DEVELOPING ENGLISH SPEAKING SKILLS THROUGH SIMULATION-BASED INSTRUCTION

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Abstract

Foreign language teachers and researchers face a major challenge enabling students' learning. Not only must they provide training in the target language, but they must also find ways to optimise class time and enhance students' communication skills in the target language. How does technology intersect with English teaching in ways that benefit learning? A possible approach would align with integrating web-based strategies and optimising class time through new methodologies, techniques and resources. In this study, a group of university engineering students were taught with simulations to aid their learning of English as a foreign language. These engineering students were taught English through both class-based and a large-scale real-time web-based simulation. We present the results of quantitative analysis of students' oral production. The goal was to show whether simulation-based instruction contributes to significant progress in oral language production in English. The results indicate that students progressed significantly in four language-related areas: vocabulary, pronunciation, variety of expression and grammar.

Keywords: web-based simulation; blended learning; simulation; flipped classroom

1. Introduction

A primary goal of university educators of foreign languages is to provide the tools and practice for students to attain a sufficient level of foreign language proficiency to communicate effectively. Far too often, language educators must teach large classes and cover dense syllabuses. However, technological developments enable the use of blended learning classrooms. Flipped learning is a specific model of blended learning that helps educators optimise class time. In this study, flipped learning was applied to move lectures outside the classroom and introduce simulation-based lessons to enhance English as foreign language (EFL) learning, particularly speaking skills development. Flipped learning inverts the traditional teacher-centred method. Instruction is delivered online outside class time, whilst traditional homework is moved into the classroom environment (Strayer, 2007, 2012; Tourón, Santiago and Diez, 2014; Tucker, 2012). The flipped model thus uses educational technology to

deliver theory and background materials and provides opportunities for learning through simulations in class. This paradigm shift transforms the roles of teacher and learner. In this study, instructors become facilitators and guides as learners work in groups or teams during the simulations. The learners become the real participants in the classroom (Strayer, 2007, 2012).

A simulation refers to an activity in which participants are assigned duties and are given enough information about the problem to perform those duties without play-acting or inventing key facts (Jones, 2013). A simulation is based on a representation of a model that imitates a real-world process or system. Key information is provided to carry out tasks, debate, negotiate from different points of view and solve a specific problem (Klabbers, 2009).

2. Literature review

Simulations are nowadays applied in several disciplines such as medicine, nursing, engineering and languages. Today's education is more and more nurtured by true-to-life simulation scenarios. A large number of studies show the benefits of simulations as they provide immersive experiential learning. Kolb's experiential learning cycle can be addressed as the main conceptual framework used for experiential learning in simulation. Experiential learning is considered a process through which knowledge is built by transforming the experience. Learners go through concrete experience, reflection, conceptualisation, and experimentation. The cycle begins with the learners' involvement in a specific experience (simulation); then they reflect on the experience from different viewpoints (reflective observation). Through reflection learners create generalisations and principles and draw conclusions (abstract conceptualization when explaining or thinking). The learners then use these principles and conclusions in subsequent decisions and actions (active experimentation such as applying or doing) that lead to new concrete experiences (Kolb & Kolb, 1999; Kolb, 2014).

Other authors have been inspired by Kolb's learning cycle in their research on simulations, such as Ekker, 2004; Chang, Peng and Chao, 2010; Wedig, 2010; Beckem, 2012; Wiggins, 2012, 2017; Gegenfurtner, Quesada-Pallarès & Knogler, 2014; Blyth, 2018; among others. Klabbers (2001) described simulations as learning and instructional resources. According to the author, simulations offer a springboard for interactive learning that develops expertise. Kriz (2003), in turn, contextualised simulation within the educational framework. A simulation is an interactive learning environment that converts problem-oriented learning into purposeful action. According to Kriz, training programmes for systems competence through simulation have shown that simulations favour change processes in educational organisations.

Ekker (2004) conducted empirical research into simulations applied to education. The author analysed data on 241 subjects who had participated in various editions of IDEELS, examining satisfaction levels and attitudes. The participants had different roles as negotiators, technical consultants, activists or journalists within the "Eutropian Federation Simulation". The three-week simulation consisted of message exchanges, written proposals and "live" conference situations. The software used was a web-based interface driven by a database server. The project resorted to a web-based questionnaire to measure students' satisfaction, personal experiences and attitudes towards the simulation. Findings revealed that students experienced satisfaction during the simulation and they were activated as the simulation invigorated learning. The simulation was a reality in itself and participants responded actively at all times during the simulation period.

Other studies conducted by Levine (2004) and Halleck and Coll-García (2011) integrated telecollaborative exchanges and global simulations to turn the foreign language class into its own immersive, simulated environment. Levine (2004) described a global simulation design as a student-centered, task-based alternative to conventional curricula for second-year university students of foreign language courses. The author provided clear guidelines to apply simulations in language courses and identified strengths such as the use of the content knowledge in the simulation dynamics, target language activation during the simulation phases and collaborative work to carry out the tasks. Furthermore, Halleck and Coll-García (2011) used simulation-based learning to teach English to engineering students. The study shed light on participants' perceptions of how web-based simulations affect the development of language abilities, critical thinking and intercultural awareness. Simulated experience proved to be significant in an engineering curriculum since a real comprehensive engineering education should provide opportunities to work collaboratively with other professionals in an intercultural setting more than simply solving problems from a textbook.

Burke and Mancuso (2012) in their study of social cognitive theory, metacognition, and simulation learning identified core principles of intentionality, forethought, self-reactiveness and self-reflectiveness in simulation environments. They asserted that debriefing helps build students' self-efficacy and regulation of behaviour. Thus, simulation-based learning combines key elements of cognitive theory and interactive approach to learning. Theory-based facilitation of simulated learning enhances the development of social cognitive processes, metacognition, and autonomy.

Other studies on language teaching and learning have shown that simulations encourage the development and acquisition of language (e.g. Rising, 2009; Andreu-Andrés & García-

Casas, 2011; Watts, García-Carbonell, & Rising, 2011; Woodhouse, 2011; Michelson & Dupuy, 2014; Blyth, 2018). The scholars agree that simulations provide greater exposure to the target language, ensure more purposeful interaction, make input more comprehensible for learners, reduce the affective filter and lower anxiety in language learning.

To mention some more aspects of simulation-based learning, Watts, García-Carbonell, and Rising (2011) examined perceptions of collaborative work in web-based simulations through evaluations of each student's end-of-course portfolio [N = 26]. Students highly valued the collaborative work required in the simulation, which was reflected by the active participation of all team members and by team members' motivation and personal satisfaction. By analysing their own work and that of their teams, the students reported that they had become more resolute and had learnt discourse strategies to persuade others and solve problems. Students also reported that the collaborative work increased their capacity to listen to others' ideas and to learn from others. All this helped increase their intellectual development and knowledge of the world. They also understood specific content faster, improved their language skills and acquired experience in self-assessment.

Andreu-Andrés and García-Casas (2011) focused on simulation and gaming as a teaching strategy. Qualitative analysis based on the discovery of emerging patterns in the data (grounded theory) was used to study the perceptions of 47 engineering students. These students endorsed experiential learning and reported that learning and having fun brought about benefits on their academic and social life. As educators and students became more familiar with the simulations, they developed a greater appreciation of their effectiveness. Students completed the simulations with a heightened awareness of what they have learnt and how they can learn more.

Another interesting example is Woodhouse's (2011) study, in which 33 Thai university students participated in a computer simulation to learn English. Data were collected through personal interviews to learn about students' opinions of the use of simulations to learn a foreign language. The students perceived that they had learned about sociocultural aspects related to communication in the target language, and this was not hindered by the fact that the simulations were not face to face. Students noted that they acquired greater powers of decision, persuasion and assertiveness in communication.

Ranchhod, Gurău, Loukis and Trivedi (2014) analysed the effectiveness of several learning strategies based on Reeve's educationally supportive learning environment through simulations (Reeve, 2013). The investigation dealt with the concrete learning experience

generated by the simulation to develop or reinforce theoretical understanding, management experience, and professional skills.

A large-scale simulation described by Michelson and Dupuy (2014) involved 29 intermediate learners of French at a public university in the Southwest of the United States in the study. Twelve students of the experimental group in the simulation had specific roles to enact the responsibilities of residents in a commercial area in Paris. Seventeen students who belonged to the control group did not participate in the simulation and followed a traditional approach to learn French. Only the experimental students demonstrated abilities to describe how their roles motivated certain linguistic choices and non-linguistic semiotic modes. The study highlighted the potential for simulations to boost students' awareness of the target language together with other communication codes.

A few other studies have also examined the effectiveness of technologies and simulations in the language classroom. O'Flaherty and Phillips (2015) provided a broad overview of research on the flipped classroom and links to other pedagogical models such as simulations. They reported considerable indirect evidence of improved academic performance and student and teacher satisfaction with flipped learning. However, further research is required to provide conclusive evidence of how the fusion of these methods enables language and social competence development. Angelini (2016) investigated combining flipped learning instruction and simulation-based lessons to optimise class time by using and designing simulations with prospective secondary school teachers. Angelini (2016) outlined the benefits of using simulations that are based on literary extracts with a substantial social component.

3. Methodology

3.1. The context of the study

The simulation in this study consisted of three phases: briefing, action and debriefing. During briefing, students were presented with topics related to the simulation scenario, literature on these topics and videos to be viewed outside the classroom to adhere to the flipped classroom model. The benefit of this approach was twofold: whilst students became familiar with the content and built new vocabulary and expressions outside the classroom, instructors and students dedicated class time to activating their knowledge of the content and the target language through minor-scale simulations, debates and forums. This class practice helped instructors gauge students' understanding of the topic and the type of language they used. Grammar clarifications and explanations were provided when needed. Students formed teams

of four or five members and performed dynamic activities in class. This teamwork favoured individualised learning because the instructor was able to identify the weaknesses of each student.

For the course analysed in this study, the International Communication and Negotiation Simulations (ICONS) web-based simulation platform was used. The ICONS platform, developed at the University of Maryland, combines simulation tools and simulation development dialogue (SDD) methodology to provide clear insights into global sociopolitical affairs and evaluate alternative courses of action in crisis situations. Simulations performed using the ICONS platform are thus ideal for addressing social issues related to education, environmental threats, the sustainable economy and human rights. Specialists report that simulations help instil ethical responsibilities in students and help students develop a global mindset (Crookall and Oxford, 1990; Crookall, 2010). In the debriefing phase, students reflected on the simulation dynamic and the learning component of the experience.

This article presents the findings of a quantitative study of students' progress in oral language production in English. The cohort of telecommunications engineering students (N = 48) who participated in the study had attained the B1 level of English and were enrolled in a four-month B2 level English course at university. This course corresponded to the B2 level according to the *Common European Framework of Reference for Languages* (CEFR). All students were in the third year of the university degree programme. Under the flipped learning model, the students received instructions on how to complete the simulation scenario and guidelines to participate in minor-scale classroom-based simulations and a web-based simulation. The web-based simulation, which was delivered through the ICONS platform, simulated an international summit on current economic, social and security issues.

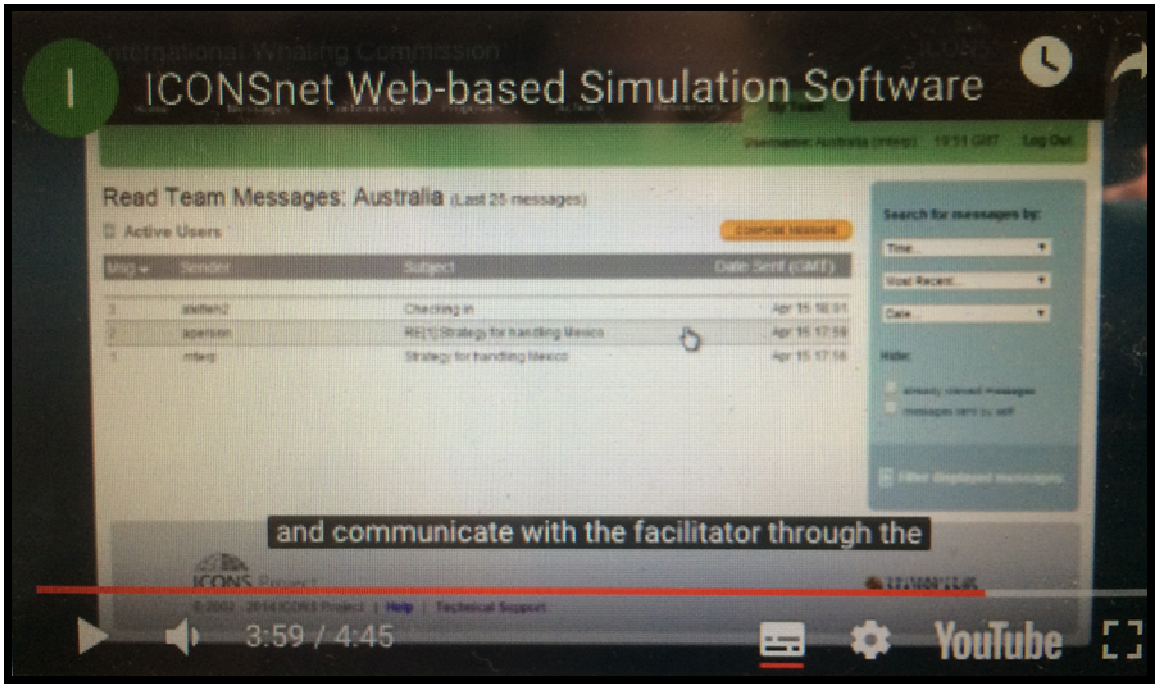

Figure 1. Screenshot of ICONSnet Web-based Simulation. https://www.icons.umd.edu/about/iconsnet

The countries that attended the simulated summit were represented by student teams. Attendance was synchronous and asynchronous. Students formed teams of four or five members, and each team member had a clear role within the team. The roles were specified in the simulation briefing.

The students signed letters of consent before participating in the research. We thereby complied with the basic principles of ethical research (see sample letter in Appendix 1).

3.2. Design and procedure

The study examined the oral production in English of third year university students of telecommunications engineering. The procedure that we followed is illustrated in Figure 2. The groups (E1 and E2) followed simulation-based training.

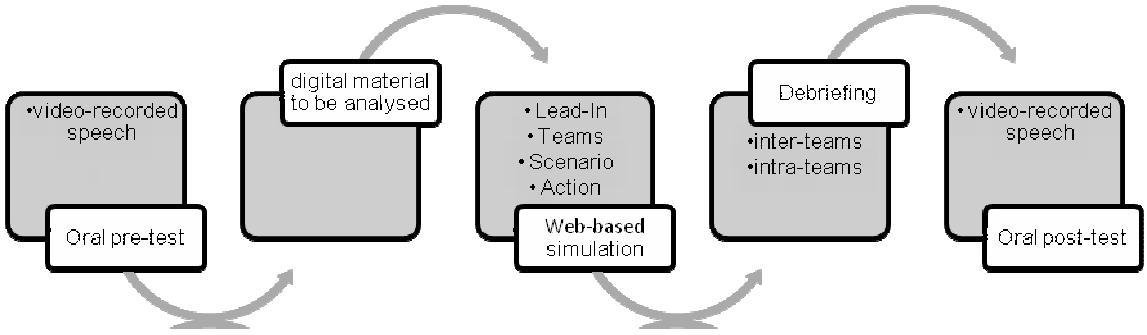

Figure 2. Procedure workflow

The groups (E1 and E2) were given simulation-based training. This training followed five steps:

(1) **Oral pre-test**: Participants were asked to speak about a topic related to the latest news by answering the following question: "Do you believe the news you read or see on TV?" English was the vehicular language prior to the simulation. This improvised speech lasted for three to five minutes. Three external examiners assessed each participant using Matthews and Marino's (1990) criteria for oral assessment. The oral presentations were video-recorded.

(2) **Flipped learning phase**: Students watched videos, read the news and researched several topics related to global issues such as the environment, society and technology. They also revised some aspects of grammar outside the classroom. The lessons were active learning spaces where students were given responsibilities and simulation scenarios to debate, negotiate and solve a problem through teamwork. Students studied grammar on their own. Occasionally, certain aspects of grammar were clarified in class. Attendance was compulsory and formative assessment was used to keep a record of students' progress. This phase prepared students for the web-based simulation.

(3) **Web-based simulation lead-in and simulation scenario**: Students revised the simulation guidelines and formed teams of four or five members. The students chose their own teams with no interference from the teacher. The participants became acquainted with the simulation scenario and their roles within the team (the simulation can be viewed in Appendix 2). The simulation lasted 21 days and entailed synchronous and asynchronous action. The final stage consisted of analysis, strategies, debate, proposals, negotiation of proposals and the final decision.

(4) **Debriefing**: Students reflected on the simulation and their performance and teamwork. The three external examiners were specialists in language testing with vast experience in the application of official exams. In this case, they assessed each participant using Matthews and Merino's (1990) criteria for oral assessment. The rubric consisted of 14 oral presentation evaluation criteria: three delivery-related criteria (natural delivery, rate of speech, posture); three content-related criteria (topic suitable for time available, topic developed with relevant details, presentation length); five textual organization-related criteria (introduction, transitions, main ideas,

development of ideas, conclusion); and four language-related criteria (appropriate vocabulary for the audience; pronunciation and intonation, variety of expressions, grammar) Descriptors were added to support the use of the assessment criteria in the rubric (Appendix 3).

The quantitative study was performed to determine students' progress in oral language production in English. The following analyses were conducted:

(1) Analysis of differences in overall assessments pre- and post-treatment.

(2) Analysis of differences in assessments for each variable.

(3) Analysis of differences in assessments for each sub-variable.

All analyses were performed in SPSS 25 under a licence held by the university.

3.3. Results and findings

3.3.1. Analysis of differences in overall assessments pre- and post-treatment

The results of a Student's t-test (p-value < 0.0001) indicate that students made significant progress in their oral language production post-treatment (Table 1).

Table 1. Overall assessment of progress post-treatment

	Mean	**Standard deviation**	**Mean standard error**	**95% confidence interval difference**		**t**	**df**	**Sig.**
				Lower	Upper			
Progress	2.94401	2.05458	0.29655	2.34742	3.5406	9.927	47	0

Note: Student's t-test for dependent variables; df – degrees of freedom; sig. – bilateral asymptotic significance.

The correlation analysis revealed a significant positive correlation (r = 0.465, p-value = 0.01) between the oral expression score pre- and post-treatment. This finding indicates that students whose scores were high pre-treatment had higher scores post-treatment. However, this finding does not necessarily indicate greater progress. According to the statistical regression principle, these students were actually least likely to achieve higher scores because they already had high scores pre-treatment.

Students made significant progress in terms of the assessments of their overall oral production post-treatment. Furthermore, there was a positive correlation between the pre- and post-treatment assessments.

3.3.2. Analysis of differences in the independent variables

Second, we studied the four independent variables: delivery, content, textual organisation and language. Table 2 shows the means and standard deviations of these four variables.

Table 2. Statistics for the pre- and post-treatment values of the independent variables

	Mean	N	Standard deviation	Mean standard error
Delivery post	2.25	48	.296	.042
Delivery pre	1.63	48	.633	.091
Content post	2.43	48	.174	.025
Content pre	1.65	48	.744	.107
Organisation post	2.37	48	.176	.025
Organisation pre	1.52	48	.606	.087
Language post	2.24	48	.232	.033
Language pre	1.54	48	.603	.087

Note: Range of scores = 0–2.5

The means of the four independent variables were higher post-treatment, resulting in a greater progress of the oral skills.

As Table 3 shows, the results of the Student's t-test confirmed that progress in the four independent variables (p-value < 0.001) was significant.

Table 3. Comparison of means of the independent variables of pre- and post-treatment

Progress	Mean	Standard deviation	Mean standard error	95% confidence interval difference		t	df	Sig.
				Lower	Upper			
Delivery	0.61	0.624	0.900	0.435	0.797	6.843	47	.000
Content	0.77	0.742	0.1072	0.563	0.995	7.271	47	.000
Organisation	0.84	0.594	0.857	0.676	1.021	9.901	47	.000
Language	0.69	0.488	0.705	0.557	0.841	9.913	47	.000

Table 4. Correlations of the pre-treatment variables with the post-treatment variables

	N	Correlation	Sig.
Delivery post- and pre-treatment	48	0.266	0.068
Content post- and pre-treatment	48	0.125	0.397
Organisation post- and pre-treatment	48	0.216	0.140
Language post- and pre-treatment	48	0.641	0.000

The results reveal a significant positive association between *language* pre-treatment and post-treatment, with a correlation coefficient of 0.641 (p-value < 0.001). This finding confirms that students with a high level of English language pre-treatment had a higher level of English language post-treatment than students with a lower level of English language (r = 0.641, p-value < 0.001). However, these results do not necessarily show that students with better scores post-treatment progressed more in language and delivery than the other students who participated in the study.

3.3.3. Analysis of differences in the sub-variables

Third, we analysed the sub-variables of oral expression in English. For *delivery*, Table 5 shows the results of the test for paired samples pre- and post-treatment for the sub-variables *oral presentation* and *fluency.*

Table 5. Paired t-test (pre- and post-treatment) of the delivery sub-variables oral presentation and fluency

Progress	Mean value	Standard deviation	Standard error difference	95% confidence interval difference		t	df	Sig.
				Lower	Upper			
Oral presentation	.53	.542	.078	.378	.693	6.849	47	.000
Fluency	.45	.561	.081	.286	.613	5.551	47	.000

Note: Student's t-test for dependent variables; df – degrees of freedom; sig. – bilateral asymptotic significance.

The mean value of the difference of the sub-variable *presentation* was 0.536 (p-value ≤ 0.001). The mean value of the difference of the sub-variable *fluency* was 0.450 (p-value ≤ 0.001). The subsequent correlation analysis of *presentation* and *fluency* confirmed students' significant progress in the sub-variable *presentation*.

Table 6. Correlation analysis of the delivery sub-variables presentation and fluency

	N	Correlation	Sig.
Oral presentation post- and pre-treatment	48	.295	.042
Fluency post- and pre-treatment	48	.201	.170

The independent variable *content* comprised the sub-variables *timed topic* and *relevance*. Table 7 shows the results of the test for paired samples (pre- and post-treatment) of the sub-variables *timed topic* and *relevance.*

Table 7. Paired t-test (pre- and post-treatment) of the content sub-variables timed topic and relevance

Progress	Mean	Standard deviation	Standard error difference	95% confidence interval difference		t	df	Sig.
				Lower	Upper			
Timed topic	.63	.578	.083	.465	.801	7.585	47	.000
Relevance	.61	.653	.094	.424	.803	6.510	47	.000

Note: Student's t-test for dependent variables; df – degrees of freedom; sig. – bilateral asymptotic significance.

The mean value of the difference of the sub-variable *timed topic* was 0.63 (p-value ≤ 0.001). The mean value of the difference of the sub-variable *relevance* was 0.61 (p-value ≤ 0.001). The subsequent correlation analysis of *timed topic* and *relevance* confirmed students' significant progress in these two sub-variables. The correlation analysis of the sub-variables

timed topic and *relevance* revealed no correlation between pre- and post-treatment that was significantly different from 0.

Table 8. Correlation analysis of the sub-variables timed topic and relevance

	N	Correlation	Sig.
Timed topic post- and pre-treatment	48	.229	.118
Relevance post- and pre-treatment	48	-.045	.759

The analysis showed that students with high scores post-treatment were not the same in most cases as students with high levels of English pre-treatment.

The independent variable *textual organisation* comprised the sub-variables *introduction*, *connectors*, *logical development of ideas* and *conclusion.* Table 9 shows the results of the test for paired samples (pre- and post-treatment) of the sub-variables *introduction*, *connectors*, *logical development of ideas* and *conclusion.*

Table 9. Paired t-test (pre- and post-treatment) of the textual organisation sub-variables introduction, connectors, logical development of ideas and conclusion

Progress	Mean	Standard deviation	Standard error	95% confidence interval difference		t	df	Sig.
				Lower	Upper			
Introduction	.69	.493	.071	.547	.834	9.71	47	.000
Connection	.55	.531	.076	.404	.713	7.28	47	.000
Logical development	.73	.561	.081	.570	.896	.9.04	47	.000
Conclusion	.92	.599	.086	.750	1.098	10.67	47	.000

Note: Student's t-test for dependent variables; df – degrees of freedom; sig. – bilateral asymptotic significance.

The analysis indicated that the mean value of the difference of the sub-variable *introduction* was 0.69 (p-value $\leq$ 0.001), *connectors* was 0.55 (p-value $\leq$ 0.001), *logical development of ideas* was 0.73 (p-value $\leq$ 0.001) and *conclusion* was 0.92 (p-value $\leq$ 0.001). The results confirmed that students made significant progress in all four sub-variables.

The correlation analysis of the four sub-variables indicated a significant positive correlation of the sub-variable *conclusion* ($r = 0.304$, $p = 0.036$) pre- and post-treatment.

Table 10. Correlation analysis of the introduction sub-variables introduction, connectors, logical development of ideas and conclusion

	N	Correlation	Sig.
Organisation-introduction PRE Organisation-introduction POST	48	.065	.661
Organisation-connectors PRE Organisation-connectors POST	48	.188	.200

Organisation-logical development PRE Organisation-logical development POST	48	.271	.063
Organisation-conclusion PRE Organisation-conclusion POST	48	.304	.036

Lastly, the independent variable *language* comprised the sub-variables *vocabulary*, *pronunciation*, *variety of expression* and *grammar*. Table 11 shows the results of the test for paired samples.

Table 11. Paired t-test (pre- and post-treatment) of the language sub-variables vocabulary, pronunciation, variety of expression and grammar

Progress	**Mean**	**Standard deviation**	**Standard error**	**95% confidence interval difference**		**t**	**df**	**Sig.**
				Lower	**Upper**			
Vocabulary	.58	.474	.068	.446	.446	8.52	47	.000
Pronunciation	.45	.332	.048	.362	.555	9.55	47	.000
Variety of expression	.59	.597	.077	.440	.753	7.67	47	.000
Grammar	.50	.503	.051	.051	.607	9.75	47	.000

Note: Student's t-test for dependent variables; df – degrees of freedom; sig. – bilateral asymptotic significance.

The results of the test for paired samples confirmed students' significant progress in the four sub-variables. The correlation analysis indicated the dependence of students' level of English post-treatment on students' level pre-treatment: *pronunciation* ($r = 0.710$, $p < 0.001$), *variety of expression* ($r = 0.407$, $p = 0.004$) and *grammar* ($r = 0.689$, $p < 0.001$).

Table 12. Correlation analysis of the language sub-variables vocabulary, pronunciation, variety of expression and grammar

	N	**Correlation**	**Sig.**
Vocabulary post- and pre-treatment	48	.227	.120
Pronunciation post- and pre-treatment	48	.710	.000
Variety of expression post- and pre-treatment	48	.407	.004
Grammar post- and pre-treatment	48	.689	.000

The correlation analysis confirmed that students' vocabulary progressed post-treatment, although this progress was non-significant. The results also show that students progressed significantly in terms of pronunciation, variety of expression and grammar.

3.3.4. Analysis of concordance of assessments by the three external examiners

We sought to confirm the objectivity and impartiality of the three external examiners' assessments of students' oral production pre- and post-treatment.

There were very few notable discrepancies in most assessments. This finding indicates that the three examiners tended to evaluate the same student in a similar way. There were no significant deviations. Table 13 shows that variability was due to differences in students' oral performance pre-treatment.

Table 13. Concordance of the three external examiners' assessments pre-treatment

Source	Sum of squares	df	Mean square	R-F	p-value
Examiners	0.463	2	0.231	0.51	0.599
Variables	4.854	3	1.618	3.58	0.013
Residual	257.441	570	0.451		
Total	262.759	575			

Note: df – degrees of freedom; R-F – relative frequency.

External examiners' assessments did not differ significantly. Thus, there was concordance in the assessments of students pre-treatment ($p = 0.599$).

In terms of the results of post-treatment, the three external examiners agreed that the students had made progress in the four independent variables *delivery*, *content*, *textual organisation* and *language*. Figure 5 shows that Examiner 3 was reluctant to award higher marks, whereas Examiner 1 seemed to be more sensitive to students' progress, awarding higher marks.

Table 14 shows that the variability was due to differences in students' oral performance post-treatment.

Table 14. Concordance of the three external examiners post-treatment

Source	Sum of squares	df	Mean square	R-F	p-value
Examiners	1.895	2	0.947	14.50	0.000
Variables	22.626	47	0.481	7.36	0.000
Residual	34.391	526	0.065		
Total	58.914	575			

Note: df – degrees of freedom; R-F – relative frequency.

Table 14 confirms students' significant progress in oral expression post-treatment. Despite different pre-treatment levels of each sub-variable (*delivery*, *content*, *textual organisation*, and *language*), these differences disappeared in post-treatment.

Students made significant progress in *delivery*, specifically in *oral presentation* and *fluency*. This can be associated with the great exposure to the target language in and outside of class. As they followed a flipped model, they had to become acquainted with specific issues from the simulation scenario and synchronous and asynchronous, they had to participate in the simulation negotiations, forums and debates. In terms of *language*, students made significant progress post-treatment. Students progressed significantly in *pronunciation*, *variety of expression* and *grammar*. They were especially careful with the language use as their proposals had to be understood to be voted favourably. They had to work the language thoroughly to avoid repetitions of vocabulary and expressions at the time their messages were straightforward and well-interpreted. Analysis of variance (ANOVA) indicated that students progressed in all variables, although their progress in *organisation of ideas* and *content* was non-significant. Surprisingly, students' textual organization of ideas and content development did not reach significance. This can be a side effect of the exposure to well-organized texts to read and debate that students had to analyse.

4. Discussion

The analyses presented herein provide evidence of significant progress in oral language production in English. Despite differences in students' levels of delivery, content, organisation and language pre-treatment, these differences tended to disappear in post-treatment. Students progressed significantly in oral presentation and fluency (*delivery*) and pronunciation, variety of expression and grammar (*language*). Regardless of students' initial level, the variables *organisation* and *content* were non-significant despite progress in post-treatment. Arguably, these results suggest that students were somewhat conditioned by the pre-test because they were already familiar with the test dynamics when they took the post-test. Notably, however, the students were exposed to a wide range of topics inside and outside the classroom during the treatment. They had to research, learn, debate, negotiate, set forth proposals and make decisions during the simulations, especially the large-scale web-based simulation. We believe that this intensive practice justifies the findings of this study.

However, the findings of this study should only be considered in light of its limitations. The experimental group analysed had autonomous work to do outside of class to learn about specific topics before attending the lessons. This type of course design may have had an impact in the experimental students' oral performance as interaction in English was sought during the lessons, and a great exposure to audio-visual material was available. Only one of the

researchers was in charge of teaching one experimental group. Due to this, we have resorted to three external examiners to bring reliability to the study.

5. Conclusion

This study thereby shows that simulations are effective at meeting the demands of language learning. This has been shown by previous research noted in the Literature section; and this study confirms it as a "by-product". In short, the results can serve as a reference for further studies of how to improve teaching and learning strategies in EFL. Future research should consider a diverse population that covers different higher education degrees in non-immersive settings.

Deciding how to employ technology in teaching to optimise learning is a genuine challenge. In the present study, the flipped model has greatly contributed to gaining class time for speaking practice as much of the research on the different issues in the simulation scenario was conducted outside of class. The flipped classroom model and blended learning provide a learning environment with massive potential, as reported by Strayer (2007, 2012), Tourón, Santiago, and Diez (2014) and Tucker (2012). Scholars should provide insight into the most suitable teaching and learning practices in the coming years, as per the proposals of Woodhouse (2011) and O'Flaherty and Phillips (2015).

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