



Effectiveness of Online Informal Language Learning Applications in English Language Teaching: A Behavioral Perspective



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Abstract: This study aimed to ascertain the learning model adopted by university lecturers in the digital era. Utilising an action research design, a mixed-method approach was employed with 32 students participating. Data were collected through two cycles of learning outcomes using online informal language learning (OILL) integrated with smartphones. These outcomes and observations were documented through photographs, video recordings, and classroom observation forms. Descriptive and content analyses were employed for evaluation and interpretation. The results revealed that a majority of students perceived the collaborative learning model, which integrates OILL with smartphones, as a technology-driven process that facilitated more flexible learning in the classroom. Crucial to this model's success was the level of student engagement, which influenced their behaviour towards OILL and smartphone use. Students in this study exhibited positive attitudes, evidenced by their enhanced self-direction, motivation, and improvements in various linguistic skills, critical thinking, and teamwork. The persistent use of the OILL and smartphone collaborative learning model by lecturers during the pandemic was observed, indicating its perceived superiority over traditional learning models, especially given the technological communication and interaction challenges experienced during the pandemic. The study underscores the importance of considering behavioural factors and the quality of OILL and smartphone applications in influencing student learning behaviour and teaching models. Therefore, the integration of OILL applications into a blended or hybrid teaching environment is suggested as an effective strategy for enhancing the quality of education in today's digital classrooms. It is recommended that future research adopt a quantitative approach with a more extensive sample to further elucidate the dynamics of learning outcomes associated with the use of OILL integrated with smartphones in the digital age.

Keywords: Teaching English as a foreign language; Behaviour; Smartphone; Teaching model; Online informal language learning

1. Introduction

The global ramifications of the COVID-19 pandemic have deeply affected various sectors, with education emerging as one of the most challenged. Amidst the crisis, innovative strategies have been developed to expedite student rehabilitation, learning, and reintegration into the academic community (Jandawapee et al., 2022; Limna & Siripipatthanakul, 2021; Limna et al., 2022). A predominant concern has been the identification of methods to prevent knowledge regression among students. Such measures have ranged from equipping students with effective learning tools and a continuous curriculum to introducing coping techniques for accelerated learning.

The spring of 2020, marked by the pandemic, witnessed an unprecedented shift in teaching approaches. In response to the crisis, much of Teaching English as a Foreign Language (TEFL) English instruction was delivered

online. Prior to COVID-19, quality TEFL programs, whether in-person or online, were characterized by specific learning models tailored to enhance student outcomes. The Indonesian Ministry of Education and Culture has underscored features such as open enrollment, online course availability, qualified educators, and consistent student progress evaluations (Direktorat Jenderal Pendidikan Tinggi Kemendikbud Pendidikan dan Kebudayaan, 2020). Research has documented exemplary TEFL methodologies that bolster learning outcomes and proficiency (Rink, 2013). With a vision for autonomous campus learning, Indonesia's objectives focus on empowering students to thrive in blended or hybrid environments, thereby fostering lifelong, sustainable physical activity. The National Standards for the TEFL program in Indonesia have been established as benchmarks to guide these educational aspirations.

The closure of academic institutions, encompassing elementary to university levels under the Indonesian Ministry of Education and Culture, posed myriad challenges. While certain institutions had seamlessly integrated technology into regular pedagogy, many grappled with training educators in the nuances of online distance learning models. The lack of requisite infrastructure and resources in several universities hindered the broad-based adoption of online learning, thereby exacerbating existing challenges. The novelty of online courses for many students, coupled with a deficit in the digital pedagogical skills among educators, particularly in various Indonesian cities, was evident.

During the pandemic, the responsibility placed upon university lecturers was manifold. Not only was there an urgency to navigate the closure of institutions, but strategies were required to ensure that students did not encounter academic setbacks (Chick et al., 2020; Reimers et al., 2020; Rogers et al., 2020; Woolliscroft, 2020). Proposed solutions included the adoption of novel technologies and platforms for post-pandemic recovery (Rogers & Sabarwal, 2020), as well as the development of administrative policies to mitigate student attrition (Nagel et al., 2020). The three-pronged approach of coping mechanisms, learning continuity management, and the advancement of education through innovative models, such as OILL, was highlighted.

Given the upheaval caused by the pandemic, many university educators explored diverse learning models, particularly as shifts to alternative schedules, such as night classes, became commonplace (Khalil et al., 2020; Rizun & Strzelecki, 2020). However, English educators faced a unique predicament. Often operating in isolation, the challenge of executing high-quality TEFL programs was intensified by perceptions of the subject's complexity (Gao & Zhang, 2020; Karataş & Tuncer, 2020). The solitude induced by the pandemic possibly diverted educators' focus from student academic progress.

The Daily English Learning App (DLE App) emerges as a paradigm of informal learning applications suitable for formal educational settings. Its features, designed in a relaxed and engaging milieu, make it an appealing choice for institutions aiming to forge stronger student relationships. Unlike formal platforms, DLE Apps exude a more personable tone. The versatility of its interactive modules, encompassing word-making games, instructional videos, audios, speaking exercises, and more, permits users to align with their preferred learning modes. Furthermore, the intuitive nature of DLE Apps encourages experiential learning, allowing users to familiarize themselves with features through practical engagement rather than traditional instruction.

2. Methods

2.1 Research Approach

This study adopted a mixed-method approach, grounded in the framework of classroom action research (CAR). In CAR, emphasis is typically placed on practical implications rather than theoretical advances. Four distinct stages structured each iteration of this investigation: (1) planning, (2) action, (3) observation and (4) reflection. The adopted learning model drew inspiration from seminal works by Bandura & Walters (1977) and Hopkins (2014).

2.2 Participants

The setting for this research was a West Indonesian university that focuses on TEFL concerning both curriculum and instructional ambiance. Participants consisted of thirty-two undergraduate students enrolled in the system information program under the faculty of computer science during their first semester. Notably, a significant majority (90%) of these participants were female, aged between 18 and 22 years. Their initial proficiency in English, which ranged from varying backgrounds, was predominantly at a lower level. During the sixteen-week study duration, certain pedagogical tasks required active participation in CAR practices.


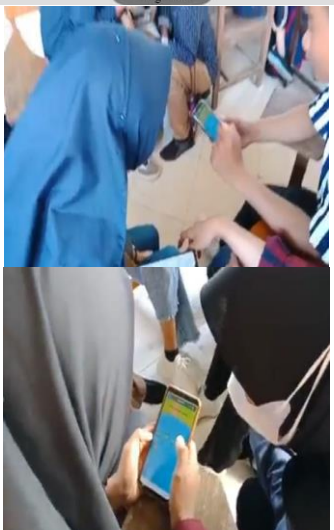


2.3 Data Collection and Analysis

Step 1. Planning

The following initiatives were undertaken:

- (1) Lessons for the entire semester were meticulously prepared in alignment with the curriculum.

Table 1. Teaching models employed in the study

<p>Attention</p>	<p>Instructors guided students to access OILL as ESL material from Google Play, specifically, "Daily Learn English (DLE)". It was ensured that students downloaded the application to their smartphones, after which the features of the DLE Apps were introduced to them.</p>	
<p>Retention</p>	<ol style="list-style-type: none"> 1. Instruction on the materials was provided by the lecturer. 2. Students were prompted to explore the DLE Apps and establish connections with the materials. <p>Students were organized into several groups, each consisting of 4-5 members.</p> <ol style="list-style-type: none"> 3. Engagement with the DLE was facilitated. Within their teams, students collaborated to discuss the content, arrange the sentences correctly, and ascertain meanings (cognitively). 	
<p>Reproduction</p>	<ol style="list-style-type: none"> 1. Collaborative discussions allowed students to read out their compiled work and practice their pronunciation with the DLE Apps, enhancing communication skills. 2. Self-correction was encouraged among students to foster critical thinking. 3. Feedback was procured from both peers and the instructor. Emphasis was placed on focusing on keywords within the DLE Apps and replicating them in English. 	
<p>Motivation</p>	<ol style="list-style-type: none"> 1. Students were given the opportunity to present their proficiency in English to the class. 2. Positive reinforcement and acknowledgment of students' efforts were provided by the lecturers. 3. Upon the conclusion of all activities and addressing of inquiries, the session was formally concluded. 	
<p>Evaluation</p>	<p>Instructors recommended students to engage with their DLE Apps at home for independent practice.</p>	

(2) Observational planning was carried out, focusing on a behavioural teaching model aimed at fostering new behavioural patterns, alleviating anxiety, enhancing collaboration, promoting teamwork, and bolstering self-confidence, critical thinking, and self-control.

(3) Integration of a teaching model was facilitated. This model encompassed acts of teaching and learning, leveraging both the social learning model by Bandura & Walters (1977) and the OILL applications.

(4) Content slated for instruction was thoroughly perused and comprehended.

Step 2. Action

The primary objective of this phase was to bolster both English language and IT competencies. The efficacy of student engagement, spanning cognitive, emotional, and social dimensions, was gauged using the behavioural teaching model in conjunction with OILL.

Step 3. Observation

During Cycles I and II, class observations were conducted, focusing on group activities. The nature and quality of communication and interactions among participants were keenly observed.

Step 4. Reflection

Subsequent to the research actions, a comprehensive reflection on data collection and its ensuing analysis was conducted.

3. Results

Outcomes of behavioral teaching model implementation using OILL+smartphone (as shown in Table 1):

At this stage of teaching, the focus is on guiding ESL (English as a Second Language) students through the use of the "Daily Learn English (DLE)" application from Google Play. These stages are divided into four main components: attention, retention, reproduction, and motivation, with additional notes on evaluation.

Attention phase, the instructor initially directs students to access the ESL material, which in this case is the "Daily Learn English (DLE)" application on Google Play. The students are required to download this app on their smartphones. After that, the instructor introduced the main features of the DLE application to students.

Retention phase, several strategies are implemented to ensure students retain information and engage with the material effectively. First, the instructor provides instructions on how to use the materials available in the application. Next, students are encouraged to explore the DLE application independently, establishing a relationship with the content. To encourage collaborative learning, students are organized into small groups of 4-5 student. In these teams, students actively engage with the application content, including constructing sentences correctly and understanding their meaning. This cognitive engagement is critical for effective language retention.

Reproduction phase, to improve language reproduction skills, students engage in collaborative discussions within their groups. They not only compose their work but also practice their pronunciation using the DLE application, which provides audio support. Self-correction is encouraged among students to improve critical thinking and accuracy in their language skills. Additionally, students receive feedback from their peers and instructors. This input is focused on identifying and replicating key words found in DLE applications in English, strengthening vocabulary and language use.

Motivation plays an important role in language learning. Instructors create a motivating environment by providing opportunities for students to present their English language skills to the class, thereby fostering a sense of achievement. Positive reinforcement and recognition of students' efforts provided by lecturers increase their self-confidence and motivation. Finally, the session officially concludes after addressing any questions or concerns raised by students, ensuring a positive and constructive learning experience. Then, in the evaluation stage, the instructor recommends that students continue their interaction with the DLE app at home for independent practice. This emphasizes the importance of continuous learning and self-assessment to measure progress in language acquisition.

Overall, this phase of instruction is designed to facilitate effective language learning by combining attention, retention, reproduction, motivation, and evaluation strategies, utilizing technology, and collaborative learning to improve students' English skills.

3.1 Analysis of Cycle I Results and Observations

3.1.1 Outcomes from Cycle I's test

Following seven instructional sessions, an evaluative test was administered in the first cycle.

From the data presented in Table 2, it is inferred that the behavioral teaching model utilizing OILL yielded an average score of 2.11, with a median of 2.00, mode of 1, standard deviation of 0.862, a score range of 3, and scores ranging between 1 (lowest) and 4 (highest). This suggests that there wasn't a notable improvement in student outcomes. The adaptation phase to the behavioral teaching model via OILL is believed to have played a role in this.

Table 2. Cycle I learning outcomes statistics

Statistic	Statistical Value
Subject	32
Mean Score	2.11
Median	2.00
Mode	1
Standard Deviation	0.862
Range Score	3
Lowest Score	1
Highest Score	4

3.1.2 Cycle I learning completeness

Table 3 offers insights into the effectiveness of the behavioral teaching model using OILL.

Table 3. Cycle I learning completion for behavioral teaching model with OILL

Absorbency	Category	Frequency	Percentage (%)
0.00<Score<2.66	Not Complete	21	65.625
2.66≤Score≤4.00	Complete	11	34.375
Total		32	100

As observed in Table 3, 34.375% of students achieved completion, translating to 11 out of 32 students. Conversely, 65% (or 21 out of 32 students) did not achieve the set criteria, suggesting that enhancements are essential to achieve class-wide proficiency.

Table 4. Cycle I behavioral values

No.	Interval	Category	Frequency	Percentage (%)
1	3.33< score≤4.00	Very Good	3	9.375
2	2.33< score ≤3.33	Good	25	78.125
3	1.33< score≤2.33	Fair	4	12.5
4	score≤1.33	Less	-	-

From Table 4, three students (or 9.375%) ranked in the 'Very Good' category, 25 students (or 78.125%) in the 'Good' category, and four students (or 12.5%) in the 'sufficient' category. Evaluated behavioral aspects included the adaptation of new behavior patterns to mitigate anxiety, foster teamwork, enhance self-confidence and critical thinking, and cultivate self-control.

Table 5. Cycle I social values averages

No.	Interval	Category	Frequency	Percentage (%)
1	3.33<score≤4.00	Very Good	-	-
2	2.33< score≤3.33	Good	23	71.875
3	1.33<score≤2.33	Fair	9	28.125
4	score≤1.33	Less	-	-

In the sample of 32 students, the following observations were made regarding their behavioral and social attitudes (as shown in Table 5):

- **Honesty:** It was observed that 71.875% of the students demonstrated a commendably honest attitude, while the remaining 28.125% portrayed a satisfactory level of honesty.
- **Discipline:** An evaluation of the students' discipline revealed that 15.625% exhibited an exemplary level of discipline, 56.25% displayed a commendable level, and the remaining 28.125% showcased an adequate level of discipline.
- **Responsibility:** In terms of responsibility, 34.375% of the students were found to have a commendable sense of responsibility. Conversely, 28.125% demonstrated an adequate sense, while 25% seemed to have a suboptimal level of responsibility.
- **Tolerance:** A significant 71.875% of students were noted to have a commendable level of tolerance. Additionally, 6.25% were classified as having an exemplary tolerance level, 15.625% with an adequate level, and 6.25% with a suboptimal tolerance level.
- **Cooperation:** An analysis of cooperation revealed that 40.625% of students cooperated commendably, whereas

59.375% showcased adequate cooperation skills.

- Politeness: A striking 81.25% of students demonstrated commendable manners. Further, 15.625% exhibited an adequate level of politeness, while 3.125% fell into the suboptimal category.

- Confidence: In assessing confidence, it was observed that 68.75% of students had commendable confidence, with the remaining 31.25% displaying an adequate level.

3.1.3 Findings from Cycle I observations

During the action research, observations were conducted using a designated instrument (observation forms). This instrument captured various aspects related to the implementation of the behavioural teaching model with the use of OILL. As the teaching model was applied and students were observed, notable changes in student attitudes toward the teaching and learning processes during the first cycle were documented.

Table 6. Overview of observations from the learning activities in Cycle I

No.	Indicators	Meeting				$\bar{x}\%$
		1-2	3-4	5-6,7	8	
1	Students who pay attention to the material explained.	22	27	28		80.208
2	Students present their work.	18	18	24		62.5
3	Students ask questions if something is not clear.	5	10	15		31.25
4	Students answer the questions asked.	6	9	10		26.041
5	Students participate in the discussion, form teams, collaborate and be critical.	30	32	32	Assessment	97.916
6	Students work on questions on the DLE Apps application.	30	32	32		97.916
7	The subject matter is concluded at the end of the meeting with full confidence.	4	5	7		16.666

According to Table 6, almost all students participate in the discussion, form teams, collaborate and are critical in working on questions on the DEL applications (97.9%).

3.1.4 Reflection on Cycle I

Over the course of the first cycle, a total of eight meetings transpired. These comprised seven sessions devoted to teaching and learning through the application, in addition to one session for the evaluation of learning outcomes. In the initial meeting, a marked lack of student engagement was noted. The application of the behavioural teaching model with OILL elicited evident confusion among some students, particularly evident in their struggles with questions posed through the DLE applications. Furthermore, skills in communication, collaboration, and teamwork were suboptimally utilized. It was observed that students' critical thinking capabilities were yet to reach their potential, and a considerable fraction of students did not demonstrate confidence or adequate proficiency in English. As a consequence, the interventions planned for Cycle II were conceptualized as enhancements to those executed in Cycle I.

3.2 Planning Stage

At the planning stage, several measures were systematically arranged by the researcher to ensure a more streamlined learning process during Cycle II, addressing the challenges encountered in Cycle I. As a continuation, Cycle II learning spanned eight meetings, following the completion of Cycle I.

The meticulous steps laid out by the researcher encompassed the design and formulation of lesson plans, the collation and enhancement of teaching materials - including sourcing video content from YouTube - the systematic organization of content within the DLE applications, and the preparation of observation sheets aimed at monitoring student engagement during the learning sessions.

Drawing from the insights gleaned, a comprehensive strategy was delineated for the actions to be undertaken in Cycle II, augmenting the initiatives of Cycle I. To realize the envisioned learning outcomes, the devised interventions included:

- (1) Highlighting the pivotal role of student participation, collaboration, and critical thinking in the learning process.
- (2) Galvanizing students to articulate their viewpoints, bolstering their confidence in showcasing their academic prowess, and encouraging proactive queries about aspects that remain unclear during learning sessions.

Continually reinforcing the imperative of teamwork, urging students to collaborate and support their peers, particularly when navigating exercises within the DLE applications.

3.3 Action Stage Results and Discussion

In Cycle II, actions mirrored those employed in Cycle I. The cycle spanned eight meetings: seven dedicated to material discussions and group deliberations, and one earmarked for assessing learning outcomes. The preliminary

phase saw the researcher equipping the research with the requisite tools: curriculum, lesson plans, observation sheets, teaching materials, DLE applications, and an analysis of the students' condition. A delineation of interventions for the students during the action phase was also charted.

Table 7. Statistics of results from Cycle II

Statistic	Statistic Value
Subject	32
Mean Score	2.99
Median	2.80
Mode	3
Standard Deviation	0.509
Range Score	2
Lowest Score	2
Highest Score	4

3.4 Analysis of Cycle II Results and Observations

3.4.1 Analysis of student learning outcomes in Cycle II

Post the seven material-centric meetings, a test was conducted, marking the conclusion of this study. The data concerning student learning outcomes from this test is captured in Table 7.

An interpretation of Table 7 reveals that, when utilizing the behavioural teaching model with OILL, the mean score stood at 2.99, a median of 2.80, a mode of 3, a standard deviation of 0.509, with score ranges spanning 2, the lowest score registering at 2, and the zenith at 4. This metric underscores a positive trajectory in student learning outcomes post the application of the behavioural teaching model with OILL.

3.4.2 Elucidation of learning completeness for Cycle II

A thorough insight into English learning outcomes concerning the set criteria is encapsulated in Table 8.

Table 8. Overview of Cycle II learning completeness

Absorbency	Category	Frequency	Percentage (%)
$0.00 < \text{Score} < 2.66$	Not Complete	3	9.375
$2.66 \leq \text{Score} \leq 4.00$	Complete	29	90.625
Total		32	100

A perusal of the aforementioned table indicates a class completeness rate of 90.625%, representing 29 of the 32 students in the 'complete' bracket, and a paltry 9.375%, equating to 3 of the 32 students in the 'incomplete' bracket. This trend hints at an enhancement in English learning outcomes post the incorporation of the behavioural teaching model with OILL in the instructional process. A juxtaposition with previous metrics reveals that Cycle I saw a completion percentage of 34.375%, which burgeoned to 89% in Cycle II. Once the benchmark of an 85% minimum completion criterion is attained, classical completeness can be declared as achieved.

Table 9. Behavioural metrics in Cycle II

No.	Interval	Category	Frequency	Percentage (%)
1	$3.33 < \text{score} \leq 4.00$	Very Good	5	15.625
2	$2.33 < \text{score} \leq 3.33$	Good	27	84.375
3	$1.33 < \text{score} \leq 2.33$	Fair	-	-
4	$\text{score} \leq 1.33$	Less	-	-

An analytical gaze at Table 9 indicates that out of the 32 students at Universitas Al Asyariah Mandar, a contingent of five students (15.625%) showcased exemplary behaviour, while the lion's share, 27 students (84.375%), were cataloged in the 'Good' category.

Table 10. Social value average for Cycle II

No.	Interval	Category	Frequency	Percentage (%)
1	$3.33 < \text{score} \leq 4.00$	Very Good	6	18.75
2	$2.33 < \text{score} \leq 3.33$	Good	26	81.25
3	$1.33 < \text{score} \leq 2.33$	Fair	-	-
4	$\text{score} \leq 1.33$	Less	-	-

From an analysis of Table 10, the following observations can be made:

(1) On average, 18.75% (or 6 students) were categorized under the 'Very Good' bracket concerning social attitudes, while a significant 81.25% (or 26 students) were placed under the 'good' bracket.

(2) When assessed for honesty, 12.5% of the 32 students exhibited a 'Very Good' attitude, while the remaining 87.5% demonstrated a 'Good' attitude.

(3) Regarding discipline, it was observed that 25% of students were rated as having 'Very Good' discipline, while the majority, 75%, were ascribed a 'Good' disciplinary attitude.

(4) For responsibility, 12.5% of the students were rated as having 'Very Good' responsibility, and the predominant 87.5% showcased 'Good' responsibility.

(5) In terms of tolerance, 9.375% were found to exhibit a 'Very Good' attitude towards tolerance, contrasting with the 90.625% who were noted to have a 'Good' attitude in this domain.

(6) In the realm of mutual cooperation, 21.875% of students were categorized as having a 'Very Good' attitude towards mutual cooperation, while 78.125% were seen to possess a 'Good' cooperation attitude.

(7) When the focus shifted to politeness, 25% of the students displayed 'Very Good' manners, with the remaining 75% being categorized under 'Good' manners.

(8) Lastly, in the sphere of confidence, 21.875% of the students exuded 'Very Good' confidence, and 78.125% manifested 'Good' confidence levels.

This detailed breakdown offers a comprehensive view of the students' behavioural metrics across various attributes.

3.4.3 Results of observations in Cycle II

From an analysis of the observation sheet focused on the implementation of the cooperative learning model, an average execution percentage of 100% was identified for various aspects. This result indicates that the cooperative learning model was effectively executed in the second cycle. Furthermore, data were collated regarding student attendance during each meeting, expressed as percentages.

Table 11 elucidates the percentage alterations in student attitudes towards learning, especially when the behavioural teaching model using OILL was employed during the second cycle.

Table 11. Observation sheet for learning activities in Cycle II

No.	Indicators	Meeting				$\bar{x}(\%)$
		1-2	3-4	5-6,7	8	
1	Students who pay attention to the material explained.	27	27	28		82.291
2	Students present their work.	20	18	26		66.67
3	Students ask questions if something is not clear.	7	13	16		37.5
4	Students answer the questions asked.	8	10	11	Assessment	30.208
5	Students participate in the discussion process.	32	32	32		100
6	Students work on DLE Apps questions in groups.	32	32	32		100
7	The subject matter is concluded at the end of the meeting.	5	6	7		18.75

3.4.4 Reflections pertaining to Cycle II

Although the implementation methodologies in Cycle II mirrored those of Cycle I, greater emphasis was placed on the students' ability to comprehend material and queries within the DLE applications and their interactions within group dynamics. This was achieved using the application of the behavioural teaching model with OILL.

Over the course of the meetings in Cycle II, an escalation in student engagement and enthusiasm for the learning process was observed. This enhancement was evidenced by the augmented number of students actively participating in group dialogues, a competitive spirit in responding and commenting during discussions, and an increased eagerness to complete in-class assignments. Furthermore, a notable rise in the number of students volunteering to progress to the whiteboard to address and debate the proposed issues was observed.

A significant increase in student proactivity when addressing practice questions became apparent. Concurrently, there was a discernible improvement in their material comprehension. Whereas previously, certain materials necessitated repeated explanations - sometimes multiple iterations - for clarity, in the second cycle, the majority of students seemed to grasp and comprehend the material after one or two elucidations. An upward trajectory in student learning outcomes was observed in this cycle, reinforcing the positive impact of the interventions.

3.5 Comparative Analysis of Results: Cycle I Versus Cycle II

In an evaluation between the initial and succeeding cycles, distinctions in student activity observations were noted and are presented in Table 12.

From the data illustrated in Table 12, an enhancement in student learning was discerned when the cooperative learning model was integrated, augmented by the DLE Apps observation sheet. The subsequent analysis of the

student participation observation data yielded the following insights:

- **Engagement with Delivered Material:** In the initial cycle, an average percentage of 80.208% of student engagement was noted, which saw an increase to 82.291% in the second cycle. Initially, a significant proportion of students were observed exhibiting reluctance, frequently being inattentive during the instructional phase. By the second cycle, however, an observable improvement in their concentration on the instructional content was recorded.

- **Presentation of Assignments:** An increase from 62.5% in Cycle I to 66.67% in Cycle II was noted regarding students' willingness to present their work. During the initial sessions, particularly those focused on English instruction, effectiveness was found wanting, marked by the hesitance of a considerable number of students to present. In response, instructional interventions with heightened motivational strategies were employed. This approach appeared fruitful in Cycle II, where students were demonstrably more predisposed to presenting their work.

- **Inquisitiveness and Interaction:** The data from Cycle I reflected a mere 31.25% of students actively seeking clarifications, which rose to 37.5% in Cycle II. Observations from the first cycle depicted students as reticent, often preferring non-engagement over interaction. This scenario contrasted markedly with Cycle II, where students emerged as more forthcoming in their queries.

- **Responsiveness to Posed Questions:** An intriguing observation was the high initial percentage of 97.916% in Cycle I, which astonishingly surged by 30.208% in Cycle II. A distinct elevation was observed in students' propensity to respond. Their initial reluctance, primarily attributed to unfamiliarity with public speaking, waned as emphasis on peer communication was reinforced during sessions. Subsequent encounters reflected their acclimatization to this interactive paradigm.

- **Participation in Discourse:** While the first cycle already boasted a high average of 97.916%, this table reached its zenith at 100% in the second cycle. The slight dip in Cycle I was attributed to suboptimal student attendance. However, Cycle II saw an amelioration in this aspect.

- **Collaborative Endeavours via the DLE Apps:** Again, while the percentage in Cycle I was an impressive 97.916%, it reached totality in Cycle II at 100%. Instructors were observed to continually emphasize collaborative efforts, particularly given the nature of questions within the DLE Apps that necessitated group problem-solving.

- **Conclusivity of Sessions:** The initial cycle recorded a 16.666% in students' participation during the concluding phase of sessions, which saw a modest rise to 18.75% in the subsequent cycle. During the initial sessions, distractions in the form of intra-student discussions were observed. Pedagogical interventions, in the form of warnings and inquiries towards the inattentive, were instated to ensure heightened focus. As sessions progressed, students exhibited a more pronounced inclination towards actively concluding the studied material under instructor guidance.

In light of the terminal test of the cycle, data pertaining to student learning outcomes across Cycles I and II was collated, the comparative analysis of which is tabulated in Table 13.

Table 12. The proportional observations of participant activities across Cycles I and II

No.	Indicators	Cycle I	Cycle II
1	Engagement with the content is evidenced by students' attentiveness to the presented material.	80.208	82.291
2	Demonstrated comprehension and application are indicated when students present their assignments.	62.5	66.67
3	Curiosity and a desire for clarity manifest when students proactively pose questions on ambiguous aspects.	31.25	37.5
4	A student's grasp of the material is further confirmed when they provide responses to posed questions.	26.041	30.208
5	Active involvement in deliberations is marked by students' contributions to discussions.	97.916	100
6	Collaborative problem-solving abilities are demonstrated when students collaboratively tackle questions on DLE Apps.	97.916	100
7	The culmination of the session is signified by a comprehensive wrap-up of the discussed subject matter.	16.666	18.75
	Percentage (%)	63.67	76.92

Table 13. A detailed comparison of learning outcomes between Cycle I and Cycle II

Statistic	Statistic Score	
	Cycle I	Cycle II
Subject	32	32
Mean Score	2.11	2.99
Median	2.00	2.80
Mode	1	3
Standard Deviation	0.862	0.509
Range Score	3	2
Lowest Score	1	2
Highest Score	4	4

From the data provided in Table 13, the following conclusions can be drawn about the computer science faculty's 32 students:

- **Score Metrics:** Both Cycle I and Cycle II witnessed the highest score achieved as 4. However, while the lowest score stood at 1 during Cycle I, it saw a positive shift to 2 in Cycle II. This progress reduced the score range from 3 in Cycle I to just 2 in Cycle II.

- **Central Tendency Measures:**

Mean: The average student learning outcome showed notable improvement, progressing from 2.11 in Cycle I to 2.99 in Cycle II.

Median: A shift was observed in the median score, from 2.00 in the first cycle to a more promising 2.80 in the subsequent cycle.

Mode: Interestingly, the mode, indicative of the most frequently achieved score, was at 1 in Cycle I, suggesting many students were at the lower end of the scale. However, Cycle II portrayed a favorable change with the mode at 3, implying a more pronounced clustering of students achieving higher scores.

- **Dispersion Measures:** The standard deviation, a measure of the dispersion or spread of scores, saw a decrease from 0.862 in Cycle I to 0.509 in Cycle II. This suggests a tighter clustering of scores around the mean in Cycle II, pointing towards increased consistency in student performance.

In light of these observations, there's a discernible positive shift in student learning from Cycle I to Cycle II. This progression underscores the efficacy of the adopted educational interventions and strategies. A comprehensive presentation of the mastery learning outcomes across these cycles can be found in Table 14.

Table 14. Comprehensive indicators of mastery learning outcomes in Cycle I and Cycle II

Indicators	Cycle I	Cycle II
Completed Students	11	29
Percentage of Complete Learning Outcomes	34.375%	90.625%

4. Discussion

The implementation of specific learning models and the integration of the behavioral teaching approach through the utilization of OILL appear to significantly enhance student participation in classroom-based social interactions. Variability in participation levels during English lessons was observed among students, underscoring the importance of fostering active group-based learning environments. Collaborative learning methodologies have been demonstrated to promote communication, cooperation, critical thinking, and social interaction. It was observed that students, who previously displayed challenges in autonomous learning, exhibited enhanced performance when engaged in group-based activities. These pedagogical strategies facilitated avenues for students to participate in discussions, articulate ideas, critically evaluate concepts, and communicate effectively. Such interactions were further found to augment the sense of camaraderie among students. Following this intervention, indications of reduced apprehension and hesitation in peer interactions were noted.

The introduction of the behavioral teaching model, in tandem with OILL, seemingly fostered a heightened motivation among students towards English learning, as evidenced by Table 13. Manifestations of enhanced enthusiasm and active engagement were prominently observed among the students. Furthermore, a marked increase in the propensity of students to articulate their perspectives was recorded. The utilization of the question card appeared to significantly motivate students, as they undertook the tasks presented therein with evident enthusiasm. Subsequent to initial material presentation by educators, students were systematically grouped into clusters of 8-9, with each group comprising 3-4 students. It was decided that group compositions would remain consistent throughout the duration of the English instructional process.

Group formations were determined arbitrarily by educators, ensuring heterogeneity in terms of academic prowess and gender. Post-grouping, students were presented with question cards for collaborative discussions. The DLE Apps, containing pertinent English questions related to the subject matter, was employed as an instructional tool. Collaborative problem-solving using the DLE applications on their smartphones was promoted. The incorporation of the DLE Apps in English instruction was observed to bolster student comprehension and engagement in learning tasks. Additionally, group accolades based on collective academic performance were introduced, aiming to further stimulate student motivation towards English learning.

At the culmination of the instructional session, opportunities were provided for students to clarify doubts related to the studied material. However, it was observed that students often hesitated or found it challenging to articulate their queries. The material was subsequently summarized by the educator, with students encouraged to draw their own conclusions. Notably, the implementation of the behavioural teaching model in conjunction with OILL seemed to notably augment students' engagement in the educational process. This assertion is supported by the systematic analysis of observed student activity data.

From a cohort of 32 students, data analysis indicated that the mean participation percentage during the first

cycle stood at 47.38%. A significant increase to 80.47% was observed in the second cycle following the integration of the behavioural teaching model supplemented by OILL. Learning outcomes, which denote the measurable achievements of students' post-assessment, further substantiated these findings. Such outcomes can be evaluated through tests designed to gauge the progression of student comprehension. Instruments measuring learning outcomes were employed to ascertain the extent of students' grasp of the learning content. Examination of data pertaining to student scores from the inaugural and secondary cycles revealed a discernible uptick in average scores. In the first cycle, the mean score was quantified at 34.375%, whereas the second cycle manifested a score of 90.625%. Concomitantly, there was an observed surge in student completion rates: 34.375% (or 11 respondents) in the initial cycle and a substantial rise to 90.625% (or 29 respondents) in the subsequent one. These tables corroborate that the established completeness criteria within the computer science faculty were attained. Additionally, a majority of students demonstrated commendable behavioral and social dispositions across both cycles. A comprehensive examination of data derived from observational techniques and learning outcome tests ascertained that student engagement in the prescribed material, facilitated through the behavioral teaching model leveraging OILL, witnessed a marked enhancement.

The present investigation also sought to theoretically evaluate the ramifications of the COVID-19 pandemic on variables such as students' academic performance, attendance rates, and overarching motivation, both within and beyond the academic sphere. Consideration was given to discerning the extent of assistance students might necessitate within a predominantly digital academic landscape. Empirical studies have indicated that notwithstanding the challenges posed by the COVID-19 crisis, access to educational resources and pedagogical interactions was sustained through mediums such as Media and Technology Education (MTE), exemplified by tools like OILL coupled with smartphones. In the evolving educational landscape characterized by post-pandemic conditions and a diversity of learning environments, such mediums have proven invaluable in holistically assessing both the learning experience and the emotional well-being of key educational stakeholders, encompassing educators, students, parents, and broader educational communities. Potential future inquiries might adopt the hybrid model and methodological framework delineated in this study, aiming to acquire a more nuanced understanding of data sets procured from learners' educational trajectories, particularly within diverse pedagogical contexts and settings, either during or post the COVID-19 era.

Building on the findings, Lai (2019) highlighted that the utility of DLE applications was explored as tools for unstructured language study. The study demonstrated that advanced language learners were proficiently able to utilize the OILL applications on their smartphones in their second language (L2). Such proficiency led them to emerge as actively engaged L2 users. However, a variance in acceptance of DLE Apps or specific features within these apps was noted among the participants, irrespective of their proficiency levels. It was observed that the configuration settings of some DLE Apps might influence the L2 proficiency of the users. A salient observation was the pronounced autonomy displayed by language learners in their engagement and behaviours associated with DLE Apps. Such autonomy underscores the necessity for a pedagogical model, especially one adopting the OILL+ smartphone approach, to be adaptive and considerate of this learner independence. While some participants provided valid reasons for abstaining from using OILL in their L2, others were seemingly unaware of the potential benefits. Predominantly, the 'games' feature of the DLE Apps was frequently employed by learners, enabling enhancements in L2 grammar, vocabulary, and sentence structures.

Extending this line of research, works by Godwin-Jones (2019), Hubbard (2019), and Lyrigkou (2019) posited that the transition of an L2 learner to a proficient user - one possessing commendable competence and a sustained interest in the language - necessitates a personal connection. The contemporary digital ecosystem, replete with information, can foster such connections with unprecedented ease. Engaging in virtual communities bound by shared hobbies, aspirations, or interests can facilitate conversations in the target language. The current investigation explored avenues through which learners might be assisted in discovering potential L2 online engagements, ranging from peer suggestions on digital platforms to smartphone-based linguistic advisory services, and even instructor-led guidance, as summarized in Table 1.

Responses from some participants indicated that the behavioral teaching model enhanced their cognizance regarding the nuances and intrinsic value of language acquisition. In light of such feedback, it is posited that enlightening learners about salient features of the DLE Apps - such as toggling language capabilities - could be beneficial. A striking observation was the preference for native speaker presence on DLE Apps, exemplified by engagement metrics on video lessons by Mr. Duncan, encompassing 90 videos, and by Mr. Steve Ford Peppy, aggregating 61 videos. The incorporation of audio elements in games, aimed at honing listening and speaking skills, was deemed invaluable in formal linguistic settings. Such tools could potentially catalyse research into linguistically intriguing subjects, further aiding in language analysis derived from monitoring L2 interactions.

An underlying sentiment in language pedagogy, as elucidated by Eaton (2010), is the inadvertent stigmatization associated with informal linguistic education. Such predispositions might inadvertently eclipse the value of experiential learning for students. Thus, language educators are advised to recognize and amplify out-of-class linguistic experiences of their students, crafting activities that integrate these real-world language engagements.

In the digital age, the pedagogical approaches adopted by university lecturers have come under examination.

The present study, involving 32 students, sought to understand the implications of these learning models on both teaching practices and policy. Data was garnered on learning outcomes through the employment of OILL via smartphones, with the study unfolding in two distinct cycles anchored in an action research design. From the analyzed results and observations, it was discerned that a preponderance of students perceives the amalgamation of OILL and smartphones as a technological conduit which augments flexibility within the learning environment. The degree of student engagement was identified as a salient determinant in shaping their predispositions towards this technologically-enabled learning method. Enhanced participation was correlated with positive inclinations, as students actively leveraged technology to foster autonomous learning, bolster motivation, and register palpable advancements in linguistic proficiency, critical thought processes, and collaborative abilities.

During the constraints imposed by the pandemic, it was observed that educators sustained their reliance on the OILL+smartphone collaborative learning model. This model, in the backdrop of compromised face-to-face interactions and hindered technological communications, manifested superior outcomes in comparison to traditional pedagogical frameworks for university instructors. The quality of the applications under the OILL umbrella was recognized as a pivotal factor; it was shown to directly modulate student learning behaviours, consequently informing the overarching teaching model. Furthermore, behavioural determinants wielded substantial influence over learning outcomes.

The imperative to assimilate language-learning applications into pedagogical blueprints was underscored. The insights gleaned from the current investigation accentuate the significance of embedding OILL platforms within blended or hybrid educational settings. Such integration is poised to elevate the educational quality in digitalized classrooms. For subsequent inquiries, it is propounded that a quantitative methodology, encompassing a more expansive cohort, would be instrumental in elucidating the nuances of learning outcomes when deploying the OILL+smartphone paradigm in digital pedagogy.

5. Conclusion

This action learning research determines the learning model utilized by university lecturers during the COVID-19 pandemic. This research involved 32 participants. Cycles 1 and 2 of the Informal Online Language Learning (OILL) and Smartphone Study were used in the development process. There was an analysis of learning outcomes and observations. According to the findings, most students view the collaborative learning model utilizing OILL+smartphone as a technology-driven method used in the classroom to facilitate more flexible learning. Student participation plays a crucial role in interacting with OILL and smartphones. Students had positive attitudes because they used technology to learn English, became more self-directed and self-motivated, and enhanced their vocabulary, pronunciation, grammar, listening, speaking, writing, and reading abilities, as well as their critical thinking and teamwork. During the pandemic, the instructors maintained the OILL+smartphone technology-based collaborative learning model. Due to the lack of quality communication and interaction with technology, it is more successful for university professors than conventional learning models. Behaviour is related to learning outcomes, and the quality of OILL educational applications enhances student learning behaviour, thereby determining the teaching model and taking the necessary steps in this direction. Adding OILL applications to a blended or hybrid classroom is a great way to improve the quality of learning.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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