

## **The Effect of Implementing the Blended Teaching Approach in ESP Courses on Students' Achievement and Attitudes**

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### **ABSTRACT**

This paper aimed to empirically test whether implementing the blended teaching approach in ESP courses positively affects students' achievement and their attitudes towards it. To this end, explanatory type and quasi-experimental design research were carried out with two groups of students (N = 60) enrolled in the computer science department at Mostaganem University, Algeria. The sample was divided into two equal groups consisting of 30 participants. One group was part of the experimental group, they received instruction through the blended teaching approach, and another group was part of the control group who taught using the traditional teaching approach. Data collection considered two techniques: a test addressed to both groups to compare their performance within different learning environments. A 10-item questionnaire was administered to the experimental group after the treatment phase to investigate the students' attitudes towards implementing the blended approach. The results indicated statistically significant differences between groups in favour of the treatment group both in achievement and attitudes. The educational experience was satisfactory for the students taught within the blended learning environment, which positively affected their academic outcomes. The perceived satisfaction is positively associated with the marks obtained in the ESP subject. Due to the positive results revealed by this study, implementing computerised teaching in addition to the traditional approach is highly recommended. In order to facilitate teachers' mission, the stakeholders in Algerian higher education should take serious steps in improving teachers' information technology skills through providing specialised training programs for the teachers to implement blended learning efficiently and effectively.

**Keywords:** *Algerian higher education; ESP courses; achievement; attitudes; the blended teaching approach*

### **INTRODUCTION**

The concept of the student has changed significantly in higher education. Students of the current generation have different features, dispositions, and expectations compared to those of just a few decades ago. Today, students prefer to construct their own knowledge and access information quickly through various digital technology channels (Engelbrecht et al., 2020). In short, students' needs are varied, and it is no longer possible to rely on a single student profile. Thus, learning environments and teaching approaches should be adapted to respond to such transformations of students' needs. Blended learning (BL) provides students with a tailored learning context by consolidating conventional teaching with ICT. In this way, BL helps create high-quality teaching and increase students' learning opportunities in computing. Flexible modalities are required to adapt to the characteristics and needs of ESP learners to prolong the learning process without losing their focus and interest. Furthermore, students learn in different ways, at their own pace, and through various learning styles, so teachers must offer multiple learning activities from which students can choose. Researchers have identified a profile of competencies required of students

in BL models. One element to consider is that, within virtual teaching spaces, students are more autonomous, reflective, and critical. These characteristics force teachers to consider the differences among students in terms of motivation (extrinsic and intrinsic), channels of perception (visual, auditory, or kinaesthetic), and cognitive styles (active, reflective, or theoretical). Furthermore, basic personal skills and attitudes towards learning (for example, self-discipline, the ability to work alone, time management, absolute degree of independence in learning, ability to carry out personal programming, and the extent to which an individual can balance their personal and professional lives with their studies) must also be considered. Thus, the corporation between educational and training processes to apply successful BL initiatives should prepare students to satisfy their academic and occupational needs and ensure high-quality standards in flexible and rich teaching scenarios.

At the end of the 1960s, the classroom was considered the only means of knowledge transmission. Currently, although still underused, ICT offers a greater range of teaching possibilities. Hannah and Venkatachary (2010) identified three pedagogical factors that affect the quality of students' learning experience, and instructors should consider when developing didactic materials as follows: the physical context, the relevance and the authenticity of course content and activities. BL methodology allows students to demonstrate greater responsibility in terms of their own commitment to the learning process, which leads to greater motivation and more satisfactory results.

As part of the population of ESP learners, computer science students encounter many language barriers while pursuing their computing studies and careers. Evidence of this exists, for instance, in how there has been an increased demand among Algerian computer science students to study and work abroad or in international foreign companies; however, lack of English communicative competence on the part of these students remains a limitation. Accordingly, ESP is highly recommended to assist students in disciplines other than English to improve their English communication competence in a way that is relevant to their programmes of study and careers. Overall, Algerian universities have encountered challenges in implementing ICT tools to improve students' learning experiences. Integrating BL in ESP teaching enables non-English major students to enhance their English proficiency more effectively than purely online or traditional teaching approaches (Kuruçova et al., 2018). It has also been reported that BL harnesses students participation and provide learning opportunities for learners with lower-level and limited English proficiency (Arslanyilmaz, 2012). Thus, BL can assist students in overcoming online learning constraints (for example, lack of participation). Besides, the BL method has significantly outperformed online learning through ensuring task achievement (Vijayakumar & Viswanathan, 2018). Face-to-face instruction is still indispensable for ESP learners in the sense that it allows them to interact directly with their teachers, thereby increasing their engagement and motivation, while online learning allows students to increase their English mastery independently. Online learning provides extensive opportunities for teachers and students to engage in English as a foreign language education beyond conventional learning limits.

Implementing BL for computer science students at Mostaganem University is feasible due to the institution's ICT facilities and the development of its e-learning system. However, the university's ESP teachers have not yet applied ICT to conduct blended teaching. Additionally, the use of BL in ESP teaching for computer science students still requires scrutiny to create an appropriate teaching model. To this end, the current study investigates computer science students' perspectives of BL with the aim of designing practical blended ESP courses for Mostaganem University. With the extensive technological developments that have occurred in recent decades, the classroom has become a durable communication system. In this sense, ICTs do not threaten the function of universities. However, scholars are discussing the need for a new pedagogy based on personalisation, interactivity, and the development of autonomous learning and thinking skills. Previous studies have assumed that ICT can be integrated into BL as a resource that allows the

educational context to offer greater flexibility. In this way, the diverse learning needs of ESP learners can be better met and teaching and communication methodologies can be innovated and diversified. However, ICT tools alone will not automatically change teaching methodologies. Hence, a powerful combination of conventional teaching and new digital teaching methods should be introduced.

Digital platforms can contribute to the development of non-face-to-face classes intended to complement face-to-face classes. Information can be offered in a restricted manner to students, and they can evaluate their own work (through tests, self-evaluation, co-evaluation, continuous evaluation, individualised monitoring, and knowledge accreditation). In this sense, new tools and web applications exploit the possibilities offered by the principle that the user is not required to have digital literacy. BL is consistent with the traditional values of HEIs, as it has the prospective to boost the effectiveness and efficiency of a meaningful learning experience. It has been argued that BL significantly influences ESP students' English mastery (Kurucova et al., 2018). BL permits students to expedite mastering language skills through various online learning resources. Furthermore, as Wichadee (2017) emphasised, its use assists English language teachers to tailor and integrate innovative instructional tasks and media into conventional classes. The reviewed studies have revealed that BL has positively influenced the quality of ESP instruction. However, students' readiness for the BL context has not been comprehensively investigated. It is thus possible to identify a need to scrutinise ESP students' readiness to use this modality through investigating their perceptions of the opportunities and challenges of BL and obtaining suggestions regarding how to prepare quality BL instruction.

Many common research studies trends on blended learning have been highlighted by researchers through structured literature reviews on the topic. A systematic web-based study by Torrisi-Steele and Drew (2013) stated three main categories of research focusing on students, academic practice, and case studies, though there are overlaps in these categories. The first category covers research related to students' responses (attitudes, perceptions, preferences) to blended courses, including research on the student experience (Holley & Oliver, 2010; Linh, 2020; Mitchell & Forer, 2010; Salamonson & Lantz, 2005) and learning performance (Heba & Nouby, 2008; Hsu & Hsieh, 2011; Vijayakumar & Revathi, 2018; Safdari, 2021; Waluyo & Bucol, 2021). The second category deals with barriers to adopting technology, strategies for facilitating adoption and professional development/support required for implementing blended courses (Brooks, 2010; Davis & Fill, 2007; Keengwe, Georgina, & Wachira, 2010; Bahari & Salimi, 2021). The third category involves both broad institutional level (Engert & von Danwitz, 2004) or programme level case studies (Salmon, 2000; Salmon, Nie, & Edirisingha, 2010) and technology-driven assessment of courses, specific tools and strategies (Luchoomun, McLuckie, & van Wesel, 2010; Purvis et al., 2011). The course-specific case studies are mainly concerned with the advantages of blended learning (for example, flexibility, pace, and access) and the use of online tools (for example, blogs, Wikis, learning management systems and online platforms). Nevertheless, other studies focus on using blended learning to address existing course challenges such as large classes (Shen et al., 2009) and improve certain discipline-specific competencies (Uren & Uren, 2009).

Although a multitude of studies are available on the utility, approaches and tools of blended learning courses, very few studies focus on a blended course that incorporates online learning into an ESP course in higher educational settings, especially in the Algerian context. There is a paucity of studies investigating the practical application of this teaching format and its effectiveness in the Algerian ESP context within a particular discipline from students' perspectives. As for existing case studies on blended learning, they tend to be context and course-specific and may not be generalisable to courses in other institutions. Given this gap, ESP-blended courses that integrate digital technologies are worth investigating. Ensuring that future specialists have high professional and communicative competence levels is likely to positively impact Algerian communities and the country's competitiveness internationally.

The problem addressed by this study stems from the increasing necessity to vary the teaching approaches used in ESP instruction to develop the educational process used and provide satisfactory learning outputs and produce students with the skills required in the 21st century. Furthermore, the problem stems from the need to evaluate the ESP educational institutions' programs in BL and the computerisation of the ESP curriculum in order to recruit resources and efforts to achieve the fundamental objectives of educational programs. The results of this study may assist researchers and educators to better understand the extent to which the blended teaching approach is successful in terms of improving student performance and satisfaction when compared with conventional classroom instruction.

The present study investigated the effects of teaching ESP to Algerian computer science students via blended classroom techniques. Therefore, the current study addresses the following objectives:

1. Examine how the implementation of the blended approach affects students' achievement as compared to the traditional approach.
2. Explore students' attitudes towards several dimensions of implementing the blended teaching approach in ESP courses regarding readiness based on opportunities and challenges of BL instruction.
3. Provide practical recommendations to higher education stakeholders concerning how the approach should actually be implemented and the importance of implementing the blended teaching approach in the future.
4. Provide instructional designers and faculty with some guidelines on transforming conventional face-to-face courses into blended courses that make learning more effective and enjoyable.

To address the objective of the study while remaining grounded in previous research, the current study was conducted to obtain data that could be used to answer the main research questions, namely:

- Does implementing BL have any significant effects on Algerian students' achievement in ESP courses?
- What is the attitude of Algerian ESP students' towards implementing BL in ESP courses?

To answer the two questions, the researchers tested the following hypotheses:

**Hypothesis One:** There are statistically significant differences in computer science students' achievement in ESP attributed to the teaching approach (blended teaching approach, traditional approach) in favour of the blended approach.

**Hypothesis Two:** There are statistically significant differences in computer science students' attitudes toward learning ESP attributed to the teaching approach (blended teaching approach, traditional approach) in favour of the blended approach.

## **METHODOLOGY**

The blended learning approach is described as applying and implementing several methods, strategies, techniques, or resources of education as a new approach to teaching ESP classes at Mostaganem University. Face-to-face and electronic lectures were combined and compared through analysing students' attitudes towards face to face and blended ESP courses with the aim of generating empirical evidence of the reliability of BL and students' satisfaction.

## Research Context and Participants

The current study was carried out with first-year Master level degree students enrolled in the Computer Science Department at Abdelhamid Ibn Badis University, Algeria. Students participated in ESP classes for the first semester of the 2018–2019 academic year. The ESP class is mandatory for all undergraduates as a non-fundamental unit of the core educational curriculum. The subjects selected for this study were taking English for a computer science course as part of their graduation requirements. This course was designed in line with the specific requirements of learners studying in this department to enhance the students' four skills and language use. The ESP course content mainly deals with various work areas in the computing field such as, artificial intelligence, computer graphics, website design, and programming languages. Students were invited to contribute to this research as a part of the new blended teaching initiative in the department, which intended to enhance their proficiency level.

The population of the study, consisting of 60 students, was randomly selected from enrolled first-year Master level degree students in the Computer Science Department at Mostaganem University during the entire semester of the academic year 2018/2019.

The population (N= 60) were divided into two equal groups:

The Control Group (N= 30) was taught using the traditional teaching approach, which was applied with face-to-face lessons, formal tasks and assessment procedures.

The Experimental Group (N= 30) was taught using the blended approach, which was applied with face-to-face lessons, live and virtual lessons, forums for discussion and additional activities, along with formal tasks and assessment procedures.

The participants in both groups ranged from 20 to 26 years old, which indicates their homogeneity and similar learning experiences. All students were selected from those who volunteered to contribute to this research. Finally, ethical issues were considered. Students were clear about understanding the research background, the rationale behind this study, and what was expected of them in advance. The researchers also ensured that none of the participants felt stressed or pressured to share opinions and responses as the anonymity of the participants served to boost their confidence.

## Research Design and Instruments

The researchers adopted the following data collection tools to accomplish the objectives of the study and to assess the effectiveness of e-learning as a complementary medium to traditional learning:

### *Achievement Test*

A test with a total of 20 marks was prepared to measure computer science students' achievement in ESP according to Bloom's taxonomy of educational objectives. It passed through two phases: 1- Analysing the content of ESP courses taught for the whole semester. 2- Preparing the test that involves the main cognitive elements distributed according to Blooms' levels. The students' scores were determined as follows: 1- 0 –9 Weak. 2- 10 –12 Average. 3- 13-15 Above Average. 4- 16 – 20 Excellent.

### *Questionnaire*

In order to investigate computer science students' attitudes towards implementing the tenets of the blended teaching approach in ESP courses, a 10-item questionnaire was administered to the experimental group after the treatment phase. The questionnaire involves two sections. The first section is about the participants' demographic data, including their age, gender, and learning experience. The second section includes items about their attitudes towards implementing blended classroom techniques in ESP courses. A five-point close-ended Likert Scale to reveal the degree of agreement and disagreement was used to develop the questionnaire, which was described in the form of statements (to collect quantitative data) ranging from Strongly Disagree, Disagree, Unsure, Agree and Strongly Agree. The researchers probed the validity of the questionnaire against the extent to which its items reflected students' attitudes. The result demonstrated that the developers measured the overall Cronbach Alpha Coefficient of the questionnaire to be ( $r = .73$ ), demonstrating a reasonable extent of internal consistency (DeVellis, 2012).

### *Instructional Design*

In this study, the control group was taught using traditional techniques. Students were taught in a conventional classroom, assigned homework and regularly examined. The experimental group was taught in the same teaching method as the control group; yet, they were supplemented by online learning, ICT practices, and materials. In this research, the researcher employed online learning materials in alignment with the courses in the classroom. The primary aim of this e-learning programme was to enhance students' proficiency level in language skills and professional language use. The same traditional, face-to-face lectures, assignments, evaluations, and formal examinations were delivered to both groups. Nevertheless, the experimental group was provided with the e-learning components and answered a blended-learning questionnaire.

### *Procedures*

The scientific procedures used for the study are outlined below.

- Preparing the research tools with the assistance of prior studies.
- The data of the questionnaire were gathered and tested to ensure integrity and validity.
- The results of the test and questionnaire were analysed using the SPSS-18 programme for final results.

### *Blended Teaching Courses*

Blended courses typically involved different activities relevant to the content of each unit. In this course, eight units were consolidating, strengthening and extending the classroom courses. Students were immediately able to review their responses, re-examine the skills development activities, and boost their skills, thereby improving their language learning. The traditional teaching approach was reinforced by digital instruments (interactive courses) to boost the learner's engagement. This covered: Educational videos that students watched at home at their own pace, online activities with feedback, digital resources within Moodle (learning management system) and discussion forums.

## **RESULTS AND ANALYSIS**

For collecting and analysing necessary data, the researchers used the designed tools to answer the research questions. The findings are outlined as follows:

**Achievement Test Results:**

To address the first research question, the control group and experimental (treatment) group scores on pretest and post-test were calculated. All participants ( $n = 60$ ) underwent a pretest designed to assess their performance before receiving the treatment. An independent t-test was carried out to ensure that there is no significant statistical difference among participants. Descriptive statistics of students' performance on the pretest are presented as follows:

**Table 1: Descriptive statistics of Participants' achievement, pretest**

Group	N	Mean	St Dev	T-Value	P-Value
Control Group	30	3.3000	1.31700	0.177	0.860
Experimental Group	30	3.3667	1.58623		

\* Statistically significant at ( $\alpha = 0.05$ )

The results demonstrated no statistically significant difference among participants ( $t = 0.177$ ,  $p > 0.05$ ) in their proficiency level on ESP pretest (independent sample t-test).

**Table 2: Descriptive statistics of Participants' scores on post-test**

Group	N	Mean	St Dev	T-Value	P-Value
Control Group	30	5.4667	1.67607	4.709	0.000
Experimental Group	30	7.4000	1.49943		

\* Statistically significant at ( $\alpha = 0.05$ )

The treatment group received ESP instruction through the blended approach, whereas the control group received ESP instruction through the conventional approach. In order to find the effect of the treatment on the participants, both groups were given achievement post-tests.

The results demonstrate a significant statistical difference between final scores of the participants attributed to group variable in favour of students within the treatment group. The mean score of the treatment group on post-test was (7.40), compared to the mean scores (5.46) of the control group. Overall, the performance of the control group on the post-test was weaker than the experimental group. This reveals the positive effect of implementing a blended teaching approach on students' achievement compared to those who studied ESP via the conventional teaching approach. As can be seen in the above tables, all analyses among different offer of the two tests (pretest and post-tests) are significant at the level of 0.05. It means that there is significant interaction among the experimental and control groups in ESP learners' vocabulary learning. Therefore, implementing blended classrooms has significant effects on Algerian students' learning in ESP courses and the first research hypothesis of the study was verified.

**Questionnaire Results:**

The collected data have been quantified (Means, standard deviation, and t-test) and analysed using the SPSS-18 programme to answer research questions as follows:

To address the second research question by finding whether implementing blended classrooms affects Algerian students' attitude in ESP courses, the attitude questionnaire was given to the experimental group. Results of descriptive statistics, including means and standard deviations of the students' answers to the questionnaire's different items, are displayed in Table 3.

As illustrated in Table 3 below, ESP students perceived blended learning as a practical approach that supports them in becoming self-directed and autonomous learners. They believed that using BL enables them to access their educational materials anytime and anywhere easily. On the other hand, students were in agreement with the statement that BL offers efficient and regular guidance and feedback since teachers are available for more one-on-one interaction with students. Thereby, students can ask questions and get immediate targeted answers to complex items. In addition, students acknowledged that BL provides students more opportunities to communicate with each other through social networking communication. Students confirmed that BL courses help them to better comprehend the topic. However, students disagreed that they would not recommend the BL to their colleagues. Students agreed that the BL initiative provides an exciting and motivating atmosphere for learning. It empowers the integration and involvement of students. Students approved that BL allows students have more time for family, friends, and extra-curricular tasks. Students disagreed that they would instead attend a traditional teacher lead course than a blended course. Finally, students disagreed that the BL has not improved the linguistic and professional abilities of the ESP students.

**Table 3:** *Participants' Attitude Toward BL Course*

	<b>Statements</b>	<b>SD (%)</b>	<b>D (%)</b>	<b>U (%)</b>	<b>A (%)</b>	<b>SA (%)</b>
<b>1</b>	BL supports students in becoming self-directed and autonomous learners.	<b>3.3</b>	<b>6.7</b>	<b>6.7</b>	<b>30</b>	<b>53.3</b>
<b>2</b>	BL enables learners to access their educational materials anytime and anywhere easily.	<b>10</b>	<b>3.3</b>	<b>10</b>	<b>33.3</b>	<b>43.3</b>
<b>3</b>	BL offers efficient and regular guidance and feedback since teachers are available for more one-on-one interaction with students. Thereby, students can ask questions and get immediate targeted answers to complex items.	<b>0</b>	<b>3.3</b>	<b>6.7</b>	<b>40</b>	<b>50</b>
<b>4</b>	BL provides students more opportunities to communicate with each other through social networking communication.	<b>0</b>	<b>3.3</b>	<b>6.7</b>	<b>26.7</b>	<b>63.3</b>
<b>5</b>	The BL courses help students to better comprehend the topic.	<b>6.7</b>	<b>3.3</b>	<b>10</b>	<b>23.3</b>	<b>50</b>
<b>6</b>	Students would not recommend the BL to their colleagues.	<b>26.7</b>	<b>50</b>	<b>6.7</b>	<b>3.3</b>	<b>13.3</b>
<b>7</b>	BL initiative provides an exciting and motivating atmosphere for learning. It empowers the integration and involvement of students.	<b>3.3</b>	<b>0</b>	<b>3.3</b>	<b>36.7</b>	<b>56.7</b>



8	BL allows students have more time for family, friends, and extra-curricular tasks.	3.3	6.7	10	20	60
9	Students would instead attend a traditional teacher lead course than a blended course.	30	40	6.66	13.33	10
10	BL has not improved the linguistic and professional abilities of the ESP students.	40	46.7	3.3	6.7	1.3

SD – Strongly Disagree; D- Disagree; U- Unsure; A – Agree; SA- Strongly Agree

Students in the experimental group regard BL as an independent and reliable technique that helps them carry accountability for their own learning. The majority of them assumed that this technique should complement in-class teaching as a blended teaching formula. Moreover, a positive reaction was received in regard to the motivational features of studying at anytime and anywhere using the technology. It encouraged students to study autonomously and strengthened their understanding of the material that they have already studied in a traditional class, as the complementary courses covered similar content. Furthermore, students perceived that this approach could contribute to the learning experience by enabling them to improve their language skills, use and comprehension. Moreover, it enables students to repeat courses without judgment or pressure according to individual differences. It contributed to the development of their knowledge and use of English. Ultimately, the achievement and satisfaction of students in the blended teaching approach were significantly higher than their counterparts in the traditional lectures. Overall, the results demonstrated that most ESP students acknowledged that the blended classroom facilitated their learning. Thus, the experimental group confirmed that implementing blended classrooms positively affects Algerian students' attitudes in ESP courses, and the second research question of the study was verified.

## RECOMMENDATIONS

Based on the prior discussion about implementing blended teaching in ESP courses and the results obtained from this research, it is recommended that the stakeholders in higher education institutions adopt and implement blended learning strategies for all ESP courses to improve students' four skills and overall performance. Furthermore, they should encourage teachers to adopt blended learning strategies. In order to increase students' exposure to the language and to enrich their understanding through audio-visual aids for improving self-paced learning, stakeholders should create forums for all ESP courses

Regarding ESP teachers, they should encourage their students to use English forums to exchange data, practice language and support collaborative learning. Moreover, they should encourage their students to participate in virtual classes and online activities, taking into account designing activities that foster interaction between students and teacher, which will extend the classroom walls and broaden students' knowledge. They also need to stimulate their virtual courses with recordings, pictures and videos. As an attempt to achieve language proficiency and effective performance, students should be provided with immediate feedback in online exercises on several ESP courses. It is also suggested that learning materials should be adjusted in accordance with the individual differences of the learners and tailored to their specific needs.

## CONCLUSION

Blended teaching is a practical approach to attain teaching objectives more effectively in a language course. It provides students with the opportunity to augment and execute their skilled

language and access the course material outside the classroom whenever and wherever they wish. Furthermore, it allows them without judgment or pressure to duplicate lectures. This sort of blended teaching validates the demonstrated improvement of the student learning reported in this study. Incorporating e-learning elements into traditional teaching offers students the prospect of autonomous learning and a highly decentralised knowledge transfer. Findings demonstrate that the blended approach can assist students to become more self-reliant and take responsibility for their own learning. They were motivated to learn technical English and assumed that the blended approach developed their learning and communication skills. The findings showed that language teaching benefits from the inclusion of technology-based instruments in ESP courses. Through establishing a positive attitude in students on the use of ICT's in their classes, it might be said that such a course's contribution to the education system is significant. In light of the current technology-based learning and teaching trend and its new requirements for implementing technology in universities, learners urgently need to create a good attitude towards incorporating technology-based lessons.

Although the current study was carefully designed, it exhibited some limitations, which should be addressed in further studies. Some biases may have influenced the findings. One limitation is that the study included students from only one discipline (computer science) at Mostaganem University in Algeria. Additional studies could be carried out with diverse institutions, age groups, academic/non-academic disciplines, and BL amalgamations. Institutions, budgets, material considerations, and students' learning styles are important factors for future study designs. Moreover, the sample size of the current study was small (N=60). Larger samples and randomly assigned groups may be applied with the inclusion of a delayed interview in future studies. Furthermore, the findings of this study were limited to the overall satisfaction of ESP students in the discipline of computing. Nevertheless, the data pertaining to the average time to answer questions, students' attitudes and motivation levels, and their willingness to participate in interactive communication and tasks in ESP classes may offer significant results for researchers in this field. Longitudinal outcomes of the implementation of the blended teaching approach on students' perspectives could also be analysed to provide more significant insights. Despite these limitations, the researchers have acquired experience in developing a blended course and knowledge regarding the value of the blended teaching approach for creating instructional materials.

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