

## Civil Aviation Students' Perspectives on Interactive Online Activities versus Textbooks in Vocabulary Learning<sup>1</sup>

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### Abstract

This study, as part of a larger research investigation, explored Turkish aviation students' perspectives on using interactive online vocabulary activities with games versus traditional textbook exercises for learning English terminology. Focusing solely on the qualitative phase of a mixed-methods study, this study analyzed interviews and focus groups to gain deeper insights into students' experiences and preferences. Findings revealed that the experimental group perceived significantly greater improvements in listening, writing, and vocabulary skills through the interactive online activities which allowed contextualized practice. However, challenges included insufficient prior language preparation and difficult assessments. Overall, interactive online vocabulary games enhanced motivation, retention, and achievement compared to textbook exercises, though recommendations included supplementing with face-to-face instruction, diverse materials, and preparatory training. Student perspectives highlighted interactive, experiential methods as the most effective for mastering the specialized vocabulary crucial for aviation communication and safety.

**Keywords:** Aviation English, interactive vocabulary activities, textbook activities, student perspectives

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## Sivil Havacılık Öğrencilerinin Kelime Öğreniminde Çevrimiçi Etkileşimli Etkinlikler ile Ders Kitaplarına Yönelik Bakış Açıları

### Öz

Daha kapsamlı bir araştırmanın parçası olan bu çalışma, Türk havacılık öğrencilerinin İngilizce terminolojiyi öğrenmek için geleneksel ders kitabı alıştırmalarına karşı oyunlarla çevrimiçi etkileşimli kelime etkinliklerini kullanma konusundaki bakış açılarını araştırmıştır. Karma yöntemli bir çalışmanın yalnızca nitel aşamasına odaklanan bu çalışmada, öğrencilerin deneyimleri ve tercihleri hakkında daha derinlemesine bilgi edinmek için görüşmeler ve odak grup tartışmaları analiz edilmiştir. Bulgular, deney grubunun, bağlamsallaştırılmış pratiğe olanak tanıyan çevrimiçi etkileşimli etkinlikler aracılığıyla dinleme, yazma ve kelime bilgisi becerilerinde önemli ölçüde daha fazla gelişme algıladığını ortaya koymuştur. Ancak, karşılaşılan zorluklar arasında yetersiz ön dil hazırlığı ve değerlendirme zorlukları yer aldı. Genel olarak, çevrimiçi interaktif kelime oyunları, ders kitabı alıştırmalarına kıyasla motivasyonu, kalıcılığı ve başarıyı artırdı, ancak öneriler arasında yüz yüze eğitim, çeşitli materyaller ve hazırlık eğitimi ile desteklenmesi yer aldı. Öğrenci bakış açıları, havacılık iletişimi ve güvenliği için çok önemli olan özel kelime dağarcığına hâkim olmak için etkileşimli, deneysel yöntemlerin en etkili yöntem olduğunu vurgulamıştır.

**Anahtar kelimeler:** Havacılık İngilizcesi, etkileşimli kelime öğretimi etkinlikleri, ders kitabı etkinlikleri, öğrenci bakış açıları

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## Introduction

Communication errors implicated in numerous air transport accidents have brought intense scrutiny on English language proficiency in aviation. Standards mandated by the International Civil Aviation Organization (ICAO, n.d.) are difficult to achieve for speakers of other languages. To address the communication issues implicated in multiple fatal accidents, the ICAO mandated English language proficiency for pilots and air traffic controllers in 2008 (Bani-Salameh et al., 2011). This mandate highlighted the pivotal role of clear communication and language skills in ensuring aviation safety worldwide. However, meeting these stringent proficiency requirements poses significant challenges, especially for non-native English speakers and students in regions with limited exposure to the language. For this reason, vocabulary poses a particular barrier to fluency for aviation students in countries where opportunities to practice English are limited (Aydoğan, 2017). Mastering the specialized lexicon is crucial for precise radio communications and comprehension of technical manuals and procedures. Student perspectives offer insights into effective instructional approaches for teaching this essential component of communicative competence.

Vocabulary plays a fundamental role in developing communicative competence across all language skills, yet vocabulary acquisition poses persistent challenges for aviation students (Muhammad & Varol, 2019). While traditional textbooks facilitate explicit vocabulary instruction, some scholars argue that interactive online games and multimedia resources can more implicitly foster motivation, engagement, and retention of new words (Donmus, 2010; Yip & Kwan, 2006). This qualitative study hence investigates Turkish aviation students' opinions on utilizing interactive online vocabulary activities with games versus traditional textbook exercises for learning English terminology within this specialized domain. In addition, technology-mediated language instruction provides promising options for active learning, immersive practice, and self-directed skill development (Donmus, 2010). However, few studies have explored student preferences and experiences with these differing approaches from the learner's viewpoint. Participants' reactions will reveal perceived advantages, challenges, and limitations in applying each method within the unique context of aviation English. Therefore, this in-depth exploration of student perspectives may guide educators and curriculum designers in integrating instructional methods optimized for 21st century learners and the specific needs of the aviation industry. Enabling students to articulate the nuances of their learning experiences that quantitative measures alone cannot fully capture is essential to promote equity and inclusivity in education. Findings will guide best practices in aviation English instruction by identifying the optimal strategies for building the essential vocabulary base required by air travel personnel. Enhancing vocabulary learning is a critical step towards addressing the key barrier of ICAO English proficiency standards that enable smooth, unambiguous communication vital for operational safety (ICAO, n.d.). Ultimately, this research serves the global aviation community by upholding rigorous, evidence-based language training programs to prevent future tragic incidents.

## Literature Review

In research on vocabulary teaching and learning, various theoretical foundations have been explored to inform this field. For instance, the connectionist theory views knowledge as connections between concepts in the brain, with learning occurring through strengthening neural links (Williams, 2006). Constructivism focuses on how individuals internalize social activities and language use to drive their development (Vygotsky, 1978). The schema theory posits that learners combine their background knowledge with new information to comprehend texts (Stott, 2001). The dual-coding theory distinguishes between verbal and non-verbal modes of cognition (Paivio, 1991; Sadoski, 2005). Across these theories, a common theme emerges - the need for active engagement, whether through making connections, constructing meaning, building on prior knowledge, or dual-coding information verbally and visually.

To facilitate such active learning of vocabulary, researchers have advocated the use of task-based activities such as dialogues, descriptions, and games that require learners to apply words in context (Ashraf et al., 2014). Vocabulary cannot be acquired through rote memorization alone; rather, it must be integrated into the core language skills of listening, speaking, reading, and writing (Tebeweka, 2021). Explicit strategy instruction can further empower learners through cognitive strategies, such as repetition (Oxford, 1990), metacognitive strategies for planning and monitoring their learning (O'Malley & Chamot, 1990; Schmitt, 2000), or social strategies involving interaction with others (Sanaoui, 1995; Schmitt, 2000). These strategies give learners control over their vocabulary journey and foster independence in lifelong learning (Oxford, 2011; Özer, 2002).

A particularly powerful approach capitalizing on these principles is the use of interactive online vocabulary activities and games. Grounded in constructivist learning theory, digital environments provide a rich context for social interaction, experiential learning, and active construction of knowledge (Doolittle & Hicks, 2003; Wang, 2014). Game elements such as fantasy, rules, and feedback loops tap into our innate desire for achievement, competition, and curiosity, thus enhancing motivation and engagement (Ruben, 1999; Wood, 2001). While access to technology can be a limitation, the ability to reinforce vocabulary through immersive, multiplayer experiences has shown great promise in previous studies (e.g., Yip & Kwan, 2006).

One specific context is vocabulary instruction for aviation English, a specialized domain with unique communicative demands. An effective mastery of aviation terminology is crucial for clear radio communications and overall safety (Mackay & Mountford, 1978). Yet this technical vocabulary poses significant challenges for learners (Wang, 2011). Researchers have therefore explored best practices from the field of English for Specific Purposes (ESP),

which advocates designing instruction around learners' vocational needs (Hutchinson & Waters, 1987). While early aviation materials narrowly focused on pilots and air traffic controllers (Cutting, 2012), a more comprehensive approach spanning all aviation roles has emerged, drawing on recent multimedia resources, including digital textbooks tailored for this industry.

To evaluate the efficacy of online, game-based approaches for teaching aviation vocabulary, findings from several prior studies across contexts have been reviewed. Broadly, the extant research has demonstrated benefits in terms of motivation, retention, and overall achievement when incorporating digital games and activities, as compared to traditional instruction (e.g., Alemi, 2010; Demirbilek et al., 2010; Dinçer & Dinçer, 2021; Dolati & Mikaili, 2011; Pinem, 2009; Saffarian & Gorjian, 2012; Septida, 2020; Turgut & İrgin, 2009; Yip & Kwan, 2006). While varying in specific design and populations, these studies consistently pointed to the advantages of harnessing technology, game mechanics, and multimedia for creating engaging, contextualized vocabulary learning experiences. Building on these insights, the researchers in this study have aimed to develop and rigorously test online, game-based curricula tailored specifically for aviation English instruction. For this particular study only, the focus was on their perspectives on the use of interactive online games versus coursebooks while learning specialized vocabulary.

## Methods

### Research Design

The larger study from which we extracted this research utilized a mixed-methods sequential explanatory design. In the quantitative phase, an experimental approach with pre- and post-testing was employed to investigate the effects of interactive online vocabulary activities with games compared to traditional coursebook activities on the vocabulary comprehension of aviation students (Creswell & Plano Clark, 2011). The experimental group received the interactive online vocabulary activity intervention, while the control group received standard course book-based instruction. In the qualitative phase, the interviews were conducted to gain deeper insights into the students' perspectives and experiences with the two instructional approaches (Ivankova et al., 2006).

### Participants

In the larger study, the participant sample consisted of 84 second-year undergraduate students pursuing studies in Civil Aviation and Transportation Management at a vocational college of Burdur Mehmet Akif Ersoy University in Turkey. The students were between 19-22 years old. Using convenience sampling, two intact classes were randomly assigned to the experimental (n=42; 22 females, 20 males) and control (n=42; 20 females, 22 males) groups. The experimental group received interactive online vocabulary activities integrated with games, while the control group followed a traditional curriculum using coursebook-based vocabulary activities.

### Data Collection

Qualitative data were collected through semi-structured written interviews and focus groups. Individual interviews using an interview form with five main open-ended questions and six sub-questions were conducted with 52 students from the experimental group and 47 students from the control group, based on voluntary participation. Follow-up focus group interviews were also carried out with six students from each group, representing high, medium, and low achievement levels based on their coursework and exam performance. These focus group interviews lasted approximately 60-90 minutes each. This allowed us to triangulate findings across the individual interviews and focus groups.

### Data Analysis

Qualitative interviews and focus group data underwent rigorous content analysis using both inductive and deductive approaches (Elo & Kyngäs, 2008). Responses were systematically coded, and then grouped into themes and sub-themes that naturally emerged from the data (inductive) as well as derived from the study's conceptual framework (deductive) (Fereday & Muir-Cochrane, 2006). Themes included factors such as perceptions of activities, skills development, tools/resources, motivation, and overall learning experiences. The analysis process involved multiple coders to enhance trustworthiness (Creswell & Miller, 2000).

### Reliability and Validity

Several measures were implemented to bolster the reliability and validity of the study. Prior to data collection, necessary permissions were secured from the university's ethics committee and the vocational college. The classroom environment was arranged to be conducive to the planned activities. The foundational concepts were identified and defined based on an extensive literature review. Validated, published testing instruments (the placement test) were used alongside the researcher-developed vocabulary test which underwent a systematic expert review and revision process. Finally, member checking was performed with interview/focus group participants to verify the accurate representation of their perspectives in the qualitative findings.

## Findings

The qualitative analysis of interviews and focus group discussions in a study involving students from experimental and control groups led to the identification of 12 themes and 21 sub-themes related to learning English in aviation. These included learning and teaching methods, course characteristics, materials used, assessment, and the overall quality of the experiment. The significant findings include the following themes.

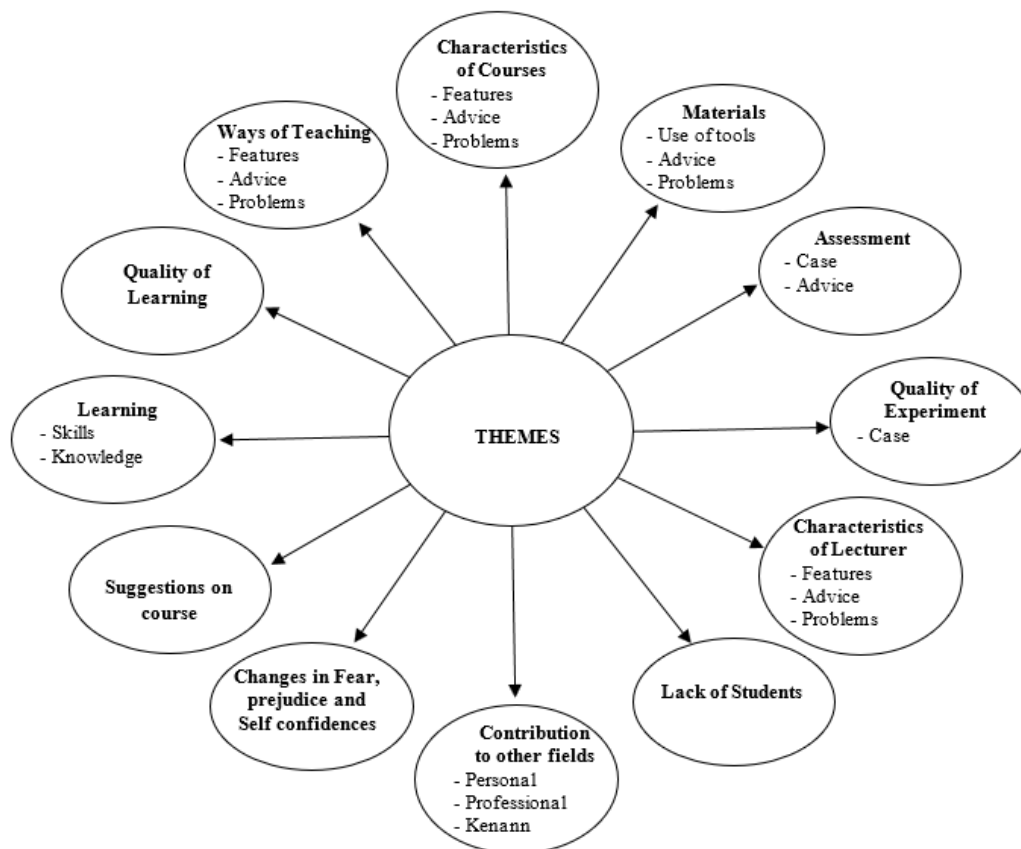


Figure 1. Themes and sub-themes obtained from qualitative analysis

## Learning

The experimental group's enhanced language skills were marked by significant improvements, particularly in listening and writing, with 42 out of 52 students reporting progress. This improvement is not only a quantitative finding but also reflects the qualitative richness of their learning experiences. As seen in Figure 2, vocabulary acquisition stood out, with a student sharing (ES= Experimental group Student; CS= Control group Student):

*...the course contributed to my vocabulary and pronunciation (ES 13).*

Another student's ability to transcribe what they heard more easily (ES24) indicated a deeper internalization of language skills, suggesting a strong link between the course's activities and listening comprehension. Students reported significant improvements in their language skills, notably in listening and writing. A remark from one student captured this progress:

*...I think that I reinforce my knowledge about words by speaking and pronounce them better (ES14).*

Another student's experience is summed up as follows:

*... at first, I could not write what I heard but now I can write the words which I listened easily and correctly (ES24).*

This comment highlights the impact of the course on their listening and writing skills, as seen in Figure 2 below.

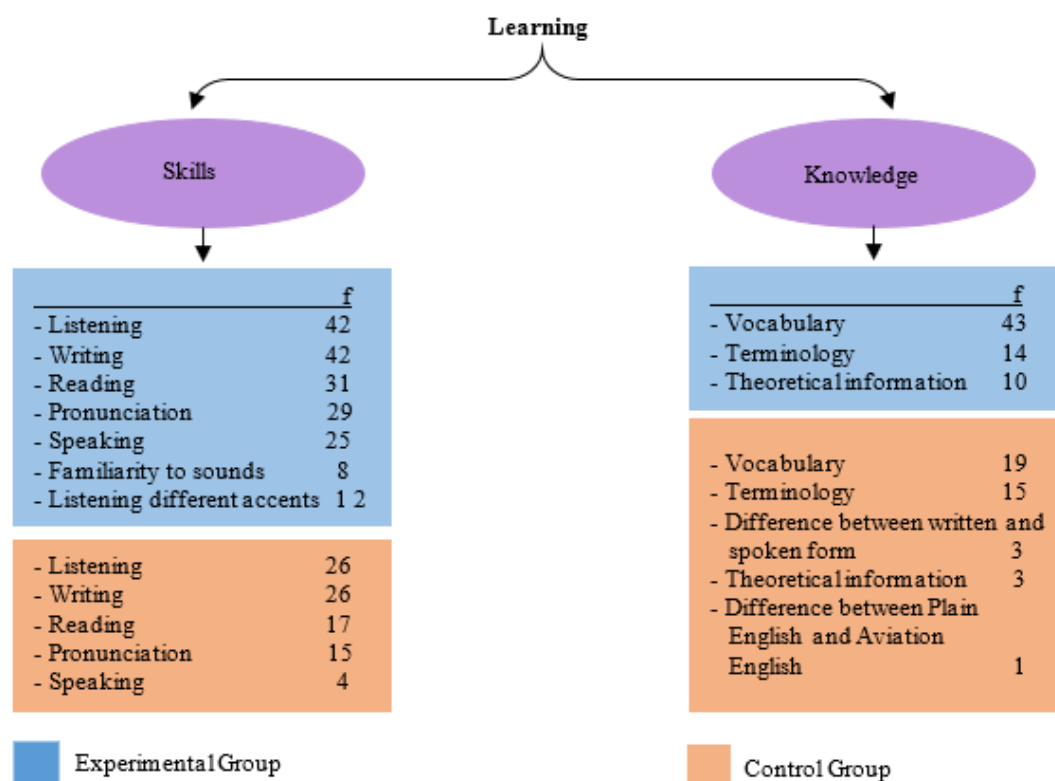


Figure 2. Students' ideas about learning

While students in the experimental group reported substantial improvements across various language skills, students in the control group also noted enhancements but to a lesser extent. For instance, 26 control group students reported writing improvement compared with 42 in the experimental group. A student from the experimental group emphasized their progress:

... *I can pronounce words better (ES1).*

However, a student from the control group remarked:

... *I think I have improved myself in pronunciation (CS 15).*

The differences in perceived improvement are represented in the above figure, illustrating the disparate outcomes between the two groups.

### Quality of Learning

Quality learning for the experimental group focused on the iterative process of repetition and persistent study, which was noted as vital for mastering aviation English. Ten students highlighted that satisfaction with their learning outcomes was closely tied to consistent engagement, as captured in Figure 3. The control group's suggestions, on the other hand, leaned towards the necessity of prior preparation and structured homework to enhance active learning, with a student proposing that:

... *The teaching of the lesson is good, but it can be more fun with different activities (CS3).*

Obviously, CS3 points to the desire for more diverse learning modalities. Persistence and active participation are considered critical to successful learning.

... *Aviation English course is an interactive course that requires active participation... the course and vocabulary needed more repetition to remember (ES12).*

ES12 reflects an opinion on the interactive nature of the course. This underscores the importance of engagement and the value of repetition in solidifying learning.

Persistence and repetition were crucial factors in the learning process for both groups. However, ten students from the experimental group expressed satisfaction with their learning experience in aviation English, contrasting with suggestions from the control group for more practical exercises and better homework reinforcement.

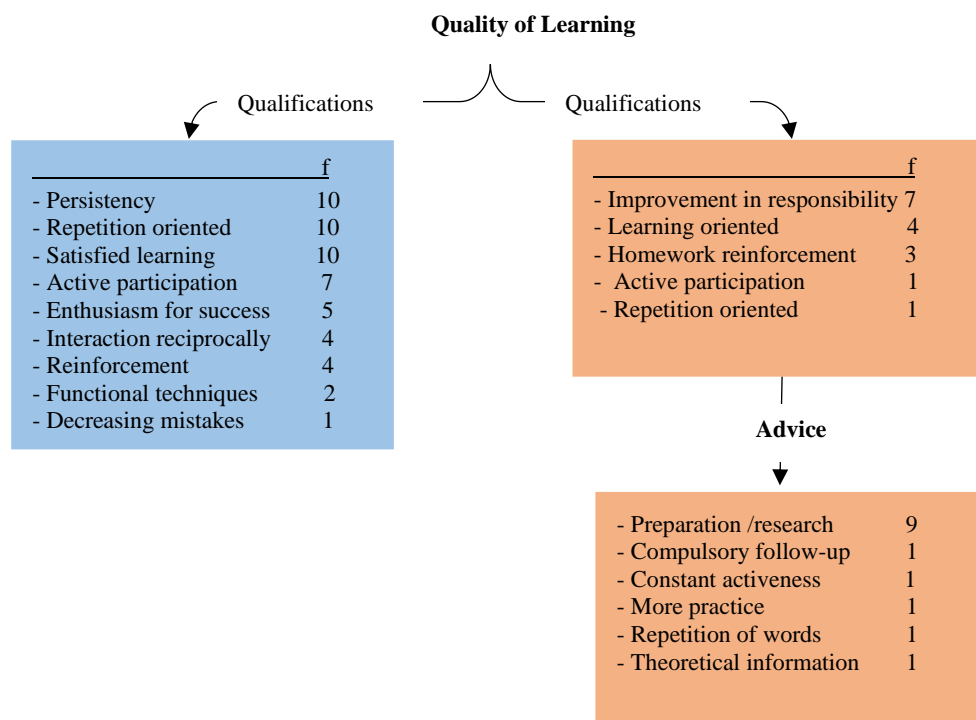


Figure 3. Students' ideas about quality of learning

A student from the experimental group shared the following view:

... Aviation English course is an interactive course that requires active participation (ES12).

However, a student from the control group suggested:

... The teaching of the lesson is good, but it can be more fun with different activities (CS3), indicating different perceptions of learning quality as seen in Figure 3.

### Ways of Teaching

The emphasis on experiential learning methods, such as field trips related to aviation, was a common thread in students' feedback. With 31 students appreciating online vocabulary exercises (Figure 4), the data indicates a clear preference for interactive and practical approaches to teaching. However, critiques emerged over the speed of listening materials and a call for more comprehensive teaching strategies to accommodate different learning paces and styles. The students' responses emphasized the value of interactive and experiential learning methods.

... Interactive online practice in this course contributed to my English (ES16).

ES16 suggested a positive reception of dynamic teaching approaches, indicating a preference for online vocabulary activities and practical assignments.

Online vocabulary activities were lauded by 31 students in the experimental group, while 14 students from the control group found translation activities effective for their learning. The experimental group favoured a blend of activities and suggested field trips and simulation exercises, with a student saying,

... field trip to airports is very important for our department (ES37).

The students in the control group also saw the value in diversified teaching methods, expressing that:

... We always study from the book; I can't say that I learned much from the book (CS13).

One can easily understand from the above comment that CS13 indicates the desire for more varied approaches.

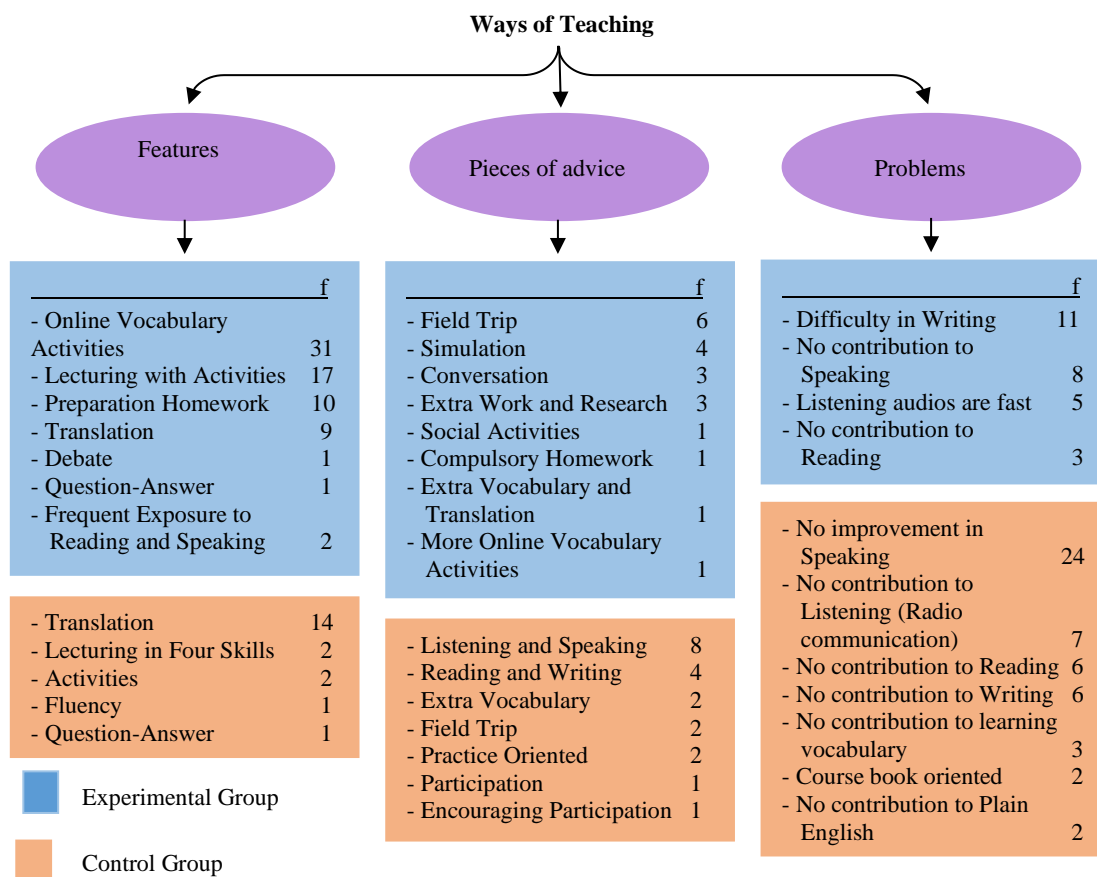


Figure 4. Students' ideas about ways of teaching

## Characteristics of Courses

Students reflected positively on the uniqueness of the aviation English course, with 27 students in the experimental group finding it enjoyable and apt for their learning goals (Figure 5). However, they also recognized the course's increased difficulty, with one stating that:

... our course is so enjoyable, funny, and perfect (ES31).

This response was juxtaposed with the need for additional support to navigate its challenges, as indicated by the advice for less reliance on digital-only formats. The courses were seen as enjoyable yet challenging.

This remark and similar ones denote the overall positive sentiment towards the course experience, despite the noted difficulty compared to plain English.

The courses were described as “enjoyable, funny, and perfect” (ES31) by the experimental group, with the control group echoing this sentiment but also stating that the courses were disciplined and serious. In contrast to the experimental group's more positive experiences, the control group faced difficulties with the course's perceived difficulty, as portrayed in the following figure.

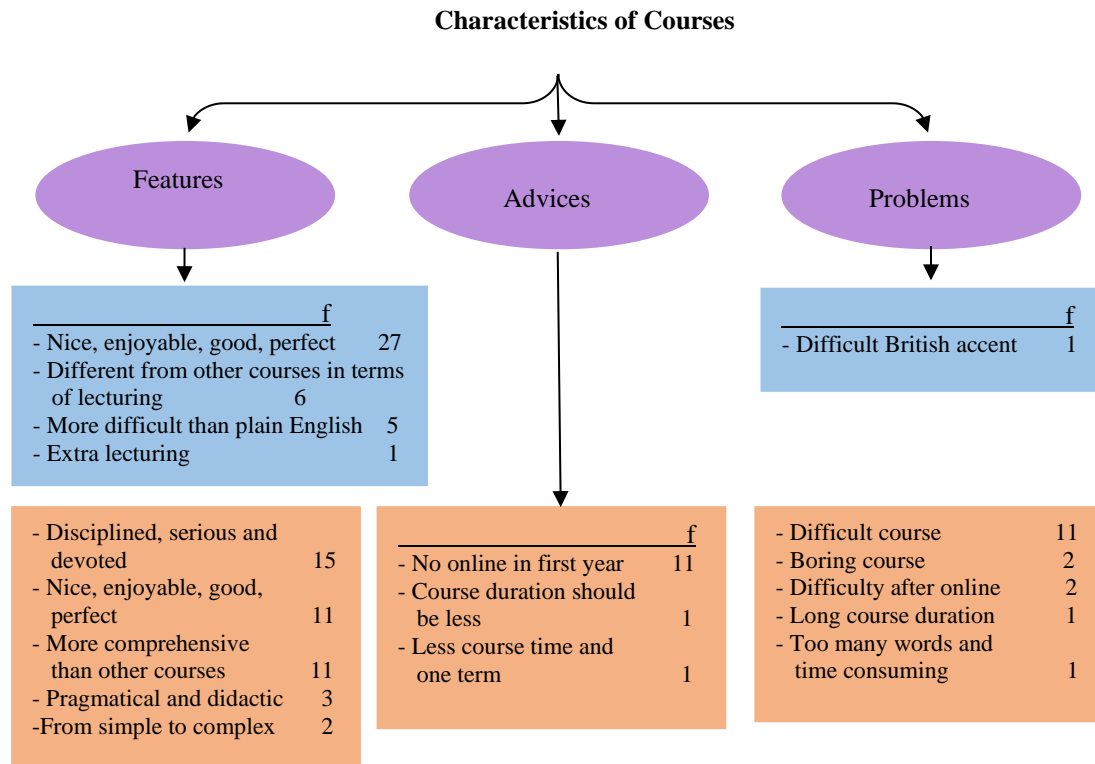


Figure 5. Students' ideas about characteristics of the courses

**Materials**

The experimental group's response to the course materials was generally positive, with ten students affirming the benefits of online resources (Figure 6). Nonetheless, there was a significant call for enhancements in school resources, with students advocating for more practical tools to better align with the demands of aviation English, echoing sentiments such as:

... the course can be taught with different tools (ES13).

There was a call for more interactive materials.

... online vocabulary activities supported our learning (ES12).

Such responses echo the students' requests for a richer variety of materials, as indicated by the responses in Figure 6.

The experimental group's call for more practical tools was paralleled by the control group's desire for more varied materials to support learning.

... the course can be taught with different tools (ES13).

... visuals related to our department should be demonstrated like models (FGCS2).

Both groups' responses, as seen in Figure 6, underline the importance of material diversity for effective learning.



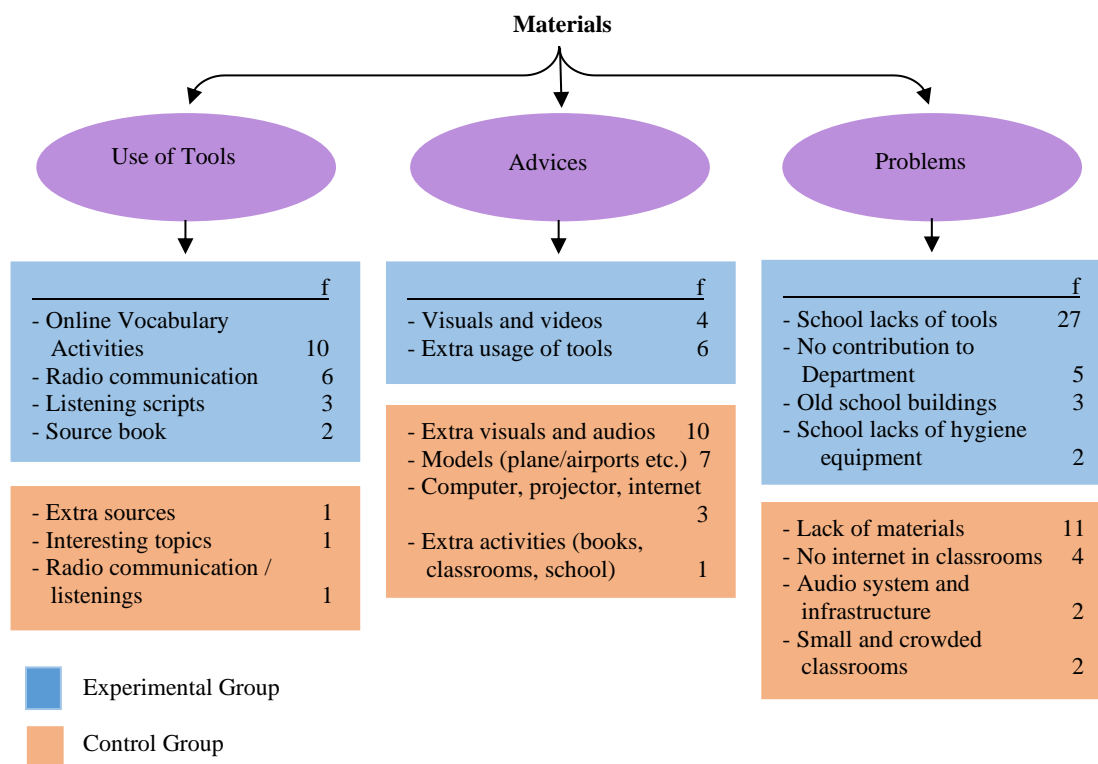


Figure 6. Students' ideas about materials

### Assessment

Assessment was a domain of mixed emotions, where nine students from the experimental group found the exams to be daunting (Figure 7). Yet, they also saw value in the feedback process, which helped them gauge their learning progression, and suggested that an increase in quizzes could serve as a constructive intermediary in evaluating their ongoing understanding. Feedback and quizzes were requested to cope with the perceived difficulty of the exams.

.... The lessons were funny, but the exams are very difficult (ES49).

This comment conveys the sentiment that while the course was engaging, the assessments posed a significant challenge.

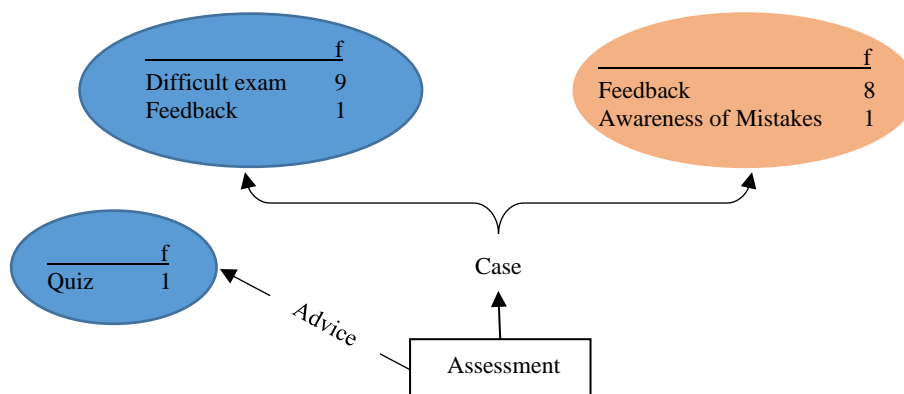


Figure 7. Students Ideas about Assessment

The difficulty of assessments was a common theme, with nine experimental group students and eight control group students highlighting the challenging nature of the exams. Feedback was a key element, with both groups acknowledging its importance for improvement “receiving feedback contributed to my learning” (ES44)). These concerns are visualized in the figure above.

### Quality of Experiment

Students lauded the structure and efficacy of course activities, with 32 students in the experimental group commending the well-planned sessions (Figure 8). The emphasis on hands-on exercises and interactive elements underscored a pedagogical approach that was both engaging and informative, aligning with statements that highlighted the course's practical application and its comparative advantage. Students valued the structure and efficacy of course activities.

... In this course, our teacher made practical and useful online interactive exercises (ES48).

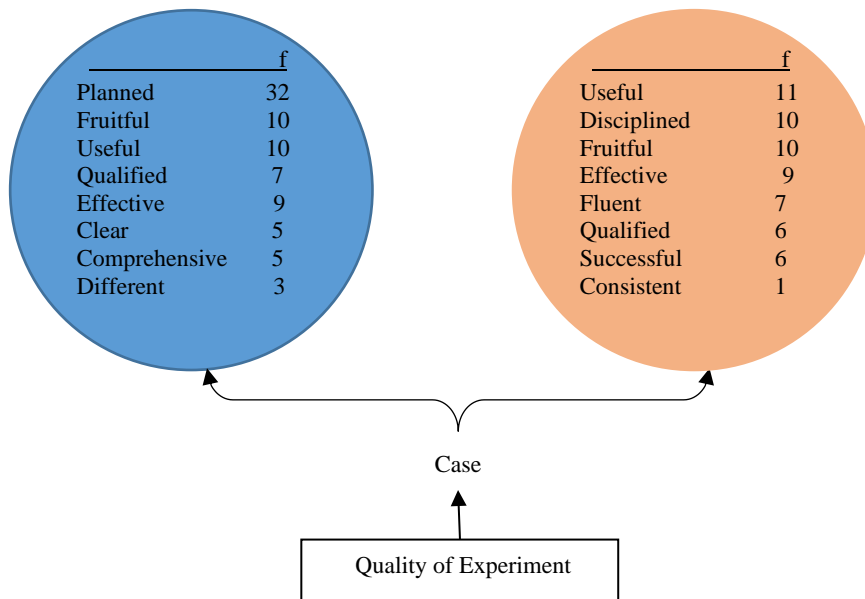


Figure 8. Students' Ideas about Quality of Experiment

Such remarks indicate the effectiveness of the interactive activities, with Figure 9 highlighting the planned and fruitful nature of these activities.

Planned and fruitful activities were appreciated by the experimental group (“Our teacher made practical and useful interactive online exercises,” ES48), while the control group also noted the benefits of disciplined and structured activities. Both groups’ views suggest appreciation for the structured and outcome-focused teaching methods.

### Characteristics of Lecturer

The lecturer’s role was acknowledged as central to the educational experience, with 13 students praising the structured and principled nature of the teaching (Figure 9). Students felt that their lecturer's methodical approach significantly contributed to the course's effectiveness, as evidenced by comments appreciating the lecturer's dedication and motivational style. The lecturer was recognized for their structured and motivating teaching style.

... Our lecturer is very good... I am sure that our teacher did his best to be effective and efficient (ES32).

This response shows the impact of disciplined and inspirational lecturers on student learning. Lecturer effectiveness was praised by both groups. The experimental group valued a structured and inspiring teaching approach (“our lecturer is very good” (ES39)), whereas the control group called for more energy and tolerance from the lecturer:

... the lecturer should be tolerant for students’ being late to course (CS5).

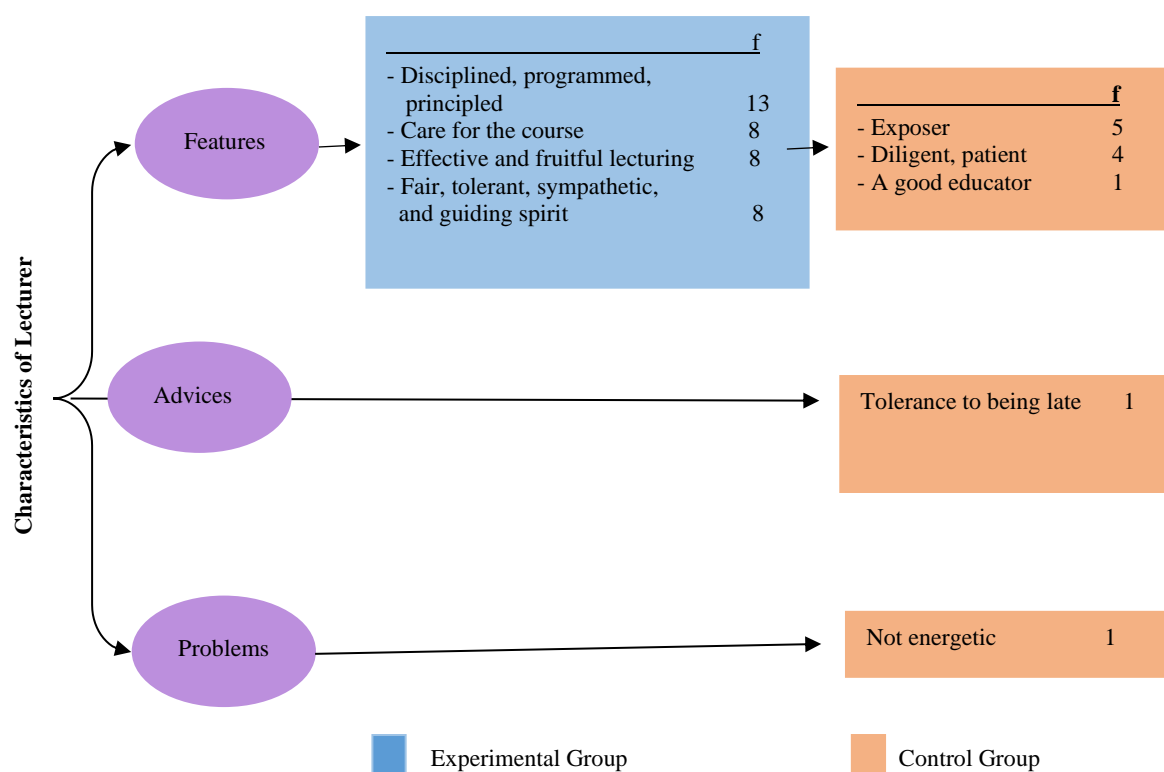


Figure 9. Students Ideas about Characteristics of Lecturer

## Lacks of Students

Reflecting on their preparedness, 19 students from the experimental group admitted to shortcomings in their foundational knowledge when commencing the course (Figure 10). This gap was highlighted as a barrier to fully leveraging the course's offerings, suggesting that a more robust foundational English curriculum could benefit future cohorts. Students initially felt underprepared.

*... Our background was not strong ... English lessons should not be distance education in the first grade (ES38).*

It is evident from the participant's approach that participants like ES38 highlighted the difficulties faced in transitioning from online learning to face-to-face education. Readiness and background issues were reported by both groups, with the experimental group feeling particularly underprepared due to online learning. A student from the experimental group stated,

*... Our background was not strong. The first grade was distance education, and we came here without knowing anything; English lessons should not be distance education in the first grade (ES38).*

However, a student from the control group noted:

*... I do not like English so much (CS22)*

These remarks reflect similar challenges in preparedness.

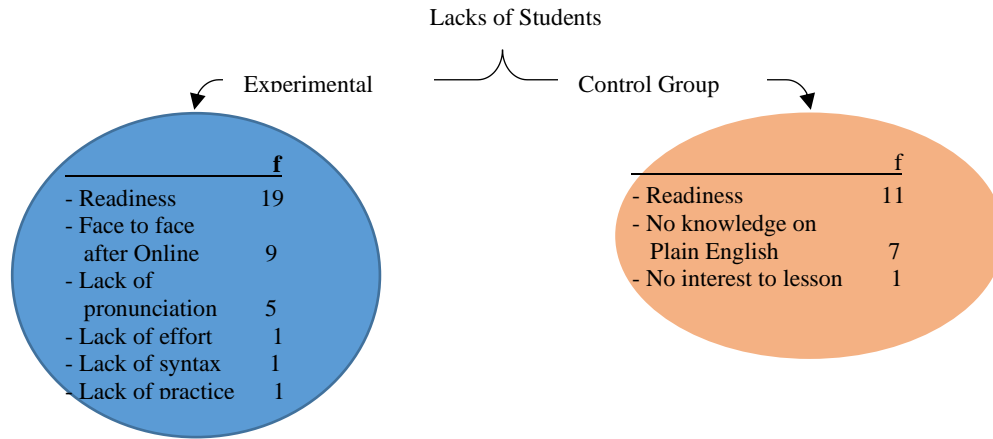


Figure 10. Students' ideas about lacks of students

### Contribution to Other Fields

Students perceived the course as extending beyond the confines of language learning to personal and professional development realms. 25 students reported personal growth, and eight noted the preparatory role of the course in industry engagement (Figure 11). This dual impact is summarized by a student who stated:

*... I developed myself in aviation, which is a different branch, and I gained professional knowledge by learning the terms" (ES45).*

Obviously, the course was perceived to contribute to both personal and professional development.

*... This course will be useful for my job after school... I gained professional knowledge by learning the terms (ES45).*

This comment illustrates the course's broader impact, extending beyond language acquisition to include personal growth and career readiness. Personal and professional development were highlighted in both groups. The experimental group mentioned self-development and knowledge acquisition, while the control group also noted gains in self-confidence and language skills. Statements such as "I will use vocabulary knowledge in this course while working at the airport" (FGES1) from the experimental group and "The teacher provided self-confidence" (CS12) from the control group underscored the course's broad impact.

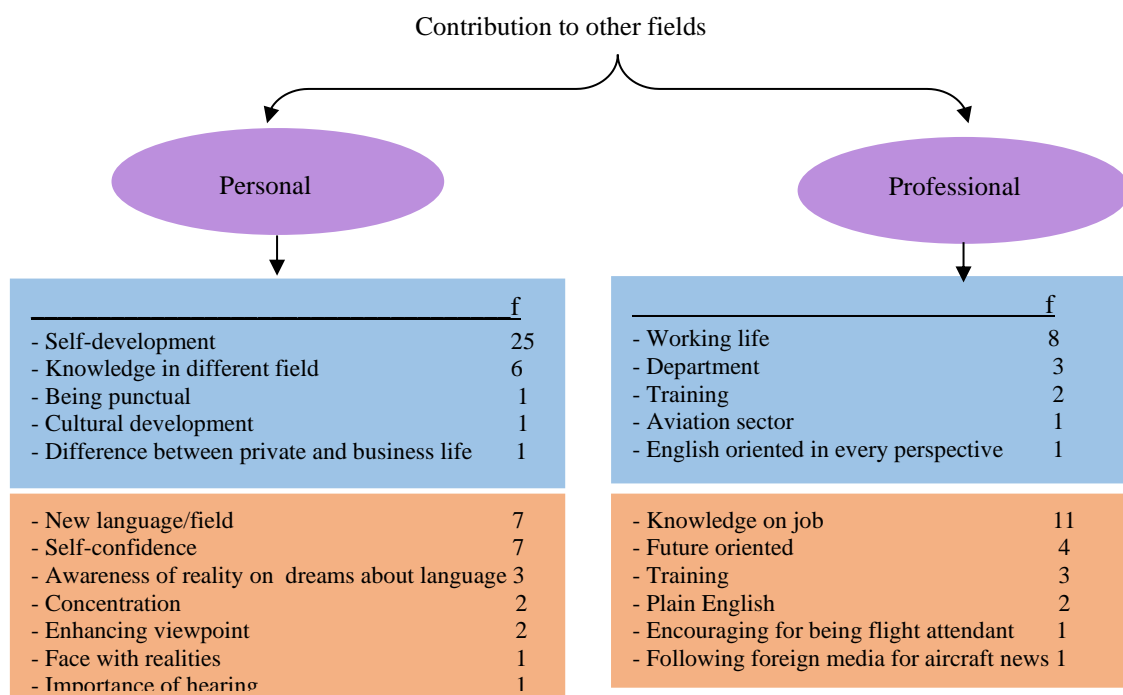


Figure 11. Students' Ideas about Contribution to other fields

### Changes in Fear, Prejudice, and Self-Confidence

Students' initial apprehensions transformed over the course duration, with 11 expressing initial feelings of inadequacy, which later gave way to confidence and proficiency (Figure 12). This evolution is poignant, with one student noting,

*... even if I don't like English, he made me like it a little bit (ES49).*

The student highlighted the influential role of the educator in reshaping student attitudes. Additionally, changes in attitudes towards English were profound.

*... The teacher is very entertaining, even if I don't like English, he made me like it a little bit (ES49).*

This statement captures a shift from apprehension to appreciation, depicting the development of students' confidence over the course. Both groups experienced shifts in confidence, with the experimental group moving from initial inadequacy to positivity and the control group overcoming the initial course difficulty. The experimental group's perspective, "even if I don't like English, he made me like it a little bit (ES49), contrasts with the control group's more cautious approach.

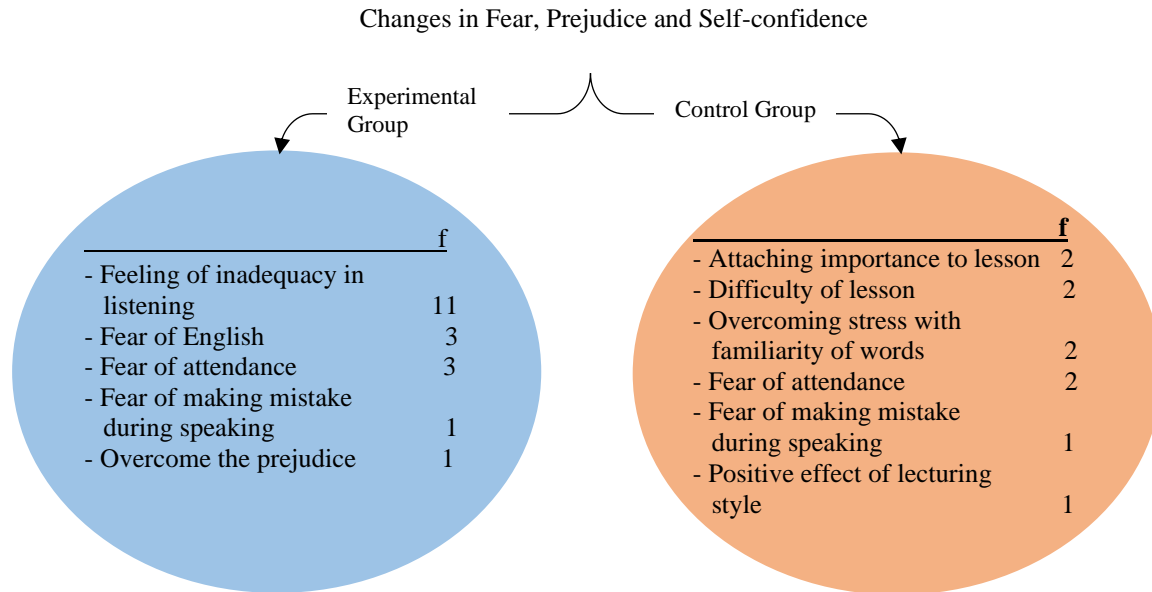


Figure 12. Students' Ideas about Changes in fear, prejudice and self-confidence

### Suggestions

The concluding theme captured proactive suggestions by the students to enhance their learning experiences. Sixteen advocated for transitioning from online to face-to-face classes, and similar numbers called for practical training solutions. More precisely, students had clear ideas for improving the course.

*... More vocabulary-based lessons can be taught... different activities can be available in coursebooks, and classroom and school (CS33).*

Such comments express the students' desire for a more varied and enriched learning environment. This proactive stance underscores the students' investment in optimizing their educational journey, aiming for tangible improvements that align with the practicalities of their future professions.

Practical suggestions for course improvement from both groups included more face-to-face classes and enhanced teaching resources. The experimental group called for frequent exposure to online activities, while the control group desired more in-class materials like "more vocabulary-based lessons" (CS33) and "visuals related to our department" (FGCS2), indicating a shared desire for an enriched educational environment.

In sum, these detailed comparative insights with quotes from both groups paint a fuller picture of the educational experience, identifying both commonalities and divergences in perceptions and recommendations. Plus, these detailed accounts and figures provide a comprehensive overview of the multifaceted learning experience, capturing the nuances of student engagement, the perceived efficacy of teaching methodologies, and the broader implications for curriculum design and pedagogical strategy within the context of aviation English education.

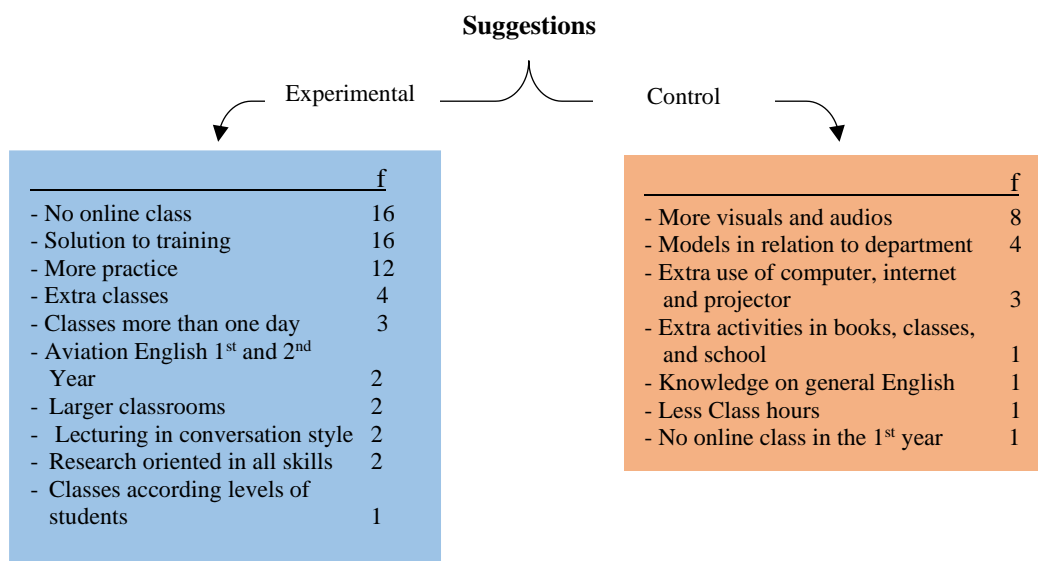


Figure 13. Students' ideas about suggestions

### Discussion, Conclusion, and Suggestions

The findings of the larger study indicate that interactive online vocabulary activities with games significantly improved the vocabulary comprehension of the experimental group, with a score increase from 32.10 to 46.29, representing a 14.19 point difference. This aligns with Wilkins' assertion, as quoted by Thornbury (2002, p. 13), that "without grammar very little can be conveyed, without vocabulary nothing can be conveyed." Consequently, vocabulary teaching holds a crucial place in English language curricula and classroom activities (O'Dell, 1997). Similar to Yip and Kwan's (2006) study, which demonstrated the benefits of online games for vocabulary learning among undergraduate students, the present study found that the experimental group utilizing interactive online games outperformed the control group.

The qualitative findings from this study provide valuable insights into the students' experiences and perspectives on the two instructional approaches. As detailed in the Results section, the experimental group perceived significantly greater improvements in their listening, writing, and vocabulary skills through the interactive online activities which allowed contextualized vocabulary practice. Quotes like "...the course contributed to my vocabulary and pronunciation" (ES13) and "...I can write the words which I listened easily and correctly" (ES24) highlight the positive impact on both vocabulary acquisition and integrated skills development.

However, the findings also revealed the challenges faced by the experimental group, such as insufficient prior language preparation and difficult assessments. Statements like "Our background was not strong anyway..." (ES38) underscore the importance of a strong foundational curriculum to optimally leverage the online activities. The control group's suggestions for diverse materials and homework reinforcement, such as "The teaching of the lesson is good, but it can be more fun with different activities" (CS3), further emphasizing the need for a balanced, multi-modal approach.

Overall, the qualitative data triangulate the quantitative results by revealing the experimental group's noticeable skill gains and positive perceptions towards engaging in interactive online activities. The improvement in vocabulary comprehension scores was corroborated by students' self-reported progress in vocabulary, listening and writing, facilitated by the contextualized practice afforded by the online games. Furthermore, increased motivation and engagement emerged as key factors contributing to the experimental group's performance gains, resonating with theories of constructivist learning, gamification, and multimedia instruction. At the same time, the qualitative insights uncovered areas requiring further support, including building a robust language foundation, diversifying materials and methods, and improving aligning assessments.

The findings of the study also highlight the significance of student-centered education in foreign language teaching, where students actively engage in the learning and teaching process to learn the language meaningfully and efficiently (Kolb, 2014). Creating an atmosphere that encourages students to apply their skills through interactive online vocabulary games is particularly important for teaching aviation English vocabulary. As Tebeweka (2021) notes, vocabulary supports students in improving their proficiency in the four basic skills of listening, speaking, reading, and writing.

The traditional coursebook-based activities in the control group also resulted in a significant increase in students' success, which could be attributed to their familiarity with traditional learning methods from previous educational experiences. The qualitative data revealed that students in the aviation English course had similar study habits as those in other courses, focusing on grammar, translation, and memorization. This suggests that traditional learning strategies were transferred to the aviation English course, contributing to their success in the quantitative study.

The study aimed to explore and compare the effects of interactive online vocabulary activities and traditional course book-based activities on vocabulary improvement among Civil Aviation students at Burdur Mehmet Akif Ersoy University. The research sought to determine the effectiveness of these two approaches and to identify which method enhances vocabulary improvement more effectively. The findings revealed that interactive online vocabulary activities in aviation English conducted in the experimental group increased the students' success in terms of vocabulary improvement in English. This aligns with Schmitt's (2000) assertion that learners can learn more effectively when they encounter and use a word in different ways from their initial encounter. The student-centered activities in the experimental group were more efficient than traditional coursebook activities in increasing students' success, supporting Wood's (2001) claim that game-like designs can be more effective in drawing students' attention compared to traditional tools such as coursebooks. As Hutchinson and Waters (1987) stated, having essential knowledge is not sufficient for learners to understand the language; they need to use it.

However, the activities based on the coursebook in the control group also increased students' success significantly, which could be attributed to their habits and familiarity with traditional teaching, and learning activities and assessment methods from previous experiences. Based on the results of this study, the following suggestions are presented to enhance the success of students and improve the learning environment in teaching Aviation English:

1. While the study focused on aviation English as a sub-branch of ESP and involved civil aviation students, the findings may not be generalizable to all English language learners. However, the contribution of interactive online vocabulary activities can be used as a model to determine the needs of students at other aviation schools and universities in Turkey.
2. Students should be provided with opportunities to learn English through different methods and practices that improve various skills, as the experimental group expressed more positive satisfaction with the interactive online vocabulary activities than the coursebook-based activities in the control group.
3. Applied research should be conducted to explore natural English learning methods, as students should be helped to overcome prejudices against language learning by providing student-centered learning environments and interactive teaching methods rather than teacher-centered education.
4. Universities and the Ministry of National Education in Turkey should take the necessary precautions to benefit from these practices at all school levels.
5. Various instructional designs that actively engage students in activities should be developed to teach English, and teachers in this field should be encouraged to use them.
6. Students should have a higher level of knowledge about English grammar and vocabulary in order to better understand and comprehend Aviation English, as "Aviation English" is not limited to pilots or air traffic controllers but also relates to general English in aviation or aeronautical universities (Aiguo, 2008).
7. Materials and environments fulfilling the needs of students, such as Internet access, computers, projectors, classrooms, smart boards, and appropriate lighting, should be provided in the Aviation English teaching process to enhance student success.

### **Ethics Committee Approval**

It was declared to be in compliance with the ethical principles with the decision of Mehmet Akif Ersoy University Ethics Committee dated 07.07.2021 and numbered 2021/07.

### **Author Contribution**

The authors contributed equally to the study.

### **Conflict of Interest**

There is no conflict of interest.



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## Genişletilmiş Özet

### Amaç

Bu karma yöntem çalışmasının temel amacı, Türk havacılık öğrencilerinin İngilizce havacılık terminolojisini öğrenmek için çevrimiçi etkileşimli kelime etkinlikleri ve oyunlar ile geleneksel ders kitabı alıştırmalarına ilişkin görüş ve deneyimlerini derinlemesine incelemektir. Havacılıkta iletişim hatalarının pek çok kazaya yol açması nedeniyle Uluslararası Sivil Havacılık Örgütü (ICAO) tarafından öngörülen İngilizce yeterliliği standartlarını karşılamak büyük önem taşımaktadır. Bu bağlamda, kelime bilgisi, havacılık öğrencilerinin akıcılığa ulaşmasındaki temel engellerden biridir. Öğrenci bakış açıları, iletişim yeterliliğinin bu kilit bileşeni için etkili öğretim yaklaşımlarına ışık tutmaktadır. Özellikle havacılıkta kullanılan terimler, öğrencilerin mesleki hayatlarında karşılaşacakları gerçek durumlar için hayati öneme sahiptir. Bu nedenle, çalışmanın sonuçları sadece eğitim alanında değil, aynı zamanda havacılık güvenliği ve operasyonel verimlilik açısından da önem taşımaktadır.

### Yöntem

Çalışmanın nicel aşamasında, çevrimiçi etkileşimli kelime etkinlikleri ve geleneksel ders kitabı uygulamalarını alan deney ve kontrol grupları arasında kelime hazinesini karşılaştıran deneysel bir tasarım kullanılmıştır. Deney grubu, çevrimiçi etkileşimli etkinlikler ve oyunlar ile kelime öğrenimi gerçekleştirirken, kontrol grubu geleneksel ders kitabı alıştırmalarını takip etmiştir. Nicel veri toplama aracı olarak, her iki gruba da uygulanan ön test ve son testler kullanılmıştır. Bu testler, öğrencilerin kelime bilgisi düzeylerini ölçmek amacıyla hazırlanmış ve karşılaştırmalı analizler yapılmıştır. Nitel aşamada ise, öğrencilerin bu iki öğretim yaklaşımına ilişkin derinlemesine deneyim ve tercihlerini anlamak için yarı yapılandırılmış görüşmeler ve odak grup tartışmaları kullanılmıştır. Katılımcılar, Burdur Mehmet Akif Ersoy Üniversitesi'ndeki 84 sivil havacılık ve ulaştırma yönetimi öğrencisinden oluşmaktadır. Deney grubu 42, kontrol grubu ise 42 kişiden oluşmuştur. Bu kapsamda, öğrencilerin demografik özellikleri, dil geçmişleri ve öğrenme stilleri de göz önünde bulundurulmuştur.

### Bulgular

Nitel analiz sonuçları, deney grubunun özellikle dinleme, yazma ve kelime bilgisinde önemli iyileşmeler algıladığını ortaya koymuştur. Çevrimiçi etkileşimli etkinlikler sayesinde kelimeler bağlamında kullanılarak pekiştirilmiştir. Öğrenciler, bu etkinlikler sayesinde kelimelerin anlamlarını ve kullanım alanlarını daha iyi kavradıklarını belirtmişlerdir. Ancak, zorluklar arasında yetersiz dil hazırlığı ve değerlendirmelerin zorluğu yer almaktadır. Öğrenciler, bazı etkinliklerin karmaşıklığı nedeniyle zorlandıklarını ifade etmişlerdir. Kontrol grubunda da öğrenciler bazı iyileşmeler bildirir de, bu iyileşmeler deney grubuna kıyasla daha sınırlı kalmıştır. Kontrol grubundaki öğrenciler, geleneksel ders kitabı alıştırmalarının monoton olduğunu ve motivasyonlarını olumsuz etkilediğini belirtmişlerdir.

### Tartışma

Genel olarak, çevrimiçi etkileşimli kelime oyunları ve etkinlikleri, geleneksel ders kitabı alıştırmalarına kıyasla öğrencilerin motivasyonunu, kelime kalıcılığını ve başarısını önemli ölçüde artırmıştır. Oyunlaştırma unsurları, görsel-işitsel zenginlik ve çok oyunculu etkileşimler, öğrenmeyi daha keyifli ve bağlamsallaştırarak pekiştirmiştir. Özellikle, çok oyunculu etkileşimler, öğrencilerin rekabetçi ve işbirlikçi öğrenme ortamlarında daha etkin bir şekilde öğrenmelerini sağlamıştır. Ancak, tüm öğrenciler için ideal olan; yüz yüze eğitim, çevrimiçi etkinlikler ve ders kitaplarının dengeli bir şekilde bir arada kullanılmasıdır. Öğrenciler, farklı öğrenme stillerine sahip olduğundan, çeşitli öğretim yöntemlerinin bir arada kullanılması öğrenme sürecini daha verimli hale getirebilir. Ayrıca, öğrencilerin hazırbulunuşluk düzeyine göre uyarlanmış çeşitli materyal ve aktiviteler sunulmalıdır. Bu bağlamda, öğretmenlerin de teknoloji kullanımında yetkin olmaları ve yenilikçi öğretim yöntemlerini benimsemeleri gerekmektedir.

### Sonuç

Derinlemesine öğrenci görüşleri, etkileşimli ve deneysel öğretim yöntemlerinin havacılık terminolojisini öğrenmede etkili yaklaşım olduğunu ortaya koymuştur. Havacılık iletişiminin özel terimleri, saha ile ilişkili öğrenme etkinlikleri ve teknoloji destekli uygulamalarla kalıcı şekilde edinilebilmektedir. Bu sayede, öğrenciler, mesleki hayatlarında karşılaşacakları durumlara daha iyi hazırlanmaktadır. Böylece, havacılıktaki güvenlik risklerini minimuma indiren standart dil yeterliliğine daha kolay ulaşabilmektedir. Öğrenciler, bu tür etkinliklerle öğrendikleri kelimeleri, gerçek hayatta karşılaşacakları durumlarda kullanabilecekleri şekilde öğrenmektedir. Ayrıca, çevrimiçi etkileşimli etkinlikler, öğrencilerin bağımsız öğrenme becerilerini geliştirmelerine de katkı sağlamaktadır. Öğrenciler, bu etkinlikler sayesinde kendi öğrenme süreçlerini daha iyi yönetebilmekte ve öz düzenleme becerilerini geliştirebilmektedir.

### Öneriler

Gelecekteki çalışmaların, çevrimiçi etkileşimli etkinliklerin ve geleneksel materyallerin uzun vadeli etkilerini ve farklı bağlamlardaki uygulanabilirliğini araştırması önerilmektedir. Havacılık İngilizcesi öğretiminde ideal öğretim materyali setinin ve değerlendirme yaklaşımlarının tasarlanması da önemli bir adım olacaktır. Ayrıca, öğrencilerin hazırlık aşamasındaki eksikliklerini gidermeye yönelik destek programlarının yaygınlaştırılması, daha üst düzey becerileri edinmelerini kolaylaştıracaktır. Bu tür programlar, öğrencilerin dil öğrenme sürecinde karşılaştıkları zorlukları aşmalarına yardımcı olabilir. Sonuç olarak, bu çalışma hem kuramsal hem de uygulamaya dönük önemli çıkarımlar sunmaktadır.

Eđitimciler, bu tür etkinlikleri müfredatlarına dahil ederek öğrencilerin öğrenme süreçlerini daha etkili hale getirebilirler. Ayrıca, teknolojinin eğitimdeki rolü her geçen gün artmakta olup, bu tür yenilikçi yaklaşımlar, geleceğin eğitim modelleri için önemli bir referans oluşturacaktır.