

Online Classes Versus On-Site: Impact on Algerian Chemistry Students' Motivation

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Abstract

During the period of COVID-19, the world lockdown compelled educational institutions to switch to online teaching. Algeria was no exception as it opted for a blended mode of teaching at tertiary level. Therefore, students were receiving online and on-site lectures including English for Specific Purposes lectures. This unpredictable shift changed the students' learning environment and affected their learning psychology. Then, this research explored the effect of face-to-face and online teaching on university students' affective filter more precisely on motivation using a correlational research design to investigate the relationship between motivation and the learning environment. The sample population consisted of sixteen third year Licence students from the department of chemistry at Djillali Liabes University. They were administered two tests related to motivation, motivation test one and motivation test two. The gathered data were analyzed via the SPSS program. The results revealed that students preferred the virtual classroom, which influenced positively their level of motivation. These findings call for encouraging the use of e-learning environment as being motivational and supportive for the learning process and leading to a better comprehensible input.

Keywords: affective filter; motivation; English for Specific Purposes (ESP); online classroom; on-site classroom.

1. Introduction

During the pandemic of COVID-19, Algerian educators, like their colleagues around the world, were working on new ways of teaching and learning in quarantine. Thus, educational institutions have opted for e-learning within its various ways of applications due to its benefits. It ensured students' safety and learning. Thereby, the Algerian universities have switched all courses and programs to be delivered first solely online, then through a blended mode of teaching. English for Specific Purposes (ESP) in the department of chemistry at the University of Sidi-Bel-Abbes (Algeria) was no exception. Efforts were done to

design web-sites for ESP students where e-courses were available. The ESP teacher, like other teachers was compelled to deliver his/ her lectures both online and on-site, and to create a learning environment where students' emotions, specifically motivation, favors a comprehensible input.

It is worth highlighting that Krashen's (1982) affective filter hypothesis holds that when learners' affective filter is low, the input is received. In other words, a comprehensible input is insured by a low affective filter that consists of high motivation and self-confidence combined with low anxiety of learners. Once these aspects

are met, students can easily understand the elements of a lecture (the input) with fewer psychological barriers.

Being aware of the importance of the affective filter for language learning, the present study focuses on one of its components: motivation, and its relation with the learning environment. As the study was conducted in a blended learning mode, the focus is on the online and the on-site classes, which were the center interest of many studies to find out the effects of these classes on students' motivation. On the one hand, some studies were for the implementation of online teaching to raise learners' motivation as found in Putra's work (2021) which focuses on Google Meet's impact on students' motivation. However, other researchers including Zaitun, Sofian and Harjudanti (2021, p. 263) claimed that "the impact of online learning on student learning motivation tends to be negative" where the case study dealt with junior high school students.

Therefore, the purpose of the current research is to investigate the correlation between university students' motivation and the learning environment in both online class via Udemey platform and on-site classes to find out the most convenient learning environment, which provides a more comprehensible input for chemistry students.

2. Literature Review

The concept of the affective filter dates back to Dulay and Burt (1977). They were the pioneers in this field who viewed that "much key factors of learners' success in language learning should be associated to the student's emotional condition." as cited in Lin and Lin (2008, p. 115). In other words, when learners are dealing with the acquisition of a foreign language, their emotions, which are referred to as the affective filter, can influence their understanding and their grasping of that language.

Few years later, Krashen (1982, p.31) dealt with the affective filter studies and

formulated a hypothesis in which he states "the relationship between affective variables and the process of second language acquisition by positing that acquirers vary with respect to the strength or level of their Affective Filters". Likewise, Wang (2020, p. 983) said that "learners' affective factors should not be ignored and the affective factors also play an important part in the process of learning English". Hence, there is a common agreement on the impact of the learner's affective filter on the success or failure of SLA.

The affective filter includes three main variables that are motivation, self-confidence and anxiety. According to Krashen's hypothesis (1982) they influence SLA in the following way. Firstly, the more the learner is motivated, the better SLA occurs. Likewise the more the learner is self-confident, i.e., the more he has a good self-image, the better he will acquire a second language. Finally, anxiety acts in an opposite way to the two previous factors, i.e., the lower the learner's anxiety is, the better SLA occurs. On the other hand, demotivation, low self-esteem and anxiety describe the high affective filter. Krashen (1982). It would lead to a mental block of the learner's language process acquisition that consequently would threaten the comprehensibility of the input that will automatically block the learner from responding and interacting in the classroom. In the views of Ahdab (2016, p. 121) "The affective filter can be raised or reduced according to the environment that learners are in". In other words, it is tightly related to the context where learners are being exposed to the target language. Consequently, the present study will focus on one of the factors of the affective filter, motivation, which at a high level may constitute a major aid to second or foreign language learning.

According to Cambridge dictionary (2023), the word motivation is defined as "Willingness to do something, or something that causes such willingness". In other words, it is the desire and the want that pushes someone to

reach a specific goal. This feeling can be generated if there are reasons and causes. Besides, Cambridge dictionary (2023) cites other close words to motivation such as “Need, reason and enthusiasm” to start or finish an action. In the views of Oxford Learner’s Dictionaries (2023) motivation is characterized by two important aspects that are “The feeling of wanting to do something”, that is the eagerness and the abstract pushing power, and “especially something that involves hard work and effort”, that is shifting from abstract feeling into concrete behaviors.

In order to provide a precise definition, it is recommended to explore and relate the word motivation to the field of education and psychology, which refers to educational psychology. Accordingly, the American psychologist Gardner (1985), motivation is defined as “The combination of attempt plus desire to obtain the aim of learning the language plus favorable attitudes toward learning the language”. As cited by Alizadeh (2016, p. 11). In other words, motivation occurs when the student possesses the desire to reach a specific learning objective and put on efforts, he or she can be described as a motivated student. Also, a simple definition is dealt with by Svinicki and Vogler (2012, p. 2336) who said that “motivation is used to explain the increase or decrease in the frequency and/or intensity of an individual’s goal-seeking behavior”. Hence, the latter definition highlighted that motivation differs from low or high and from one person to another whether it is intrinsic motivation, “related to a person’s interest in a task or activity, enjoyment, and intrinsic satisfaction” as defined by Çetin (2022, p.1942), or extrinsic one.

The latter type of motivation, the extrinsic motivation is defined by Mertasari, Paraniti and Mahardika (2023, p.130) as “external factors refer to environmental influences, such as reward, social pressure, and punishment”. In other words, the desire, the want and the willingness of studying

is boosted from the outside environment and not from the within. Thereby, students’ external motivation can be highly affected by the learning environment. The present study is interested in the on-site and online learning environments namely as the latter became widely used during the COVID-19 pandemic which imposed the remote networking in various domains among which education.

learning has been implemented as a web-based learning accessible to many resources formats that are not limited to a particular place or time as explained by Javed et. al. (2014, p. 448) “It can be an efficient way of delivering course materials and the resources can be made available from any location and at any time, potential for widening access”. Virtual learning can be applied via different e-tools such as platforms or applications including: Zoom, Google Meet, Coursera and Udemy.

In the broader sense of e-learning, many researches noticed this mode of course delivery affected students’ emotions and consequently their affective filter such as the works of Camacho-Zuñiga (2021) and Gallardo and Matts (2021). In fact, Tran (2013, p. 14) viewed that “technology can be an extremely important factor to motivate students to learn the target language, if used effectively and appropriately”.

The latter is the surroundings where the students learn, study and acquire a foreign language whether on-site or online. Therefore, it would be interesting to see how both online, precisely via Udemy platform, and on-site learning environments affect students’ motivation, consequently the affective filter that allow or block the students’ ability to absorb the input of the ESP course.

3. The Study

The present research was conducted at Djillali Liabes University of Sidi-Bel-Abbes in the department of chemistry. The objective of the study was to investigate the correlation between

motivation and the learning environment with third year chemistry students' in the course of ESP examining the online and the on-site classes. This was done in order to answer the question: Which learning environment is more motivating for chemistry students' when learning English?

3.1 Research Method

This study was based on a correlational research design. According to Stangor (2011) "Correlational research involves the measurement of two or more relevant variables and an assessment of the relationship between or among those variables...the goal of correlational research is to uncover variables that show systematic relationships with each other" as cited in Crawford (2014). Therefore, this research tried to examine the relationship between two variables: learners' motivation and the learning environment. The latter took two forms: online classes during the first semester, and on-site ones during the second semester. Thus, the purpose of the study was to measure students' level of motivation when learning online and on-site.

3.2 Sample Population

The sample population were third year Licence chemistry students at Djillali Liabes University of Sidi-Bel-Abbes (Algeria). It should be noted that there were two specialties in the department of chemistry: analytical and fundamental chemistry. The latter group consisting of sixteen students constituted the sample population of this study. Hence, the convenience sampling, that was a type of the non-probability sampling method, was used "A convenience sample simply includes the individuals who happen to be most accessible to the researcher" McCombes (2022). The 16 participants were adults between 20 and 23 years old whose field of study was chemistry. Since the population were adults, ethical approval was not required. However, all the participants have been previously informed about taking part in the current research for ethical purposes. The

population's curriculum included ESP courses that were the concern of this study.

3.3 Instruments

Two motivation tests were administered to the sample students to investigate the impact of the learning environment on learners' motivation. Both tests were adapted from Gardner's Attitude/Motivation Test Battery (AMTB) model (2004). They consisted of 11 questions that were both open-ended and close-ended ones. The former type of questions were meant to elicit from students explanations about the motivating and the unmotivating ones, while the close-ended questions (based on 6 points likert-scale ranging from 1 strongly disagree to 6 strongly agree) tried to determine the student's position, attitude and reaction. The combination of both types of questions aimed at explaining, illustrating and measuring all aspects of students' motivation. It should be noted that the two tests were similar except that the first one raised items and situations related to online teaching and the second one raised items and situations related to face-to-face teaching.

3.3.1 First Motivation Test

Motivation Test one (MT1) was administered to one group which included 16 students at the end of the first semester of the academic year 2021/2022, after a series of online teaching sessions. This test targeted determining their motivation in the online class.

3.3.2 Second Motivation Test

Motivation Test two (MT2) was administered to the same sample after the on-site sessions at the end of the second semester. It aimed at measuring students' motivation in the traditional classroom.

3.4 Research Procedure

This research was undertaken during the academic year 2021-2022. It was the period when the COVID-19 pandemic occurred and

transformed the on-site courses into online ones. In fact, the ESP courses were delivered online to the sample students during the first semester then on-site class in the second semester. The online sessions relied on delivering lectures via a learning platform: Udemy. The latter online teaching platform is defined to be a “platform that allows instructors to build online courses on their preferred topics. Using Udemy's course development tools, they can upload videos, PowerPoint presentations, PDFs, audio, ZIP files and live classes to create courses. Instructors can also engage and interact with users via online discussion boards” as Bilim (2023) denoted. This platform is characterized by the advantage is that “There is no fee to open or to maintain an instructor account” Udemy official web page (2023).

In fact, the online syllabus was designed according to the students' Needs Analysis that was previously undertaken. It included three main units and each unit was composed of two lectures shaped in the form of two main videos, a theoretical and a practical part. These video courses were joined with the option of being downloadable and transcribed the content visually and being asynchronous characterized it by flexibility. Other files were joined to each lecture as PDF files, You Tube links and web-sites as extra-sources of information related to the course content, chemistry, and motivational videos related to their psychology when learning. The teacher-students and the students-students contact was possible via using e-mails and a collective Facebook group to share and exchange the updates. At the end of these online sessions students were administered the first motivation test MT1.

Afterwards, the on-site sessions, which were based on teaching face to face in the university classrooms and laboratories, took place during the second semester. Accordingly, the on-site syllabus was built in parallel to the online one in terms of unit numbers, timing and structure. It

was composed of three main units too. Besides, the six lectures were presented using handouts, whiteboard and experiments. Thus, students were able to work in pairs, groups and make presentations using laboratory materials and chemical substances in English. According to the university timetable, one hour per week was devoted the English course. Finally, MT2 was administered to the same sample students to measure their motivation during these on-site sessions.

4. Data Analysis

This section is devoted to analyze the findings in order to answer the following research question and test its corresponding hypotheses

Which learning environment is more motivating for chemistry students' when learning English?

H1: The online learning environment is more motivating than the on-site one for chemistry students.

H0: There is no significant difference between online and on-site learning environments for chemistry students' motivation.

Accordingly, proving or rejecting the hypotheses requires a comparison of the Mean variable of both cases of the same sample. Besides, the statistical results rely on student t-test unilateral for the same sample, i.e, student t-test associated with two-paired sample as the most relevant test in this case to analyze the data gathered from both tests, (MT1) and (MT2).

In fact, these tests were based on scale that included 09 items related to motivation. Both of them were analyzed by counting the standard deviation and the Mean, which is the average of its constituent elements for each individual using the SPSS.V.25. Özer (2019) undertakes a similar way of analysis. The SPSS is defined by Nagaiah and Ayyanar (2016, p.1) as “A Windows based program that can be used to perform data entry and analysis and to create tables and graphs. SPSS is capable of handling large amounts of data. SPSS is commonly used in the Social Sciences”.

5. Results

The current research results are divided into two main sections: descriptive statistics and statistical tests results. The former section allows the comparison of the Mean for both online and on-site classes within the same sample. The second section relies on Wilcoxon test for each item of motivation, which presents the results of the 09 items in details and separately. Followed by the student t-test unilateral for the same sample. Both tests are preceded by the normality test as being a

requirement. Both tests findings are compared with the probability value, p-value, which indicates that if the calculated p-value is greater than 0.05 significant level, the null hypothesis is accepted.

5.1 Descriptive Statistics

Although the motivation scale was composed of 6 elements of ordinal measurement arrangement, the estimate of the measure as a whole, the overall Mean, gave a quantitative variable included within the interval measurement as shown in table 01.

Table 1 Descriptive Statistics of Motivation Scale

	Mean	Q1	Median	Q3	Std-Dev	Min	Max
Online Semester	4,5764	3,694	4,7778	5,333	0,828	3,22	5,67
On-site Semester	3,5347	3,138	3,5	4	0,803	2,11	5,22

Q1: First quartile: One quarter of the population: 25 %

Median: Two quarters of the population: 50%

Q3: Third quartile: Three quarters of the population: 75 %

The descriptive statistics indicated that on the one hand, in the online classes, the Mean was described as 'Moderately Agree' which is 4,57. Thus, students were generally motivated. In addition to that, the majority of students (75%) were considered closer to 'Moderately Agree' as indicated by the third quartile (Q3 = 5,333). On the other hand, in the on-site classes, there was a significant difference in students' level of motivation if compared to the online classes because the Mean was within 'Slightly Agree' (Mean = 3.53), and 75% of students were considered as 'Slightly Agree' (Q3= 4). As a result, the difference between the two Means was 1.05, which seems to be a significant difference. Therefore, the difference will be checked through the t-test.

According to the two open-ended questions delivered to the students, the same results are found and justified. In fact, students have mentioned the reasons behind selecting and being more interested and motivated to study online to on-site. It is due to the students' preferences that are shaped in: Firstly, encouraging group work and pair work chats and exchanging messages and e-mails was effective due to many reasons including sharing similarities as age, interest, learning styles and their usualness of using digital tools daily. In addition to the teacher's intentional motivational verbal and none-verbal communication joined with less direct and public critics. Moreover, the use of famous motivational quotes at the end of each course and at the beginning of the practical course side, tasks and activities, boosted students to do better and work harder. Finally, the choice of the e-learning tool, Udemy platform, is considered to be a motivational tool selected according to learners' preferences via a high quality animated videos with the ability of being saved. The research

concluded that these strategies and techniques impacted the current research results positively in the online class over the on-site.

The result of the standard deviation was described as being a small value if compared with the two Means, online = 4,5764 and on-site = 3,5347. It indicated that there is little discrepancy between the participants regarding their level of motivation. Hence, the results of the standard deviation in both classes referred to the uniformity and the homogeneity of the sample.

5.2 Statistical Tests Results

The statistical tests results included the results of three tests. First, the normality test was applied

through Shapiro-Wilk test as required by both of the Wilcoxon test and the student t-test. Then, the motivation components of the two cases were compared using Wilcoxon test results for each item of motivation scale. Finally, a t-test, to compare the overall motivation.

5.2.1 Normality Test

The t-test was a parametric test that required the normal distribution of the data subject. Since the size of the sample was fewer than 30, it was necessary to conduct normality test: Shapiro-Wilk test. The result of this test is shown in table 02.

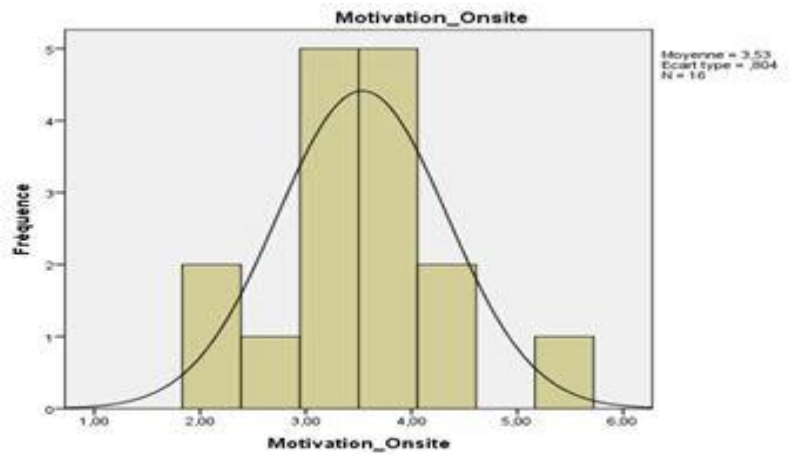
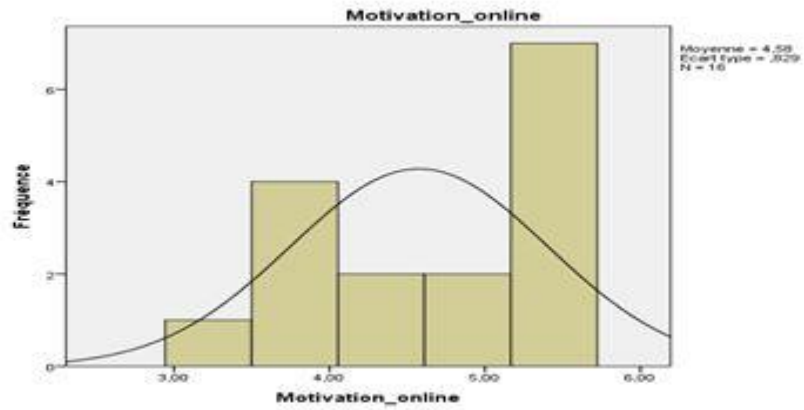
Table 02 Normality Test for Motivation Scale

	Shapiro-Wilk test	
	S-W statistic	p-value
Online Semester	0,220	0,052
On-site Semester	0,112	0,951

The normality test indicates that the p-value is greater than the 5% significant level in both tests, which means that motivation is naturally

distributed in both classes.

Figure 1 Histogramme of Motivation Scale



The results are also supported by figure 1, which represents the probability distribution. It indicates a symmetrical distribution centered on the Mean.

Since the components of the motivation test were ordinal data ranking from 1 to 6, the most appropriate statistical test to compare students' level of motivation was Wilcoxon signed rank test for paired samples in which it analyzed each item of motivation separately (Table 3).

5.2.2 Tests for Each Item of Motivation Scale

Table 3 Wilcoxon Test Results for Each Item of motivation Scale

	Online vs On-site		Decision
	W-statistic	p-value (One-tailed test)	
Item1	-0,238	0,812	No difference
Item2	-0,319	0,750	No difference
Item3	-2,910	0,004	Online
Item4	-2,886	0,004	Online

Item5	-0,921	0,357	No difference
Item6	-1,862	0,063	No difference
Item7	-0,406	0,685	No difference
Item8	-0,984	0,325	No difference
Item9	-3,557	0,000	Online

No difference: the null hypothesis is accepted

Online: the null hypothesis is rejected at 5% level of significance

The table 02 shows that there is no significant difference in students' level of motivation regarding the elements: 1, 2, 5,6, 7, and 8, but for elements: 3, 4 and 9 the results show that students are more motivated and inspired when learning virtually if compared to the classroom at a significance level of 5%. Indeed, this is confirmed by the open-ended question, which searched for the aspects that raised students' motivation. Firstly, most of them enjoyed being responsible for their learning in organizing their own learning via the platform, depending on their understanding abilities and following their personal methods such as: watching the videos many times, reading the transcriptions of the video course or using notes and relying on listening. Secondly, what made learners more motivated in the online sessions over the on-site ones is their ability to select the course timing .i.e., whenever they had the desire to study and the timing they feel enthusiastic, they could find the course. Most importantly, their desired learning time changes from one student to

another, but the e-class solved the problem of timing and absences since this e-learning was asynchronous one. Besides, the students' location did not stand as a problem to attend the course any more. In addition to that, the majority of students enjoyed the teacher's e-learning style using Udemy platform and the digital tools such as computers, phones or laptops as they are considered to be a digital generation. Finally, the students' usual environment, their home, affected most students positively and their motivation was higher than in the classroom. The later can be described as relaxing and less strict if compared to the traditional classroom at the university.

5.2.3 T-test Results

Approving the normal distribution requirement allowed the paired samples t-test to compare the Mean of the students' motivation in both semesters. The results are shown in table 4. As the results of the t-test indicate, the p-value probability value is smaller than the 5% (0.05) significance level, which means that the null hypothesis is rejected and the alternative hypothesis, H1: the students are more motivated in the online learning environment over the on-site one, is accepted and proved.

Table 4 Paired T-test Results

	Mean	Std.dev	95% Confidence Interval		t-statistic	df	p-value (One-tailed)
			Lower	Upper			
Mean Difference	1,04167	1,03984	- 0,4875	1,5957	4,007	15	0,001

Therefore, the difference between the two Means has a significant difference at the level of 5%. Consequently, the e-learning method effected the students' level of motivation positively. In fact, the results proved that the students were more motivated to learn online than on-site.

6. Discussion

The two tests results are derived from comparing the Mean of (MT1) motivation in the online class, and (MT2) motivation in the on-site class. The interpretation of these tests findings led to extract the students' motivation levels when learning in both environments relying on both the descriptive statistics and the statistical tests results.

Descriptive statistics compared the Mean of each class: the online class Mean was 4.57 and the on-site class one was 3.53. Hence, this analysis shows that students' motivation in the online class was higher than the on-site one. In fact, these findings are also proved by the student t-test results that indicate a higher level of motivation in the online class if compared with the on-site. In other words, the p-value (probability value) is lower than the 5%, 0,001, which is a significant level. This means that the first hypothesis (H1) is confirmed, and the null hypothesis (H0) is rejected, i.e., the online learning environment is more motivating than the on-site one for chemistry students.

7. Conclusion

The shift to online and blended learning during the pandemic of COVID-19 raised the core interest of this study that is inquiring about the relationship between the learning environment and students' affective filter precisely motivation. The correlational research played a key role in providing an answer to the research question highlighting that students were motivated in both ways of learning, nonetheless, the majority of them showed enthusiasm when learning English online in comparison with the traditional

classroom. Thus, motivation is a psychological factor that proved to be higher in the virtual classroom.

Indeed, both descriptive statistics and statistical test results revealed that the online learning environment had a higher effect and a positive impact on learner's motivation in the sense that this type of learning relied on students' preferences, and therefore raised their interest in learning. Besides, the teachers' implemented e-classroom techniques and strategies provided students with a large number of e-opportunities, which accommodated their needs and pace of learning. Moreover, it solved the problem of location. Then students were in a better psychological state, which increased their motivation and lowered the affective filter providing a favorable environment for comprehensible input.

Among the current research limitations, the limited time frame and number of participants. Thereby, this research calls for expanding the sample size. Furthermore, other psychological aspects such as anxiety and self-confidence can be studied as being other important variables of the affective filter as highlighted by Krashen's affective filter hypothesis.

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9. Appendices

9.1 Appendix 01: Motivation Test 01 (MT1)

Dear third year chemistry students,
This test is a part of a research that targets detecting the effects of online learning on your motivation. I would be thankful if you respond to the suggested questions. Please, tick the answer that you feel more relevant to you, or give a full answer when required.

1. Complete the table using '√' when appropriate.

Expressions	SD	MD	SD	SA	MA	SA
1. I have a strong desire to learn in an online class using digital tools: PC, tablets or mobile.						
2. I keep up to date with English by checking my online class regularly.						
3. I love being responsible about my studies.						
4. I really enjoy selecting my preferable time and location.						
5. I would really like to select my learning methods: Pdfs, Audios, Videos, PPT or YouTube.						
6. I have a great wish to control the speed of the lesson.						
7. It would bother me to control the technical problems: Internet, account...						
8. I have little interest to do an online exam via Testmoz platform.						

9. My teacher of English has a dynamic and interesting online teaching style.						
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(SD= Strongly Disagree, MD= Moderately Disagree, SD= Slightly Disagree, SA= Strongly Agree, MA= Moderately Agree, SA= Strongly Agree)

Participation noted with thanks

9.2 Appendix 02: Motivation Test 02 (MT2)

Dear third year Fundamental chemistry students,

- 2. The aspects that made me feel unmotivated during the online session were:.....
- 3. The aspects that made me feel motivated during the online session were:.....

The present test is a part of a research that targets detecting the effects of traditional classroom on your motivation. I would be thankful if you respond to the suggested questions. Please, tick the answer that you feel more relevant to you, or give a full answer when required.

1. Complete the table using '√' when appropriate.

Expressions	SD	MD	SD	SA	MA	SA
1. I have a strong desire to study in an on-site class and face to face with the teacher.						
2. I look forward to attend my English class at the university.						
3. It bothers me to follow the teacher and the administration regulations'.						
4. I am losing my desire of learning when I face an imposed time and place.						
5. I enjoy learning using hand-outs.						
6. I would spend more than 1 hour for each course.						
7. It would bother me to manage accessibility problems as preferred timing and unavailability of classes, laboratories and materials.						
8. I have little interest to do exams using the exam sheets.						
9. I do not think that my teacher of English is very good in class.						

(SD= Strongly Disagree, MD= Moderately Disagree, SD= Slightly Disagree, SA= Strongly Agree, MA= Moderately Agree, SA= Strongly Agree)

- 2. The aspects that made me feel unmotivated during the on-site session were:.....

- 3. The aspects that made me feel motivated during the on-site session were:.....

Participation noted with thanks