8.232	.977	0 39	0.
Total	278.80	4			

Regarding the homogeneity of groups' variances in post-test (P-Value of Test of Homogeneity of Variances = 0.95 > α = 0.07) as shown in Table 13, the researcher conducted a one-way ANOVA test to address the research question (Table 14). The obtained P-value from this test was 0.00, indicating statistical significance at the 0.05 level. Therefore, with a confidence level exceeding 95%, it can be confidently stated that there is a significant difference in the mean of learners' ego resiliency based on the groups they are assigned to after implementing technology integrated project-based learning (F (2,42) = 134.166, p < 0.01).

Table 13
Test of Homogeneity of Variances

ime	Levene Statistic	df1	df2	Sig.
ost	2.924	2	42	.07

Table 14
ANOVA test of Ego Resiliency in Post-test

Model	Sum of Squares	df	Mean Square	F	P-Value
Between Groups	2208.844		110 4.422		
Within Groups	345.733	2	8.232	134.166	1 00	.0
Total	2554.578	4			

The statistical analysIs results (Table 14) indicate an enhancement in ego resiliency across all groups. Pairwise comparisons further revealed significant disparities in improvement among the three groups in the post-test (Table 15). Consequently, the Bonferroni post hoc test was implemented. Table 15 illustrates that Experimental 1 and Experimental 2 surpassed the Control group in terms of group differences. The Bonferroni test outcomes indicate that Experimental 2 performed better than Experimental 1 group (p<.05).

Table 15
Pairwise Comparisons of the Groups for Ego Resiliency (Post-test)

Group			Mean Difference (I-J)	Std. Error	Bonferroni Sig.	95% Confidence Interval	
						Lower	Upper
Control		Experimental2	-3.00	.05	.000	-5.61	-0.39
		Experimental1	-16.13	.05	.000	-18.75	-13.52
Experimental2		Control	3.00	.05	.000	0.39	5.61
		Experimental1	-13.13	.05	.000	-15.75	-10.52
Experimental1		Control	16.13	.05	.000	13.52	18.75
		Experimental2	13.13	.05	.000	10.52	15.75

DISCUSSIONS

In the current study, involving three distinct groups of English language learners, significant advancements were observed in the enhancement of learners' vocabulary learning, social identity, and ego resiliency for both experimental groups. Nevertheless, the findings indicated that the integration of technology in project-based learning led to more substantial improvements in vocabulary learning, social identity, and ego resiliency compared to the traditional group. The statistical analysis answered the research questions as follows:

Regarding the first research question, does project-based learning have a significant effect on English language learners' vocabulary learning in traditional and technology integrated classrooms? the statistical analysis demonstrated that both experimental groups achieved success in enhancing learners' vocabulary. However, the integration of technology proved to be more effective compared to the traditional group.

The explanation for the enhancement of learners' vocabulary within the context of a project-based classroom can be illuminated through an examination of four fundamental principles derived from the realm of learning: firstly, the notion that learning is most efficacious when students actively construct their understanding; secondly, the idea that collaborative efforts amongst students greatly enhance the learning experience; thirdly, the significance of engaging in authentic learning environments; and lastly, the necessity of providing students with appropriate cognitive tools to facilitate their learning process (Krajcik & Shin, 2014).

In line with the results of this study, the comparative analysis between project-based learning and teacher-led instruction has revealed that project-based learning yields superior academic accomplishments (Balemen & Özer Keskin, 2018; Chen & Yang, 2019). Furthermore, research has provided empirical evidence that project-based learning possesses the potential to improve cognitive abilities and foster the development of thought-provoking inquiry skills among students (Sasson et al., 2018). The cultivation of enhanced thinking skills, in turn, can positively impact academic performance. Several studies, in alignment with the present research's findings, have consistently reported a positive correlation between the adoption of project-based learning and student learning outcomes (e.g., Halvorsen et al., 2012; Harris et al., 2014; Parker et al., 2013; Summers & Dickinson, 2012). It can be concluded that the perception of the Project-Based Learning approach as an advantageous method for students' engagement in learning is highly likely to lead to improvements in their academic performance (Bilbao et al., 2018).

The explanation for the increase in learners' vocabulary in the classroom that integrated technology with project-based learning can be elucidated by taking into consideration the various experimental modalities. According to Schnotz and Bannert (2003), the use of different types of learning content resources or modalities proved to be beneficial for students as it encouraged them to actively engage with and process the content. This claim is further supported by research conducted by Chiu and Churchill (2015), Chiu et al. (2020), and Schnotz and Bannert (2003). It should be emphasized that the provision of a single modality would not have yielded the same degree of effectiveness. In a setting where numerous resources are accessible, students experience a feeling

of independence and proficiency, thereby stimulating their inclination to explore supplementary resources or learning methods to increase their vocabulary knowledge.

Children acquire knowledge more effectively when they are actively engaged with a computer. This mode of learning is considered the most convenient for them to connect with their environment. Consequently, the integration of technology and project-based learning in language classes is believed to enhance students' motivation to learn. It is important to note that the primary function of educational software is not solely focused on teaching efficiency, but rather on stimulating students' interest and thereby improving their overall learning experience. The learning process itself plays a crucial role in this regard, surpassing the significance of the teaching activity. As a result, these types of technologies can contribute to fostering a sense of responsibility and self-regulation among students. This can be particularly beneficial for educators who have been striving to cultivate these qualities in students ever since the emergence of the constructivist approach to learning. The utilization of technology in education can serve as an educational assistant (Ghuloum, 2010), a teaching aid (Walker, 2012), or simply as a general support tool (Leuski et al., 2006).

Regarding the second research question, does project-based learning have a significant effect on English language learners' social identity in traditional and technology integrated classrooms? the statistical analysis demonstrated that both experimental groups achieved success in enhancing learners' social identity. However, the integration of technology proved to be more effective compared to the traditional group.

In terms of the achievements of social identity, projects offer a remarkable setting for participating in activities that enable learners to develop a sense of belonging to a group (Reagan & Osborn, 2002). Moreover, it provides them with an opportunity to grasp the values and principles of the group. By engaging in such an environment, students are given the chance to thrive socially, with a particular focus on inclusivity, thereby enhancing their understanding as both group members and individuals within their respective teams (Qualifications & Curriculum Authority, 2009).

Based on the findings derived from the study conducted by Mantri et al. (2008), it was illustrated that the utilization of project-based learning methodologies had a significant impact on the development and enhancement of various crucial skills pertaining to interpersonal dynamics, social interactions, and collaborative endeavors among the involved individuals. Furthermore, the implementation of such pedagogical approaches plays a pivotal role in fostering a deeper understanding and appreciation of social values, as well as facilitating the establishment and maintenance of group relationships and associations within the educational setting.

In line with the social identity shifts observed in project-based settings of this research, Van Bavel et al. (2021) demonstrated that an individual's knowledge, attitudes, and beliefs can be influenced by their social membership. Consequently, this influence impacts their perception and interpretation of events, decision-making process, and collaboration within social groups. These effects have been associated with a heightened sense of social identity.

Moreover, the enhanced performance displayed by the experimental group aligns consistently with the findings of Staudinger and Kunzmann's (2005) investigation, which ascertained that students undergo identity transformation or growth when they confront and endeavor to adapt to novel experiences (such as exposure to projects in this study), an undertaking that exerts profound effects on their socio-emotional development and can subsequently give rise to fruitful social interactions.

The explanation for the increase in learners' social identity in the classroom that integrated technology with project-based learning can be elucidated by the study conducted by Yu (2022). It was reported that engaging in online social networking can lead to favorable social learning outcomes. These outcomes include the development of a comprehensive identity and the recognition of the importance of bridging the gap between perceiving online environments as a "social space" versus a "personal space," especially in academic settings. Moreover, Chang et al. (2022) and Gu et al. (2022) have discussed the connection between social identity formation and social behavior in online knowledge communities. Their research indicates that behavior in these communities is positively influenced by the social identity tied to them, emphasizing the reciprocal relationship between different levels of social identity and the technology-driven networked society. Other scholars have similarly documented that digital technologies show potential in facilitating connections and fostering a sense of belonging among people (see Chen, 2017).

Regarding the third research question, does project-based learning have a significant effect on English language learners' ego resiliency in traditional and technology integrated classrooms? the statistical

analysis demonstrated that both experimental groups achieved success in enhancing learners' ego resiliency. However, the integration of technology proved to be more effective compared to the traditional group.

The findings pertaining to the increase in ego resiliency of learners in project-based classrooms can be elucidated by examining the alteration in the overall atmosphere within the classroom (Salmela-Aro et al., 2008). These changes happened due to students adopting new learning methods or having distinct learning experiences compared to previous ones (Irwansyah et al., 2019). The research conducted by Ghaznavi et al. (2021) denoted that effective English language instruction is accompanied by various positive ego resilience transformations in learners, findings that closely correspond to the conclusions drawn from the present study. As suggested by Gao (2019), with regard to the agency of language teachers, it is imperative for them to explore various strategies that enable the creation and sustenance of contextual conditions that are conducive to fostering changes in both the learning and resiliency of their students.

The explanation for the increase in learners' ego resiliency in the classroom that integrated technology with project-based learning can be elucidated by the fact that ego resiliency within educational environments is influenced by the behaviors exhibited by teachers and classmates, as well as the individual experiences encountered by learners (Ratelle rt al., 2018). Digital technologies offer individuals the opportunity to access a wealth of information and resources, enabling them to make well-informed choices and actively participate in their environment (Jackson & Chen, 2021). This, in turn, has the potential to enhance their ego resiliency and adaptability. Results of the current study confirm the importance of empowering students, especially children, to take responsibility for their learning, and see themselves as competent and effective by making learning interesting for them (Kinnula et al., 2017). This study supports Luthar and Cicchetti's (2000) assertion that learners' character is not a static or definitive concept, but a dynamic process in action. It implies a positive adjustment of an individual's social and personal characteristics because of a series of interactions using technology tools. Therefore, to grow and socialize, children interact continuously with their environment (Vanistendael & Lecomte, 2002).

However, these findings contradict the conclusions drawn by Hitosugi et al. (2014), who found that digital environments were not preferred over traditional instruction when it came to vocabulary learning. Furthermore, Pawlak et al. (2022) reported that learners perceive online classes as more boring compared to offline classes. This contradiction may be attributed to the unique characteristics of the individuals involved as well as their diverse background experiences.

CONCLUSION AND IMPLICATIONS

This study investigated whether the use of project-based learning in traditional and technology integrated classrooms can contribute to improving learners' vocabulary learning, social identity, and ego resiliency. Using a quasi-experimental research design with three groups of Iranian high school students, significant changes were found in the vocabulary learning, social identity, and ego resiliency for the experimental groups but not for the control group. The changes, however, were even more noteworthy in the technology integrated group.

Project-based learning focuses on enabling students to take charge of their learning, make informed decisions when needed, and ultimately improve their performance. Through involvement in classroom projects, teachers offer students interactive and intellectually challenging learning opportunities. These projects possess the natural capacity to spark and maintain students' curiosity, leading to a profound and meaningful grasp of the subject matter.

Project-based learning is an educational methodology that goes beyond the mere integration of various literacies and the implementation of rigorous standards. It goes a step further by emphasizing the active participation of students in the interpretation of information and the resolution of real-world problems. By incorporating captivating and thought-provoking projects that are grounded in authentic situations, project-based learning acts as a catalyst for sparking and maintaining students' curiosity and fascination. Consequently, this approach fosters the cultivation of profound comprehension and a wide range of essential social skills.

One of the main goals of high school education is to provide students with the necessary skills to tackle academic challenges. The aim is to give students a solid theoretical background and practical abilities that will help them secure employment in their desired fields. Through project-based learning, students' curiosity and creativity are stimulated, encouraging their active involvement in classroom tasks. These approaches focus on engaging students and promoting independent work, moving from passive learning (like interpretation and

explanation) to more interactive ways of gathering knowledge. As a result, students become more self-reliant in pursuing their educational goals.

Furthermore, technology integrated curricula can be implemented through a diverse array of scenarios that mimic real-life situations, allowing learners to participate in communicative interactions with the help of interactive technological tools. These materials should be easily accessible to language teachers for use in their classrooms and provided to learners to support both in-class and out-of-class learning. Additionally, when enrolling in language programs that use online learning platforms, it is crucial to create and execute student-centered tasks that engage learners' underlying cognitive skills.

The integration of technology and project-based learning in the classroom requires teachers to source teaching and learning materials from various outlets, rather than solely relying on school resources. Teachers can explore the internet to find materials, which can then be adjusted to meet educational goals and cater to the needs of their students. It is the duty of teachers to ensure that technology is used in line with educational principles. Without a strong educational basis, technology will not reach its full potential. Therefore, teachers play a crucial role in utilizing technology to enhance project-based learning for students with different abilities.

the outcomes of this study hold great relevance for various parties in the field of English language teaching and learning, including the academic system itself, curriculum designers, teachers, and students. The significant correlation between the process of language learning and the experiences encountered within the confines of the classroom is the underlying cause for this phenomenon. This research can assist English language teachers in guiding their students as they plan and make decisions about their learning. The findings of this study provide a valuable addition to the existing body of knowledge in literature focusing on improving language skills through the integration of project-based learning activities in the classroom. Of particular note, this holds great importance for students who are learning English as a Foreign Language (EFL) and struggle with expanding their vocabulary.

REFERENCES

Aeschlimann, S., Bleiker, M., Wechner, M., & Gampe, A. (2020). Communicative and social consequences of interactions with voice assistants. *Computers in Human Behavior*, *112*,106466. https://doi.org/10.1016/j.chb.2020.106466.

Alorda, B., Suenaga, K., & Pons, P. (2011). Design and evaluation of a microprocessor course combining three cooperative methods: SDLA, PBL and CnBL. *Computers & Education, 57 (3)*, 1876-1884, 10.1016/j.compedu.2011.04.004.

Balemen, N., & Özer Keskin, M. (2018). The effectiveness of project-based learning on science education: A meta-analysis search. *International Online Journal of Education and Teaching (IOJET)*, 5(4), 849–865. http://iojet.org/i ndex.php/IOJET /article/v iew/ 452/297.

Biazus, M., and Mahtari, S. (2022). The impact of project-based learning (PjBL) model on secondary students' creative thinking skills. *Int. J. Essential Competencies Educ. 1*, 38–48. doi: 10.36312/ijece.v1i1.752

Bilbao, J., Varela, C., Rebollar, C., Bravo, E., & García, O. (2018). Selecting assessments for problem-based learning. *International Journal of Education and Learning Systems*, 3, 129–133.

Block, J. H., & Block, J. (1980). *The role of ego-control and ego-resiliency in the organization of behavior.* Hillsdale, NJ: Erlbaum.

Block, J., & Kremen, A. M. (1996). IQ and Ego-Resiliency: Conceptual and Empirical Connections and Separateness. *Journal of Personality and Social Psychology*, *70(2)*, 349-361.doi.org/10.1037/0022-3514.70.2.349.

Bruner, M.W., & Benson, A.J. (2018). Evaluating the psychometric properties of the Social Identity Questionnaire for Sport (SIQS). *Psychology of Sport and Exercise, 35,* 181-188. Exeter, UK: ElmBank Publications https://doi.org/10.1016/j.p sychsport.201 7. 12.006.

Cerezo, R., Calderón, V., & Romero, C. (2019). A holographic mobile-based application for practicing pronunciation of Basic English vocabulary for Spanish speaking children. *International Journal of Human-Computer Studies*, *124*, 13-25. doi.org/10.1016/j.ijhcs.2018.11.009Get rights and content.

Chang K-F, Huang Y-H, Li W-C, Luo S & Yang D-J (2022) Promotion of Internet Users' Aggressive Participation via the Mediators of Flow Experience and Identification. *Front. Psychol.* 13:836303. doi: 10.3389/fpsyg.2022.836303.

Chen, X. (2017) Continuance Intention to Use MOOCs: Integrating the Technology Acceptance Model (TAM) and Task Technology Fit (TTF) Model. *Computers in Human Behavior*, 67, 221-232. doi.org/10.1016/j.chb.2016.10.028.

Chen, C.-H., & Yang, Y.-C. (2019). Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. *Educational Research Review, 26*, 71–81. https://doi.org/10.1016/j.edurev.2018.11.001

Chiu, T. K., & Churchill, D. (2015). Exploring the characteristics of an optimal design of digital materials for concept learning in mathematics: Multimedia learning and variation theory. *Computers & Education Journal*, *82*, 280-291. DOI:10.1016/j.compedu.20 14.12.001.

Chiu, T. K. F., Jong, M. S. Y., & Mok, I. A. C. (2020). Does learner expertise matter when designing emotional multimedia for learners of primary school mathematics? *Educational Technology Research and Development, 68(5)*, 2305–2320. https://doi.org/https://doi.org/10.1007/s11423-020-09775-4.

Finnsson, H., & Björnsson, Y. (2015). Learning simulation control in general game-playing agents. In *Twenty-Fourth AAAI Conference on Artificial Intelligence.*

Gao, Y. (2019). Teaching Technical Communication to Engineering Students: Design, Implementation, and Assessment for Project-based Instruction. *Proceedings of the Interdisciplinary STEM Teaching and Learning Conference*, 3. DOI: 10.20429/ stem. 2019.030106.

García-Rodríguez, F. J., Ruiz-Rosa, I., & Gutiérrez-Tao, D. (2021). Project-based learning as a tool to foster entrepreneurial competences (el aprendizaje basado en proyectos como herramienta para potenciar la competencia emprendedora). *Cult. Educ. 33*, 316–344. doi: 10.1080/11356405.2021.1904657.

Gratchev, I., & Jeng, D. S. (2018). Introducing a project-based assignment in a traditionally taught engineering course. Eur. *J. Eng. Educ. 43,* 788–799. doi: 10.1080/03043797.2018.1441264.

Gu, P. (2002). Effects of project-based CALL on Chinese EFL learners. *Asian Journal of English Language Teaching, 1(12)*, 195–210.

Ghaznavi. N., Haddad Narafshan, M. & Tajadini, M. (2021). Ego-resiliency and physically disabled learners: The implementation of a multiple intelligences teaching approach. *Res Dev Med Educ.* doi: 10.34172/rdme.2021.004.

Ghuloum, H. (2010). 3D hologram technology in learning environment. In *Informing Science & IT education conference*, 693, p. 704. Informing Science Institute Santa Rosa, CA. Proceedings of Informing Science & IT Education Conference (InSITE) doi.org/10.28945/1283.

Halvorsen, A-L., Duke, N. K., Brugar, K. A., Block, M. K., Strachan, S. L., Berka, M. B., **&** Brown, J. M. (2012). Narrowing the achievement gap in second-grade social studies and content area literacy: The promise of a project-based approach. *Theory and Research in Social Education*, 40**,** 198-229. DOI:10.1080/00933104.2012.705954.

Harris, J. H., & Katz, L. G. (2001). *Young investigators: The project approach in the early years.* Teachers College Press. New York.

Harris, C. J., Penuel, W. R., DeBarger, A. H., D'Angelo, C., & Gallagher, L. P. (2014). *Curriculum materials make a difference for next generation science learning: Results from Year 1 of a randomized controlled trial*. Menlo Park, CA: SRI International.

Hidalgo, A., Gabaly, S., Morales-Alonso, G., & Urueña, A. (2020). The digital divide in light of sustainable development: An approach through advanced machine learning techniques. *Technological Forecasting and Social Change*, *150*, 119754. doi.org/10.1016/j.techfore.2019.119754.

Hitosugi, C. I., Schmidt, M., & Hayashi, K. (2014). Digital game-based learning (DGBL) in the L2 classroom: The impact of the UN's off-the-shelf videogame, Food Force, on learner affect and vocabulary retention. *Calico Journal*, *31*(1), 19-39. DOI:10.11139/cj.31.1.19-39.

Holmes, L. M. (2012). *The effects of project-based learning on 21st century skills and no child left behind accountability standards* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (3569441).

Hudáková, J., & Papcunová, (2019). Constantine the Philosopher University in Nitra Faculty of Natural Sciences, Institute of Economics and management. Nitra, Slovak republic2019 4th International Conference on Education Science and Development (ICESD 2019) ISBN: 978-1-60595-593-3.

Hsieh, T. H., Liao, Y. L., Lin, Y. Y., & Liaw, Y. M. (2016) A study on the relationship among teacher's job stressors, ego-resilience, and job engagement on well-being: The teacher as the sample. *Journal of Human Resource Management*, 16(2), 55–80. doi: 10 6147/ JHRM 2016 1602 03**.**

Irwansyah, M., Meitriana, M. A., & Istiqomah, N. (2019). Exploring student academic procrastination based on time management, social support and self-efficacy.Advances in Social Science, Education and

Humanities Research. (4th International Conference on Innovative Research Across Disciplines). doi.org/10.2991/assehr.k.211222.019.

Jackson et al (2021). Student expectations of technology-enhanced pedagogy: A ten-year comparison. *Journal of Education for Business*. 86(5):294–301. doi: 10.1080/08832323.2010.518648.

Jingfu, L., and Zhixian, Z. (2002). Project-based learning model. Foreign Educ. Res. 11, 18–22.

Karpudewan, M., Ponniah, J., and Zain, A. N. M. (2016). Project-based learning: an approach to promote energy literacy among secondary school students. Asia Pac. Educ. Res. 25, 229–237. doi: 10.1007/s40299-015-0256-z

Kinnula, M., Iivari, N., Molin-Juustila, T., Keskitalo, E., Leinonen, T., Mansikkamäki, E., & Similä, M. (2017). Empowering Children'in and through Digital Technology Design? In *ICIS*.

Kızkapan, O., and Bektaş, O. (2017). The effect of project based learning on seventh grade students' academic achievement. Int. J. Instr. 10, 37–54. doi: 10.12973/ iji.2017.1013a. https://doi.org/10.14812/cufej.479322.

Kovácsné Pusztai, K. (2021). Evaluation of Project-Based Learning. *Acta Didactica Napocensia, 14(1)*, 64-75, https://doi.org/10.24193/adn.14.1.5

Krajcik, J. S., & Shin, N. (2014). Project-based learning. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (2nd ed., pp. 275–297). Cambridge University Press. https://doi.org/10.1017/CBO9781139519526.018

Leuski, A., Kennedy, B., Patel, R., & Traum, D. (2006). *Asking Questions to Limited Domain Virtual Characters: How Good Does Speech Recognition Have to Be?*. University Of Southern California Los Angeles.

Li, Y., & Ding, F (2020) Retrospect and prospect of the research on primary school adaptation *Journal of Basic Education Reference, 2,* 10–15 http://www cqvip com.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: a critical evaluation and guidelines for future work. Child Development, 71, 543e562. http://dx.doi.org/10.1111/1467-8624.00164.

Ma, S., and Yang, X. (2021). Cooperative reasoning learning to promote the development of higher-order thinking. Educ. Dev. Res. 24, 64–73. doi: 10.14121/j. cnki.1008-3855.2021.24.011

Maitland, C. A., Rhodes, S., O'Hare, A., & Stewart, M. E. (2021). Social identities and mental well-being in autistic adults. *Autism*, *25*(6), 1771–1783. doi.org/10. 1177/ 1362 36 13211004328.

Mantri, A. et al. (2008). Design and evaluation of a PBL-based course in analog electronics, IEEE Trans. *Educ. 51,* 432–438. DOI:10.1109/TE.2007.912525.

O'Connor, K. (2020). Constructivism, curriculum and the knowledge question: tensions and challenges for higher education. *Studies in Higher Education*, DOI: 10.1080/03075079.2020.1750585

Parker, S., Stratton, G., Gale, T., Rodd, P., & Sealey, T. (2013). *Higher education and student aspirations: a survey of the adaptive preferences of Year 9 students in Corio, Victoria.* Centre for Research in Education Futures and Innovation (CREFI), Deakin University

Parrado-Martínez, P., and Sánchez-Andújar, S. (2020). Development of competences in postgraduate studies of finance: A project-based learning (PBL) case study. *Int. Rev. Econ. Educ. 35*:100192. doi: 10.1016/j.iree.2020.100192.

Pawlak et al. (2022). Investigating the Use of Grammar Learning Strategies in Hungary and Poland: A Comparative Study. *Applied Linguistics, 44(2)*. doi.org/10.1093/applin/ama. c038.

Qualification and Curriculum Development Authority (2009). *National Curriculum.* http://curriculum.qcda.gov.uk/key-stages-1-and-2/Values-aims-and-purposes/index.aspx

Ratelle, C.F., Morin, A.J.S., & Guay, F., & Duchesne, S. (2018). Sources of evaluation of parental behaviors as predictors of achievement outcomes. *Motiv. Emot. 42,*513–526. doi: 10.1007/s11031-018-9692-4. DOI:10.1108/JARHE-05-2019-0105.

Reagan, T. G., & Osborn, T. A. (2002). *The foreign language educator in society: Toward a critical pedagogy.* (1st Edition). Mahwah, NJ: Lawrence Erlbaum. Doi.org/10.4324/9781410602862.

Salmela-Aro, K., Kiuru, N., Pietikäinen, M., & Jokela, J. (2008). Does school matter? The role of school context for school burnout. *European Psychologist, 13*, 1–13. doi:10.1027/1016-9040.13.1.12.

Sonia Sánchez, S., & -Andújar, M. (2020). Development of competences in postgraduate studies of finance: A project-based learning (PBL) case study. *Review of Economics Education*, *35,* (1-5) doi.org/10.1016/j.iree.2020.100192.

Sasson, I., Yehuda, I., & Malkinson, N. (2018). Fostering the skills of critical thinking and question-posing in a project-based learning environment. *Thinking Skills and Creativity*, 29, 203–212. https://doi.org/10.1016/j.tsc.2018.08.001.

Schnotz, W., & Bannert, M. (2003). Construction and interference in learning from multiple representation. *Learning and Instruction*, 13(2), 141–156.doi.org/10.1016/S0959.

Shin, Y. J. (2005) *The study on relationships among parental child-rearing attitude, self-resilience and school adjustment of elementary school students* (Unpublished master's thesis) Kongju Education University.

Sivia, A., MacMath, S., Novakowski, C., & Britton, V. (2019). Examining student engagement during a project-based unit in secondary science. Can. J. Sci. Math. *Technol. Educ. 19*, 254–269. doi: 10.1007/s42330-019-00053-x.

Staudinger, U. M., & Kunzmann, U. (2005). Positive Adult Personality Development: Adjustment and/or Growth? *European Psychologist, 10(4)*, 320–329. https://doi.org/10.1027/1016-9040.10.4.320.

Suhardiana, I. P. A. (2021). Attitudes of EFL Students Regarding Learner Autonomy in English Vocabulary Acquisition. *Yavana Bhasha: Journal of English Language Education*, *4*(2), 67-80. DOI:10.25078/YB.V4I2.2773.

Summers, E. J., & Dickinson, G. (2012). A longitudinal investigation of project-based instruction and student achievement in high school social studies. Interdisciplinary Journal of Problem-Based Learning, 6**(**1), 82-103.

Tajfel, H. (1978). *The social psychology of minorities.* London: Minority Rights Group. Retrieved from

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-37). Monterey, CA: Brooks/Cole.

Thompson, T. & Simmons, N. (2009*). Family and Friend (3).* Oxford University Press

Van Bavel J. J., Rathje S., Harris E., Robertson C., & Sternisko A. (2021). How social media shapes polarization. *Trends in Cognitive Sciences, 25*, 913–916. https://doi.org/10.1016/j.tics.2021.07.013.

Vanistendael, S., & Lecomte, J. (2002). *La felicidad es posible: Despertar en niños maltratados la confianza en si mismos: construir la resiliencia*. Gedisa Editorial.

Vogler, J. S., Thompson, P., Davis, D. W., Mayfield, B. E., Finley, P. M., & Yasseri, D. (2018). The hard work of soft skills: Augmenting the project-based learning experience with interdisciplinary teamwork. *Instructional Science*, *46(3)*, 457–488. https://doi .org/10 .1007/s11251-017-9438-9.

Walker, A., Recker, M., Ye, L., Robertshaw, M. B., Sellers, L., & Leary, H. (2012). Comparing technology-related teacher professional development designs: A multilevel study of teacher and student impacts. *Educational technology research and development*, *60(3)*, 421-444. DOI:10.1007/s11423-012-9243-8.

Waller, M A (2001) Resilience in ecosystemic context: Evolution of the concept. *The American Journal of Orthopsychiatry, 71(3)*, 290–297 https://doi org/10 1037/0002-9432 71 3290.

Wei, Z (2010) Research on the influencing factors of school education on children's social development *Journal of Guancha*, 6, 1–7 https://doi:CNKI:SUN:KJWZ 0 2010-06 005.

Worthy, J. (2000). Conducting research on topics of student interest. *The Reading Teacher*, *54(3),* 298–299.

Yam, L. P. K. (2021). Creative teaching and communication: A study of creative teachers' traits and skills as perceived by primary school students. *Journal of Communication and Education, 5(1), 104-120.*

Yu, Y. (2022) Embedded self-conceptualization and social learning in online social networking platforms. *Front. Psychol. 13*:901625. doi: 10.3389/fpsyg.2022.901625.

Yun, X. (2022). Practical exploration of project-oriented deep ritual education -- take the project-oriented learning of searching for roots Xu Huiyuan in grade 5 as an example. *Shanghai J. Educ. Res. 9,* 64–68. doi: 10.16194/j.cnki.31-1059/g4.2022.09.006

Zhang, Y. (2022). A study on the effect of project-based teaching on the intrinsic motivation of private university students' English learning. *J. Sci. Educ. 13,* 29SPi_ ENDASH31. doi:10.16400/j.cnki.kjdk.2022.13.010

Zhang, J. & Ma, Y, (2023) A Personalized Learning Path Recommendation Method Incorporating Multi-Algorithm. *Applied Sciences, 13.* https://doi.o rg /10. 3390/ app1 3 105946.