

On the Digital Turn: Ensuring Continuity of Education via Moodle Platform during the Coronavirus Pandemic

نحو المنعطف الرقمي: ضمان استمرارية التعليم عبر منصة مودل أثناء جائحة فيروس كورونا

Fouad BOULKROUN^{1*}, Amirouche BOUCHELAGHEM², Aissa BOULMERKA³

¹ University Centre of Mila, f.boulkroun@centre-univ-mila.dz

² University Centre of Mila, amirouche.bouchelaghem@centre-univ-mila.dz

³ University Centre of Mila, a.boulmerka@centre-univ-mila.dz

Date of receipt: 2021-02-26 Date of revision: 11/07/2021 Date of acceptance: 2021-10-21

Abstract

Ever since social distancing measures got implemented during the Coronavirus pandemic, educational institutions got stuck midway in the academic year because of closures. In order to ensure continuity of education, the Ministry of Higher Education started looking for a way out. No wonder, it took advantage of the digital turn as an outlet; Moodle e-learning platform was thereby embraced, together with other digital tools, to make sure no student is left behind.

The present study aims to investigate the use of Moodle e-learning platform and educational continuity. Specifically, it seeks to explore the relation between receiving training in Moodle and concomitant pedagogical activities, namely uploading lectures and conducting assessment, which are quintessential in any pedagogical work. For this to obtain, five research questions were raised along with five corresponding hypotheses. An online questionnaire was administered via Google Forms to teachers at the University Centre of Mila; eventually, 123 subjects took part in the study. The raw data were submitted to a *Chi-square Goodness of Fit test* and a *Chi-square of Independence test* using *IBM SPSS 26*. The results were statistically significant for the former test, which is not true of the latter. Limitations, implications and recommendations are thus discussed.

Keywords: *Closures, Coronavirus, continuity of education, Moodle, social distancing, training.*

ملخص

منذ أن تم تنفيذ تدابير التباعد الاجتماعي أثناء جائحة فيروس كورونا، تعطلت المؤسسات التعليمية في منتصف العام الدراسي بسبب الإغلاق. من أجل ضمان استمرارية التعليم، بدأت وزارة التعليم العالي في البحث عن مخرج، حيث استفادت من المنعطف الرقمي بتبني منصة مودل (Moodle) للتعليم الإلكتروني، إلى جانب وسائل رقمية أخرى، قصد التواصل مع كافة الطلبة.

تهدف الدراسة الحالية إلى التحقق من استخدام منصة مودل للتعليم الإلكتروني من أجل استمرارية التعليم. على وجه التحديد، تسعى إلى استكشاف العلاقة بين تلقي التدريب في مودل والأنشطة البيداغوجية المصاحبة، أي تحميل المحاضرات وإجراء التقييم، كونها جوهرية في أي عمل بيداغوجي. تم طرح خمس أسئلة بحثية و خمس فرضيات. أُجري استبيان عبر الإنترنت عبر نماذج جوجل (Google) لفائدة أساتذة المركز الجامعي لميلة حيث شارك 123 أستاذًا في الدراسة. تم استخدام اختبار مربع كاي لجودة التوفيق واختبار مربع كاي للاستقلالية على SPSS 26. بينما كانت النتائج ذات دلالة إحصائية للاختبار الأول، لم تكن كذلك بالنسبة للاختبار الثاني. في الأخير، تمت مناقشة القيود والآثار والتوصيات.

الكلمات المفتاحية: الإغلاق، الكورونا، استمرارية التعليم، مودل، التباعد الاجتماعي، التدريب.

* Corresponding Author: Fouad Boulkroun, Email: f.boulkroun@centre-univ-mila.dz

1. INTRODUCTION

The latest challenge that humanity has faced to date is the Coronavirus (COVID-19) pandemic. Because of the implemented social distancing measures and the accompanying closures, universities got caught midway through the academic year. In order to ensure continuity of education, the Ministry of Higher Education in Algeria took advantage of what technology offers. Specifically, Moodle e-learning platform has been adopted, but this was not to the exclusion of other digital tools; ideally, it is hoped that no student is left behind. This way, it is mandated that work be done from home, urging universities to shift to online teaching and learning.

The current agenda of the Algerian educational policy is prioritising the implementation of technology, which is making its way into education at a rapid pace. Never before has the Algerian university witnessed such a situation, a situation characterised by an unprecedented transformation to the digital making virtual education a reality. In fact, even before the pandemic, there was a huge demand for methodologies and technologies for e-learning, but such a demand is now increasing in a noticeable way.

There are, at present, many providers of e-learning, many of which are open source. A good case in point is Moodle, which is arguably a potentially viable competitor to commercial software, meeting a growing interest worldwide. It is an important resource for higher education, and it

proved even more so in times of the current crisis. It cannot be denied that it is a virtual solution for educational problems, and for this reason the University Centre of Mila has made recourse to it – besides others.

This study is, then, an attempt to explore the use of Moodle as a virtual learning environment for educational continuity. This is done through determining the relation or the lack thereof between receiving training in Moodle and concomitant pedagogical activities, namely uploading lectures and conducting assessment. For this situation to obtain, a number of research questions are raised, which are then converted into working hypotheses to be tested using the appropriate statistical test.

2. LITERATURE REVIEW

2.1. Social Distancing Measures during the Coronavirus Pandemic

The Coronavirus (COVID-19) outbreak was declared a pandemic on March 12, 2020 by the World Health Organization (Viner et al., 2020). In Algeria, the first case of the epidemic was confirmed on February 25th, 2020. Ever since the outbreak, preventive measures have been implemented everywhere across the world and Algeria was no exception.

Countries worldwide have struggled to control the Coronavirus pandemic by implementing social distancing measures. These are twofold: *individual social distancing measures* (e.g., isolation of cases, stay-at-home recommendations, quarantine of contacts, etc.) and *group social distancing measures* (e.g., closure of educational institutions, workplace closures, mass gathering cancellations, and the like) affecting many people at once (see the European Centre for Disease Prevention and Control (ECDC), 2020).

In education, the impact of the Coronavirus lockdown is, it goes without saying, unprecedented. A great many countries have implemented nationwide closures, impacting most if not all of the world's student population. In Algeria, the implemented social distancing measures via closures of educational institutions were initiated by mid-March, 2020. If the truth be told, notwithstanding the harms, social distancing measures have *not suspended* teaching/learning activities; this is due to what digital platforms offer. That is, as educational institutions mandated that work should be done from home, universities have shifted to the digital.

2.2. Virtual Learning Environments and Continuity of Education

The use of the term *social distancing* is rather confusing. Actually, it is *physical distancing* that we should be after, not *social distancing* proper. It is possible to reduce *physical contact* while maintaining *social connections* at distance through the use of *Virtual Learning Environments* (VLEs), software used to aid the teaching/learning process (Weller, 2007).

UNESCO (2020) recommended the need for *distance teaching* and *learning*, which has a potential for helping schools and teachers to reach learners *virtually* and make the educational process less disrupted. In Algeria, many educational institutions started working already, making the

transition to VLEs a reality. Doubtless, being stuck in the academic year made *distant* education now, more than ever before, a necessity. For instance, ever since the outbreak, teachers in the University Centre of Mila started connecting pedagogically with students and administratively with their departments through different VLEs. As such, teachers, students, and the administrative staff could keep abreast of educational concerns.

This unprecedented transformation to the digital is now well underway and the pandemic has contributed in making it more glaring; the pandemic has also made the demand for VLEs, including Moodle, even more increasing. We are witnessing what might be the future of education.

Actually, even long before the Coronavirus (COVID-19) pandemic became endemic, it was difficult to pursue teaching/learning practices in a total absence of technology, namely Information and Communication Technologies (ICTs, henceforth). It might be true that if Moodle and other virtual platforms were used as a *complement* to the classroom lessons before the outbreak, they are rather used as a *replacement* during the lockdown.

2.2.1. What is Moodle?

Moodle refers to Modular Object-Oriented Dynamic Learning Environment (Henrick & Holland, 2015). It is a web-based software package allowing an environment in which educational programmes can be pursued. More precisely, it is a VLE used for teacher-student online communication. It allows teachers and students to pursue their regular pedagogical activities in a virtual way. Henrick and Holland explained that:

Teachers can simply create content in Moodle using the accessible text editor or upload files, learning objects, and multimedia into the Moodle course including embedding third-party content such as SlideShare, YouTube, and other social systems into the pages of the course. (2015: 2)

Moodle is used by private and public educational institutions, without excluding non-profit organisations, governmental bodies, training companies, and healthcare facilities (Hollowell, 2011). It is an Open Source Software (OSS), the world's most widely used course management platform accessible for all and downloadable for free (Henrick & Holland, 2015).

2.2.2. Moodle: Different Names, Different Functions

There is to date a wide range of acronyms, each suggesting Moodle to belong to their group: Moodle is said to be a *Virtual Learning Environment (VLE)*, a *Learning Management System (LMS)*, a *Course Management System (CMS)*, a *Content Management System (CMS)*, a *Learning Content Management System (LCMS)*, a *Curriculum and Information Management System (CIMS)*, a *Managed Learning Environment (MLE)*, a *Learning Support System (LSS)*, and a *Learning Platform (LP)* (Hollowell, 2011; Weller, 2007). Different as these categories are, there are arguably a number of similarities that they share, one of which being the fact that most of them are used to create and maintain online learning environments. As put by Hollowell:

Two of the most widely used categories of systems that are used to describe Moodle, LMSs, and VLEs, are often used interchangeably, although the term LMS is generally used to describe a system of wider scope that includes the ability to perform administrative tasks involved in education such as reporting, documenting, and analyzing. (2011: 6)

2.2.3. Why Moodle?

Moodle is identified by several studies as the platform mostly used in higher education and this is not without a reason (Paulsen, 2003; Alexander, 2006; Al-Ajlan & Zedan, 2008). It is designed around an educational philosophy or pedagogical principles which make it special. Al-Ajlan and Zedan (2008) put it this way: “The key to Moodle is that it is developed with both *pedagogy* and *technology* in mind” (p. 60). This platform is based on a social constructivist approach to learning, inspired by

educational theorists, namely Vygotsky. It uses the possibilities offered by the Internet for users to work collaboratively on projects. The approach is learner-oriented in philosophy, meaning that learners are actively involved.

The benefit of basing one’s teaching on a learning theory is the fact that in planning the structure of the course, we can make the course design most likely in keeping with the overall learning objectives. The idea of an educational philosophy does not suggest that Moodle offers one way of teaching; on the contrary, teachers/learners can pursue various avenues to

teaching/learning, which is another advantage of this VLE (Nash & Moore, 2014). It is so flexible that it offers different choices for constructing a course. Users can interact via message boards, chats, and discussion forums.

2.2.4. Comparing Moodle to other VLEs

Al-Ajlan and Zedan (2008) conducted a comparative study between Moodle and nine other VLEs, in an attempt to determine their strengths and weaknesses and eventually to discover the best platform that would meet the requirements of Qassim University. Their study was based on the *features and capabilities* of VLE tools and on their *technical aspects*. The platforms were OSS and commercial. Regarding the features and capabilities, Moodle and Sakai proved to be the best platforms; as regards the technical aspects, again Moodle scored high. The authors obtained results in favour of Moodle and strongly recommended it as the best choice for higher education.

2.2.5. Moodle on the Defensive: The Issue of Training

Despite Moodle's flexibility and cost saving features, it is subject to some limitations (Al-Ajlan & Zedan, 2008). It is complex for normal users who happen to be mostly students and teachers; these need ICT experts to guide them. As put by Al-Ajlan and Zedan (2008): "Moodle will work, but not by itself. If there is not a course administrator that can work with both teachers and technicians in creating on-line materials, then Moodle will remain an empty shell, like a good aircraft but with no pilot" (p. 60). Given the foregoing, one might well ask: how can Moodle users be comfortable using its tools? The answer is quite simple; teachers as well as students should receive some *training* so as to induce comfort and usability.

3. METHODOLOGY

3.1. Context

During the COVID-19 pandemic which keeps pushing without coming to an end, social distancing measures have been implemented; these include, among others, closure of educational institutions. This study aims at investigating the way this impacts university teachers and whether the use of Moodle as a VLE contributes in preventing suspension of education and in

ensuring continuity thereof instead. More specifically, it aims at determining whether or not prior training in the use of Moodle constitutes a factor. This requires an investigation into the relation, if any, between receiving training in Moodle and using it for follow-up teaching and assessment practices.

3.2. Research Questions and Hypotheses

In pursuit of the foregoing aims, and for the above situation to obtain, a number of *research questions* are raised: (1) What is the proportion of teachers who received any training in the use of Moodle platform? (2) What is the proportion of teachers who uploaded their lectures to the e-learning platform? (3) Is there a relation between receiving training in Moodle or the lack thereof and uploading lectures on the platform? (4) What is the proportion of teachers who conducted assessment activities on Moodle platform? (5) Is there a relation between receiving training in Moodle and doing assessment?

These research questions translate into the following *hypotheses*:

H_1 = The proportion of teachers who received training in the use of Moodle platform is different from the proportion of those who did not.

H_0 = *The null hypothesis would be that the proportions are the same.*

H_2 = The proportion of teachers who uploaded their lectures to the e-learning platform is different from the proportion of those who did not.

H_0 = *The proportions are the same.*

H_3 = There is a relation between training in Moodle or the lack thereof and uploading lectures on the platform.

H_0 = *There is no relation between training in Moodle and lecture upload.*

H_4 = There is a difference in the proportion of teachers who conducted assessment activities on Moodle platform and teachers who did not.

H_0 = *The proportions of teachers are the same.*

H_5 = Receiving training in Moodle and giving assessment are related.

H_0 = *Receiving training and giving assessment are not related.*

3.2. Participants

The sample of this study consists of 123 teachers, all from Abdelhafid Boussouf University Centre of Mila. Although demographic information is in no way of direct relation to the purpose of the present research, it is thought that it might serve the curious reader. The total number divides into 52 (or 42.3%) male and 71 (or 57.7%) female teachers. Of note, the respondents belong to three institutes, namely the Institute of Letters and Languages, of Mathematics, and of Economy.

3.3. Procedure

3.3.1. Instrument

An online structured questionnaire was used to collect data from the participants via Google Forms. It may be worthwhile to indicate that originally the administered questionnaire was constructed in such a way as to inform administrative questions, so it included more questions than reported here. As such, because several items are of no relevance to the present study and its aims, they are excluded from further consideration.

3.3.2. Analysis

The set variables are nominal, otherwise called categorical. The questionnaire items are dichotomously responded to as ‘yes’ or ‘no’, and the data are coded as 1 or 0. With the exception of the last item, no other missing data are registered. To answer the research questions and test the set hypotheses, the raw data are computed using the Statistical Package for the Social Sciences (*IBM SPSS*) software (version 26). Doubtless, the *Chi-square test* is the appropriate hypothesis-testing tool since the variables in the present study are said to be *nominal*. The type of Chi-square used will, of course, depend on the hypothesis under investigation.

On the one hand, the raw data are submitted to a *Chi-square test for Goodness of Fit*, where necessary, to compare the counts of cases and to test

the difference between the categories; that is to say, the aim is to determine if the proportions are equal. On the other hand, the data are submitted to a *Chi-square test for Independence*, depending on the hypothesis in question, to determine the likelihood of a relationship between each two variables. Put

otherwise, since the study seeks, partly, to determine if any two variables are related, the *Chi-square test for Independence* is the one to be used.

4. RESULTS AND DISCUSSION

For reminder purposes, 123 university teachers took part in the present study by answering an online questionnaire. When asked whether they received any training in Moodle, 79.7% of the respondents answered in the positive whereas 20.3% answered in the negative (see Table 1a below). As regards the question of whether they uploaded the courses on the digital platform, 92.7% indicated that they did, while only 7.3% did not perform any upload (see Table 1b below). Insofar as assessment is concerned, 86.2% revealed that they did not attempt any sort of online assessment as opposed to 13.0% who did (see Table 1c below); of note, a missing value was recorded regarding the question on assessment: one participant, translating into 0.8%, did not contribute any answer. On the whole, most of the sample did receive training on the use of Moodle, on which they uploaded their courses for use by their students; this is not true of assessment.

Table 1. Summary Frequencies

a. Training		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	20.3	20.3	20.3
	Yes	98	79.7	79.7	100.0
Total		123	100.0	100.0	
b. Course Upload		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	7.3	7.3	7.3
	Yes	114	92.7	92.7	100.0
Total		123	100.0	100.0	
c. Assessment		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	106	86.2	86.9	86.9
	Yes	16	13.0	13.1	100.0
Total		122	99.2	100.0	
Missing	System	1	.8		
Total		123	100.0		

Hypothesis 1

So as to put the first hypothesis to the test and answer the respective research question (i.e. determining if the counts in the two categories are

equal), a *Chi-square test for Goodness of Fit*, comparing the proportion of teachers with respect to receiving training in the use of Moodle, was used. The test indicated a significant difference between those who did (98 out of 123) and those who did not (25 out of 123), $\chi^2 (1, n = 123) = 43.325, p < .05$ (see Tables 2a&b below). The Sig. value of .000 is smaller than alpha (.05), so we can conclude that the result is significant i.e. there is statistical evidence to reject the null in favour of the alternative hypothesis.

Table 2a. Frequencies

	Training		
	Observed N	Expected N	Residual
No	25	61.5	-36.5
Yes	98	61.5	36.5
Total	123		

Figure 2. Pie Chart Displaying Frequencies of Training

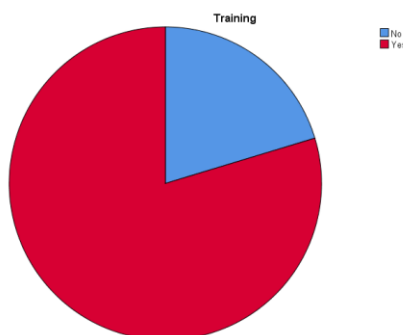


Table 2b. Chi-Square Test

Test Statistics	
	Training
Chi-Square	43.325 ^a
Df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 61.5.

Hypothesis 2

The participants were asked whether they uploaded their lectures to the e-learning platform in an attempt to answer the second research question

and obtain evidence for the concomitant hypothesis. A *Chi-square test for Goodness of Fit* was conducted, indicating a significant difference between those who uploaded lectures (114 out of 123) and those who did not (9 out of the total), $\chi^2(1, n = 123) = 89.634, p < .05$ (see Tables 3a&b below). Given that the Sig. value of .000 is smaller than alpha (.05), the result is significant in that there is statistical evidence to reject the null.

Table 3a. Frequencies

	Observed N	Lecture Upload	
		Expected N	Residual
No	9	61.5	-52.5
Yes	114	61.5	52.5
Total	123		

Figure 3. Pie Chart Displaying Frequencies of Lecture Upload

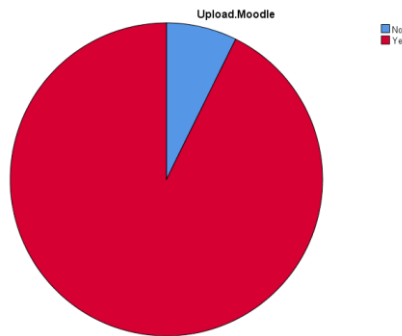


Table 3b. Chi-Square Test

Test Statistics	
	Lecture Upload
Chi-Square	89.634 ^a
Df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 61.5.

Hypothesis 3

The third research question is meant to determine whether there is a relation between receiving training in Moodle and uploading lectures on the platform. For this to obtain, the *Chi-square test for Independence* (with Yates' Continuity Correction; see Field, 2013), was used indicating no significant association, $\chi^2(1, n = 123) = 1.01, p > .05$ (see Table 4c below). Stated otherwise, the two events appear to be independent of one another.

The Sig. value is .31, but because we have a 2 by 2 table that has one cell with an expected count less than 5, we should consider reporting Fisher's Exact Probability Test instead; this is .38, respectively. Again, the result is *not* significant. Given the test results, we will not analyse further the difference between the observed and the expected frequencies (see Table 4b below) to determine the *strength* of the relationship between the two variables; we will not as well report *Phi* coefficient.

Table 4a. Case Processing Summary

Cases	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Training * Upload Moodle	123	100.0%	0	.0%	123	100.0%

Table 4b. Training * Upload.Moodle Crosstabulation

		Upload.Moodle		Total
		No	Yes	
No	Count	3	22	25
	Expected Count	1.8	23.2	25.0
	% within Training	12.0%	88.0%	100.0%
	% within Upload.Moodle	33.3%	19.3%	20.3%
	% of Total	2.4%	17.9%	20.3%
	Standardised Residual	.9	-.2	
Training Yes	Count	6	92	98
	Expected Count	7.2	90.8	98.0
	% within Training	6.1%	93.9%	100.0%
	% within Upload.Moodle	66.7%	80.7%	79.7%
	% of Total	4.9%	74.8%	79.7%
	Standardised Residual	-.4	.1	
Total	Count	9	114	123

Expected Count	9.0	114.0	123.0
% within Training	7.3%	92.7%	100.0%
% within Upload.Moodle	100.0%	100.0%	100.0%
% of Total	7.3%	92.7%	100.0%

Figure 4. Bar Chart Displaying Frequencies of Training vs. Lecture Upload

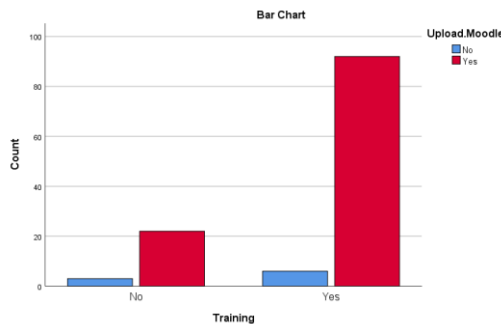


Table 4c. Chi-Square Tests

	Value	Df	Asymptotic Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.015 ^a	1	.314		
Continuity Correction ^b	.333	1	.564		
Likelihood Ratio	.904	1	.342		
Fisher's Exact Test				.386	.266
Linear-by-Linear Association	1.006	1	.316		
N of Valid Cases	123				

a. 1 cell (25.0%) has expected count less than 5. The minimum expected count is 1.83.

b. Computed only for a 2x2 table

Hypothesis 4

To answer the fourth research question and obtain evidence for the corresponding hypothesis, the sample of teachers were asked whether they conducted assessment activities on Moodle. A *Chi-square test for Goodness of Fit* was conducted, indicating a significant difference between those who assessed their students (16 out of 122) and those who did not (a total of 106), $\chi^2 (1, n = 122) = 66.393, p < .05$ (see Tables 5a&b below). Given that the Sig. value is .000 i.e. smaller than alpha (.05), the result is significant meaning that there is statistical evidence to reject the null hypothesis.

Table 5a. Frequencies

	Observed N	Assessment	
		Expected N	Residual
No	106	61.0	45.0
Yes	16	61.0	-45.0
Total	122		

Figure 5. Pie Chart Displaying Frequencies of Assessment

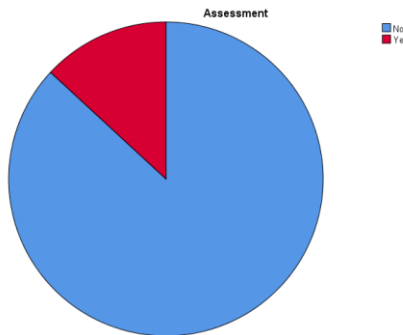


Table 5b. Chi-Square Test

Test Statistics	
	Assessment
Chi-Square	66.393 ^a
Df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 61.0.

Hypothesis 5

Moving to the fifth research question and the respective hypothesis, namely the relation or the lack thereof between receiving training in Moodle and doing assessment, a *Chi-square test for Independence* (with Yates’ Continuity Correction) was computed, revealing no significant association, $\chi^2(1, n = 122) = .099, p > .05$ (see Table 5b below). Put differently, there is no significant dependence of one variable on the other.

The Sig. value of .14 is larger than need be, and Fisher’s Exact Test is .19, which is evidence that the result is *not* significant and that the null cannot be rejected. Of note, a missing value was recorded (Table 5a).

Given the test results, we will not pursue analysing the difference between the observed and expected frequencies, nor reporting *Phi* coefficient.

Table 5a. Case Processing Summary

Cases	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Training * Assessment	122	99.2%	1	0.8%	123	100.0%

Table 5b. Training * Assessment Crosstabulation

			Assessment		Total
			No	Yes	
Training	No	Count	23	1	24
		Expected Count	20.9	3.1	24.0
		% within Training	95.8%	4.2%	100.0%
		% within Assessment	21.7%	6.3%	19.7%
		% of Total	18.9%	0.8%	19.7%
		Standardized Residual	.5	-1.2	
Training	Yes	Count	83	15	98
		Expected Count	85.1	12.9	98.0
		% within Training	84.7%	15.3%	100.0%
		% within Assessment	78.3%	93.8%	80.3%
		% of Total	68.0%	12.3%	80.3%
		Standardized Residual	-.2	.6	
Total	Count	106	16	122	
	Expected Count	106.0	16.0	122.0	
	% within Training	86.9%	13.1%	100.0%	
	% within Assessment	100.0%	100.0%	100.0%	
	% of Total	86.9%	13.1%	100.0%	

Figure 6. Bar Chart Displaying Frequencies of Training vs. Assessment

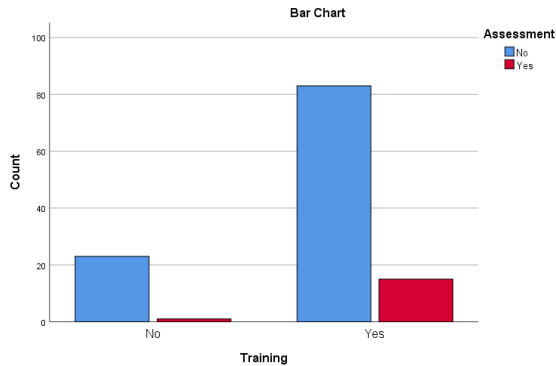


Table 5c. Chi-Square Tests

	Value	df	Asymptotic Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.099 ^a	1	.147		
Continuity Correction ^b	1.236	1	.266		
Likelihood Ratio	2.611	1	.106		
Fisher's Exact Test				.192	.130
Linear-by-Linear Association	2.082	1	.149		
N of Valid Cases	122				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.15.

b. Computed only for a 2x2 table

To summarise, when running a *Chi-square Goodness of Fit test* in SPSS to test hypotheses 1, 2, and 4, the results turned out to be statistically significant, so we gain confidence in the set hypotheses and reject the null. In performing a *Group-Independence Chi-square test* to test hypotheses 3 and 5, no significant relation was found, so we fail to reject the null that the variables are independent. *Phi* and *Cramer's V* measures of the strength of association between the two variables are not necessary to report because there is no point in asking for the effect size when the results are not significant. Notwithstanding the second finding, we should remind of the principle that: absence of evidence is not necessarily evidence of absence.

It goes without saying that the present study is subject to some limitations, but it has equally generated a number of implications and recommendations. First, let us start with the *limitations*. One of the assumptions of the Chi-square test is that the sample size should be

relatively large. This is composite of rather two assumptions: that the expected frequencies for each category should be at least one, and that for 80% or more of the categories the expected frequencies should be at least five. While both assumptions are met in the *Chi-square Goodness of Fit test*, this is not the case for the *Chi-square of Independence test*: one cell (25%) has expected counts less than 5. The outlet is to add more subjects to the sample or to use Fisher's exact test (Field, 2013), reported above.

As for the *implications*, a number of considerations should be addressed. The COVID-19 outbreak has made class attendance and educational continuity questionable, especially during the collection of the

data for the present study. Fortunately, education can be pursued otherwise i.e. virtually. This is evident in light of the findings of this study; the majority (92.7%) did upload lectures on Moodle. It stands to reason that working from home may serve convenience, but even if the pandemic is under control, distant teaching is here to stay; it might well take over.

Notwithstanding the foregoing, the participants did not take full advantage of all that Moodle offers, namely assessment. It is as if they took a minimalist approach when using the platform, contenting themselves with the provision of lectures. Such a practice is too minimalistic and too narrow a conception of teaching, for teaching is a comprehensive process that starts off with providing input, moves to securing the process of intake, and ends up with assessment of learner production/output. Actually, the intent behind the use of Moodle and other VLEs is not to have teachers work harder than need be; instead, it is to help them avoid doing things the hard way.

Whether one is concerned with uploading lectures or conducting assessment, pertinent to both practices is the issue of training. A prerequisite to going digital in education is that all VLEs users should be comfortable using the tools. Those who lack the skills should develop them, obviously through training. Luckily, 79.7% of the participants received training in the use of Moodle which is comparable to the proportion of teachers who did upload the lectures, but this leaves the 86.2% of teachers who did not give follow-up assessment unexplained. Besides, one should not forget to state

the obvious: students themselves should be comfortable using VLEs since securing ease of use for teachers alone is only a part of the whole process.

Moving to the *recommendations*, understanding Moodle and exploring its functionalities are crucial for optimal design and use. For this, future research should investigate its use from the students' perspective and cross-check the results in order to have a comprehensive picture of the Moodle experience. In effect, this *was* done by the authors and it remains to see whether they would give a follow-up to the publication of the study. Likewise, it is recommended that an investigation be made from the perspective of the technician, the developer, and the course designer; such might yield more telling insights into the matter at hand. An open dialogue could, as well, be established between teachers and Moodle developers.

To push further, given that technology is changing rapidly and non-stop, a comparison between Moodle and other VLEs is worth being made in future research agendas so as to discover their strengths and weaknesses in terms of the features and capabilities of each. Moreover, the scenario of m-learning (or mobile learning), an evolution of e-learning offering a handy and ubiquitous experience, is gaining ground and it would be interesting to explore the potential of this emerging area of the learning process.

5. CONCLUSION

To bring this paper to a close, the study set off outlining the social distancing measures implemented during the Coronavirus pandemic. These have affected many sectors, of which education is a part. To ensure continuity of education, recourse to VLEs, namely Moodle, has been made.

It has been argued that if Moodle was used as a supplement to classroom activities prior to the outbreak, it is used as a replacement during the lockdown instead – although lately in Algeria there is a re-emergence of it being a complement. In either case, just like other technological tools that have found their way into education, Moodle has gained currency at universities and its popularity is rapidly increasing. This transformation is now well underway, but it remains unprecedented in that the pandemic, having gone endemic, has contributed in making it more visible.

Its importance notwithstanding, Moodle is criticised for the issue of its complexity, hence the necessity of training users who should be comfortable using it. It has been argued that teachers and students should receive training to induce comfort and usability. In this respect, the authors mainly hypothesised that receiving training is related to eventual uploading of lectures and doing assessment. All in all, while the *Chi-square Goodness of Fit test* was significant, the *Group-Independence Chi-square test* was not.

At any rate, suffice it to say that Moodle is only an e-learning environment and the teacher remains essential in the teaching-learning process. Besides, the quality of teaching and learning does not depend solely on the use of Moodle or any other technological tool. Teachers need to know that there is more to teaching than mere technology. Technology does not replace the teacher for it is but a means for an educational end.

6. BIBLIOGRAPHY LIST

1. Al-Ajlan, A., & Zedan, H. (2008). Why Moodle. In 2008 *12th IEEE International Workshop on Future Trends of Distributed Computing Systems*, 58-64. IEEE.
2. Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning? *Educause Review*, 41, 32-44.
3. *European Centre for Disease Prevention and Control* (2020). Considerations relating to social distancing measures in response to COVID-19 – second update. Stockholm: ECDC. Retrieved on March 23, 2020: <https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-social-distancing-measuresg-guide-second-update.pdf>
4. Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics*. Sage.
5. Henrick, G., & Holland, K. (2015). *Moodle Administration Essentials*. Packt Publishing Ltd.
6. Hollowell, J. (2011). *Moodle as a Curriculum and Information Management System: Beginner's Guide*. Packt Publishing Ltd.
7. Nash, S. S., & Moore, M. (2014). *Moodle Course Design Best Practices*. Packt Publishing Ltd.

8. Paulsen, M. (2003). Experiences with Learning Management Systems in 113 European Institutions. *Educational Technology & Society*, 6(4), pp. 134-148.
9. UNESCO (2020). 290 million students out of school due to COVID-19: UNESCO releases first global numbers and mobilizes response. Retrieved on March 5, 2020 from <https://en.unesco.org/news/290-million-students-out-school-due-covid-19-unesco-releases-first-global-numbers-and-mobilizes>.
10. Viner, R.M., Russell, S.J., Croker, H., Packer, J., Ward, J., Stansfield, C., Mytton, O., Bonell, C., & Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. 4(5), 397-404. Retrieved May 2020 from <https://pubmed.ncbi.nlm.nih.gov/32272089/>
11. Weller, M. (2007). *Virtual Learning Environments: Using, Choosing and Developing your VLE*. London: Routledge.

8. APPENDIX

Questionnaire for Teachers

Dear colleagues, would you be so kind as to answer the following yes/no questions? Your effort is much appreciated.

1. Male..... Female.....
2. Institute you belong to:.....
3. Have you received any training in the use of Moodle e-learning platform?
Yes..... No.....
4. Have you uploaded lectures on Moodle for students' use?
Yes..... No.....
5. Have you conducted any assessment on Moodle?
Yes..... No.....

Thank you for your cooperation.