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The Impact of Information and Communications Technology on Innovative Teaching - Teachers' Perspective

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Abstract:

Since the turn of the millennium, individuals have become ceaselessly dependent on new technologies. In both teachers' and learners' lives, the use of Information and Communications technology has become decisive; teachers endeavour to enhance their way of teaching through the adoption of novel ways of teaching and the introduction of a large amount of fun, such aspects are present in the virtual world of technology. In fact, this study aims to investigate the impact of ICTs on innovative teaching. This is to say that making use of ICTs in the academic setting would certainly accentuate teachers' performance, and thus a positive students' response. The research was designed at Teachers' Higher College-ENS Laghouat, among thirty teachers of Arabic, French and English language, involving a questionnaire of twenty-five questions. The study revealed a significant impact of Information and Communications technology on innovative teaching.

Keywords: Communication, Information, Innovation, Teaching, Technology.

JEL Classification Codes : A22 ; I21 ; I23

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1. Introduction

Traditionally, education used to be restricted to three main components: the sender or the source of information and knowledge, the receiver (the learner) and the material (information or knowledge) being presented. Emerging from some premises of the behavioural approach, the most common method used in the delivery of information was the "chalk-and-talk" one; a very popular method which has widely been used over decades in most educational institutions in the four corners of the world. Nonetheless, it has widely been criticised as it basically renders the learning atmosphere passive, allowing students/learners to play little or absolutely no role in their learning process.

On the other hand, if one is to consider the fact that learners need to get involved in their learning process to guarantee the success and achievement of the overarching goals, it turns to be very obvious that in order to provide a dynamic and active environment in education there is a need for the systemic change implementation. That is to say, to look for some modern techniques and methods that seek for the involvement of students in their learning process. Thus, rendering them active and effective participants in structuring information and knowledge.

In this regard, because of the dynamic nature of e-learning system, the current information age forces educational organisations and institutions to acknowledge the e-learning system as a priority to cope with and face the new challenges. Hence, the integration of Information, Communications and Technology is highly perceived as providing assistance to teachers aiming at replacing the traditional teaching methods with the technology-based education. In Algeria, ICT is regarded as a crucial element in the development of education in general and higher education specifically. Lately, the Ministry of Higher Education and Scientific Research, through many facilities, has been inciting all the educational institutions to implement ICT as a major part in the educational system, emphasising the importance of such a change implementation in the development of the whole sector.

2. Innovation and The Rise of ICT in the Field of Education

Basically, the teaching-learning process is sure to encompass the three major components (sender, receiver and material) with the primary aim of imparting knowledge. But, it should also be emphasised that any technique, method, tool or system serving this objective with enhancement ought to be regarded as innovative method of teaching. Moreover, the implementation of innovative ways in the different educational institutions does not only contribute to the progress of education but also to the development of the country as a whole.

In effect, by virtue of the noticeable development of technology over the last decades, a variety of innovative techniques and methods has come onto the surface in the field of education. Namely the implementation of ICT, Information and Communications Technology is certainly not a new term to the contemporary world. It refers to various technologies used to collect, transfer and distribute information. With the development

in ICT, electronic information services have settled the world into information age to such an extent that no institution can only rely on the conventional printed documents to work effectively (Sunusi & Ahmad, 2021). In the present paper, ICT is presented as a way to implement change and innovation in teaching. Three major aspects are dealt with:

2.1 Multimedia/Information Technology

Multimedia learning mainly describes learning as the adaptation, modification and combination of several materials such as: texts, pictures, audio and video into a unified multisensory and interactive setting to convey information to students. The multimedia principle represents the groundwork for Multimedia Design Theory. The principle suggests that the combination of words and pictures provides much deeper learning than from words only provided that the multimedia instructional content is elaborated through some assumptions from the field of cognitive science (Mayer, 2005):

- **Active processes assumption**

Active learning calls for the implementation of a coordinated set of cognitive processes during learning.

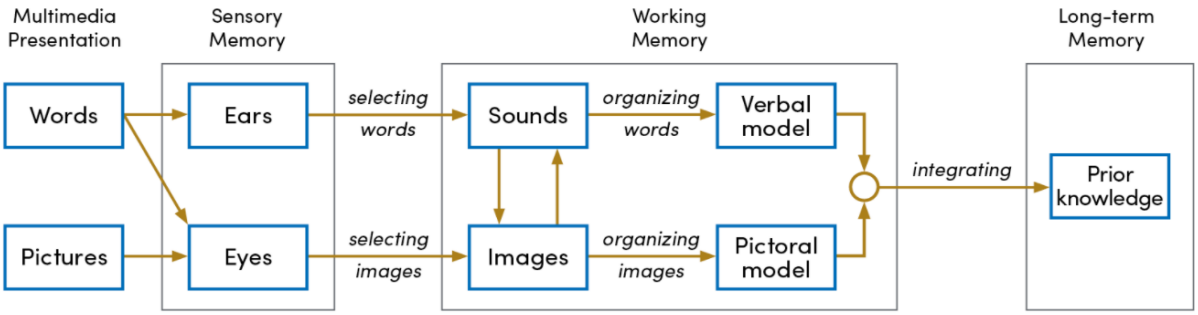
- **Dual-channel assumption**

Two channels representing a visual/pictorial processing and an auditory/verbal one.

- **Limited-capacity assumption**

Arguing that each channel holds a limited capacity for processes.

Fig.1. Cognitive Theory of Multimedia Learning



Source: Mayer, 2005, 37

According to this theory, one of the primary aims of multimedia instruction is to help the learner construct a full, coherent image from the material being presented. The learner's task consists in discerning the meaning of the presented material, playing the role of an active member and eventually building and creating new knowledge.

2.2 Social Software and Social Media/Communications Technology

Social Software has many definitions and has acquired much fame lately. Boyd (2005) defined Social Software as software that promotes communication and interaction among groups or individuals, providing opportunities for social feedback and supporting social networks. He argues that Social Software supports the desire of individuals to affiliate, their longing to be integrated into groups aiming to achieve their personal objectives (Boyd, 2005). Both Social Software and Social Media

represent the range of tools assisting social networking especially personal web pages containing photos, videos, posts and comments; as well as different applications (web and mobile) employed to convert communication into interactive dialogue, assistance and sharing. The only difference between the two consists in the fact that Social Software is basically used within an institution or enterprise, that is to say private; while Social Media is mainly used externally, or public (Garfield, 2018).

Today, social media such as Facebook, Twitter, Instagram and Flickr represent the mirror reflecting and impacting all different aspects of people's lives, education is surely no exception. Even though many people hold a negative view on social media, the use of such media for learning/teaching ends is certainly not limited to the number of likes. Properly used in a classroom, it actually can support the teaching and learning processes.

Interestingly, educational innovation, though highly dependent on online tools, is not limited to them; Ferdig (2007) remarks that a number of articles on social software seem to emphasise online tools such as blogs, wikis and social bookmarks, but Teresa Franklin and Ewa McGrail attract scholars' attention to the fact that technology innovations must not be restricted to the desktop nor exclusively online. Franklin's research investigated the possibility of using handheld devices (PDAs) to promote the implementation of technology in education. The study highly supports the use of the handheld devices in educational setting with particular emphasis on the importance of the mobility aspect of learning technologies (Ferdig, 2007).

2.3 Google Apps

(Allen & Seaman, 2014) suggest that most educational institutions are now longing for some effective methods to implement web-based educational systems for both the design and delivery of their material online to match the constant development of the educational apps.

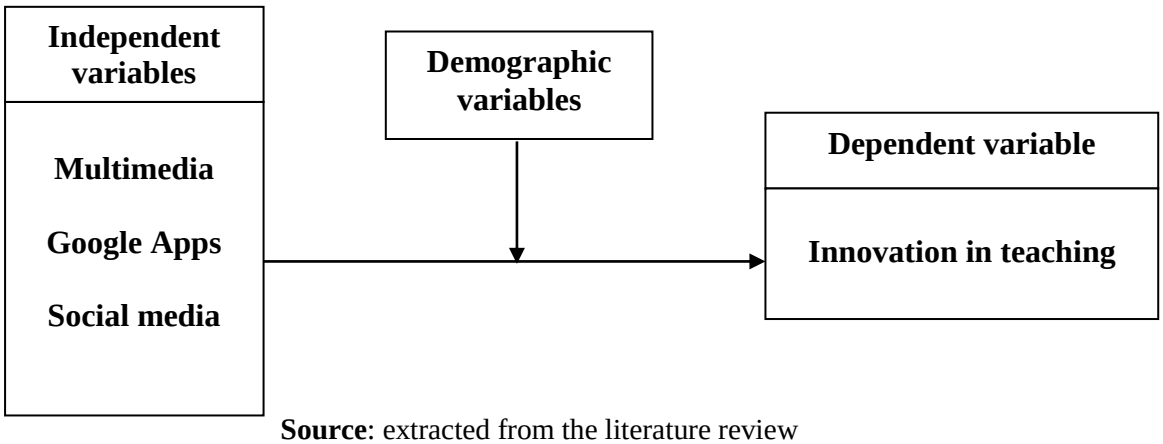
Awuah (2015) argues that: "Google Apps for Education (*GAFE*) is a powerful cloud-computing solution that works for students regardless of their location, time, or the type of device being used". *GAFE* tools allow learners to work together virtually on documents, presentations and projects within the cloud. These settings are developed as an addition to the traditional class-instruction to improve the e-learning implementation. The *GAFE* suite includes Gmail, Google Drive, Google Groups, Google Calendar, Google Docs, Google Sites and Google + (Google, 2020). However, the achievement of such innovations strongly depends on the effective use and implementation of these educational apps (Awuah, 2015) the reason why, the present article puts forward other techniques that may be used to enhance teaching and learning efficiencies, such techniques have a common aspect with social media that insists on communication and interaction, the techniques include simple acts such as bringing some change in the educational atmosphere such as the use of games.

3. Methodology

The current research has been conducted to assess the impact of Information and Communications technology on innovative teaching.

3.1 Research Model: the variables have been divided into two types as shown in figure (02).

Fig.2. Research model



Source: extracted from the literature review

a- The independent variable: consisting of multimedia, social media and Google apps.

b- The dependent variable: consists in the notion of innovation in teaching.

3.2 Research Questions and Hypotheses

The present study urges one to ask many questions, such as:

- Is there a significant impact of ICTs on innovative teaching?
- Is there a significant impact of multimedia on innovative teaching?
- Is there a significant impact of Google apps on innovative teaching?
- Is there a significant impact of social media on innovative teaching?

In fact, from the sample of the study and as an answer to the above raised questions, four main hypotheses and other secondary hypotheses could be put forward:

First Main Hypothesis:

H_1: There is a statistically significant impact of ICTs on teaching innovatively at the 0,05 level.

From this hypothesis three sub-hypotheses branch out:

- H_1: There is a statistically significant impact of multimedia on innovative teaching at the 0,05 level.
- H_1: There is a statistically significant impact of Google Apps and software on innovative teaching at the 0,05 level.
- H_1: There is a statistically significant impact of Social media on innovative teaching at the 0,05 level.

Second Main Hypothesis:

H_1: There are significant differences in innovative teaching due to the variable of gender at the 0,05 level.

Third Main Hypothesis:

H_1: There are significant differences in innovative teaching due to the variable of degree at the 0,05 level.

Forth Main Hypothesis:

H_1: There are significant differences in innovative teaching due to the variable of experience at the 0,05 level.

Fifth Main Hypothesis:

H_1: There are significant differences in innovative teaching due to the variable of department affiliation at the 0,05 level.

3.3 Method and Tools

3.3.1 Research Design

In the empirical part of this study, a quantitative approach was employed using a survey method through a questionnaire to ENS-Laghouat teachers.

3.3.2 Population and Sampling Procedures

The target population of the study consisted of university teachers in general, from different ages, grades and specialities. However, the sample included 30 teachers from Teachers' Higher College -ENS Laghouat. From three departments (Arabic language department, French language department and English language department).

3.3.3 Data Collection and Research Instruments

The data collection started from 25/01/2020 to 15/02/2020. The whole data collection period lasted for twenty days. The questionnaire consisted of four axes; the first axis concerning multimedia included six items, the second related to Google apps included six items, the third axis regarding social media included five items and the fourth axis which was devoted to innovation in teaching included eight items.

Likert's five degrees scale (Malhotra, 2004) has been used to assess the participants' answers. So, a number was given to each degree of the scale in order to facilitate the statistical analysis process. It goes as follows: always (5), often (4), sometimes (3), rarely (2), never (1).

3.3.4 Data analysis methods

SPSS 26 program has been used to statistically analyse the data and test the hypotheses; it included the following statistical methods:

- Cronbach's Alpha coefficient in order to test the reliability of the tool of the study.
- Frequencies and percentages in order to display the sample's characteristics.
- Arithmetic average and standard deviation to determine the directions of the participants' answers.
- The model of multiple linear regression to test the first main and sub-hypotheses.
- Independent sample t-test to test the second main hypothesis.
- One-Way ANOVA to test the third, fourth and fifth hypotheses.

4. Results of the Study

4.1 Testing the Questionnaire's Reliability

In order to ascertain the reliability of the questionnaire, the value of Cronbach's alpha coefficient has been calculated using SPSS program and the following results were obtained:

Table 1. Cronbach's Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
,740	25

Source: SPSS 26 output.

It is noticed from the table above that Cronbach's Alpha coefficient equals (α=0.740). Thus, it can be said that the questionnaire was indeed reliable and totally credible; meaning that the questionnaire does represent a tool for the measurement of the variables being studied. Hence, the results of the questionnaire can be generalized to all the population being studied.

4.2 Sample's characteristics

Table 2. Sample's characteristics

Variable	The variable categories	Frequency	Percentage
Gender	Male	16	53,3 %
	Female	14	46,7 %
	Total	30	100 %
Degree	Assistant Professor -B-	8	26,7 %
	Assistant Professor -A-	10	33,3 %
	Associate Professor -B-	4	13,3 %
	Associate Professor -A-	3	10,0 %
	Professor	5	16,7 %
	Total	30	100 %
Experience	From 0 to 5 years	10	33,3 %
	From 6 to 10 years	10	33,3 %
	More than 10 years	10	33,3 %
	Total	30	100 %
Depart ment	DepartmentofEnglish Language	11	36,7 %
	Department of French Language	10	33,3 %
	Department of Arabic Language	9	30,0 %

	Total	30	100 %

Source: SPSS 26 output.

- **Gender**: the above table shows that the number of males in the study sample is 16 out of 30 which represents 53,3 %, while the number of females is 14 out of 30 which represents 46,7 %, these are almost the same percentages in the population of the study. Meaning that the sample is in accordance with the population.
- **Degree**: the above table clarifies that the dominant category in the sample is the category (Assistant Professor -A-) 10 out of 30 which represents 33,3 % while the least represented group is the (Associate Professor -A-) 3 out of 30 representing 10 %, these are almost the same percentages in the population of the study.
- **Experience**: the three groups of teachers; those having an experience from 0 to 5 years, from 6 to 10 years or more than ten years, include 10 members, suggesting that the groups are all equal in number.
- **Department**: the above table portrays that the number of teachers in the three departments is nearly the same, 9 from the department of the Arabic Language, 10 from the department of French and 11 from the department of English.

4.3 Display of the Study Output

The study results are displayed through the tables containing the directions of the items constituting the questionnaire.

4.3.1 The Direction of the Items of the First Axis (Multimedia)

Table 3. The Direction of the Items of the First Axis (Multimedia)

Number	Items	Mean	Std. Deviation	Direction
01	I use multimedia for lesson presentations like: slideshows, Prezi, diagrams, infographics, podcasts, videos, etc.	3,23	0,971	Sometimes
02	I use audiovisual **tools** in my lectures (projector, television, computers, etc)	3,13	1,106	Sometimes
03	I teach online through videoconferencing	1,87	1,137	Rarely
04	To save time, I use optical media (such as: Flash-drives, CDs, DVDs) to provide students with lessons	3,07	1,285	Sometimes
05	I use mind-maps to help students brainstorm	3,20	1,270	Sometimes
06	I send adaptive content though mobile applications	2,87	1,252	Sometimes
The average of the first axis items		**2,89**	**0,679**	**Sometimes**

Source: SPSS 26 output.

It is clearly shown from the above table that there is a general agreement over a neutral attitude towards multimedia use (2,89). The less agreed upon percentage was the item n^0 03 (1,87) and the most agreed upon item was $n^0$01 (3,23). It is noticed that, the fourth item is the less homogenous in their excluded answers with the standard

deviation (1,285), while the item the most homogenous is the first with the standard deviation (0.971).

4.3.2 The Direction of the Items of the Second Axis (Google Apps)

Table 4. The Direction of the Items of the Second Axis (Google Apps)

Number	Items	Mean	Std. Deviation	Direction
07	I send books, articles or other type of references to students via email	3,97	1,066	Often
08	I use the Internet to get additional information or resources	4,47	0,776	Always
09	I use some passages from YouTube or podcasts during my lectures	3,33	1,061	Sometimes
10	I welcome students' feedback through smartphone apps (like Google Forms , Survey Monkey , Socrative)	2,40	1,133	Rarely
11	I provide students with websites to further their researches	4,13	0,937	Often
12	I participate in developing and updating my institution's website	2,47	1,358	Rarely
The average of the second axis items		**3,46**	**0 ,641**	**Often**

Source: SPSS 26 output.

The above table demonstrates that there is a general agreement (often) upon the implementation of Google Apps (3,46) The less agreed upon item was n^0 10 (2,40) and the more agreed upon item was $n^0$08 (4.47). It is also noticed that the twelfth item is the less homogenous in their excluded answers with the standard deviation (1,358), while the item the more homogenous is the eleventh with the standard deviation (0,937).

4.3.3 The Direction of the Items of the Third Axis (Social media)

Table 5. The Direction of the Items of the Third Axis (Social media)

Number	Items	Mean	Std. Deviation	Direction
13	I use social media (such as Facebook or Twitter) to get in touch with students	3,43	1,251	Often
14	I use Twitter Hashtags to receive students' questions	1,97	1,066	Rarely
15	I launch Wiki Pages for collaborative assignments	2,40	0,675	Rarely
16	I set up students' blogs	2,57	1,006	Rarely
17	I set Facebook groups to prepare, discuss and reflect on lessons	2,50	1,358	Rarely
The average of the third axis items		**2,57**	**0,660**	**Rarely**

Source: SPSS 26 output.

The above table portrays that there is a general disagreement (Rarely) upon the implementation of Social media (2,58). The less agreed upon item was $n^0$14 (1,97) and the more agreed upon item was $n^0$13 (3,43). It should be noted that the seventeenth item is the less homogenous in their excluded answers with the standard deviation (1,251), while the item the more homogenous is the fifteenth item with the standard deviation (0,675).

4.3.4 The Direction of the Items of the Fourth Axis (Innovation in teaching)

Table 6. The Direction of the Items of the Fourth Axis (Innovation in teaching)

Number	Items	Mean	Std. Deviation	Direction
18	I often make adjustments to my modules' programs	4,33	0,922	Always
19	I often make adjustments to my teaching methods	4,33	0,844	Always
20	It is possible/easy for me to detect students' weaknesses and lacks	3,97	0,669	Often
21	I use games as a tool to test students and enhance their learning	3,40	0,932	Often
22	I think that giving online courses is time saving and much advantageous	3,37	1,189	Sometimes
23	I ask students to reflect on what has been taught	4,23	0,898	Always
24	I take into consideration students' opinion on my way of presenting the lesson	4,27	0,944	Always
25	I devote sufficient time to students' reflection	4,27	0,640	Always
The average of the sixth axis items		**4,02**	**0,497**	**Often**

Source: SPSS 26 output.

The above table shows that there is general agreement (Often) on Innovative teaching (4,02). The less agreed upon item was n^0 22 (3,37) and the more agreed upon items were $n^0$18 and $n^0$19 (4.00). It is noticed that the item $n^0$22 is the less homogenous in their excluded answers with the standard deviation (1,189), while the item the more homogenous was $n^0$25 with the standard deviation (0,640).

4.4 Normality Test

Before testing the hypotheses, there is a need to test the data distribution to check whether it matches the normal distribution, the procedure follows the Shapiro – Wilk test as the sample consists of less than 50 items. The table below presents the obtained result:

Table 7. Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Multimedia	,153	30	,072	,944	30	,114
Social_media	,133	30	,186	,938	30	,081
Google_Apps	,174	30	,020	,931	30	,052
Innovation_in_teaching	,146	30	,101	,935	30	,064

a. Lilliefors Significance Correction

Source: SPSS 26 output.

The results show that all of the Sig values in the Shapiro – Wilk test are higher than 0,05. Hence, it may be said that the data conforms to the normal distribution and the application of the parametric tests is possible to test the hypotheses.

4.5 Testing the Hypotheses

Testing the First Main Hypothesis and its Divergent Sub-hypotheses

The research adopted the method of the multiple linear regression to test both the main and sub-hypotheses as shown by the SPSS output in table n^{0}08.

Table 8. Testing the First Main Hypothesis and its Divergent Sub-hypotheses

Independent variables	Dependent variable	T / F	Sig	Test results
Multimedia	Innovation in teaching	-2,772	0,010	H_1 approved
Google Smartphone Apps	Innovation in teaching	2,613	0,015	H_1 approved
Social media	Innovation in teaching	1,094	0,284	H_0 approved
ICTs	**Innovation in teaching**	**3,341**	**0,035**	**H_1 approved**

Source: SPSS 26 output.

Testing the First Main Hypothesis

It is shown that the Sig (P-value) is inferior to or equals α (Sig = 0,035 ≤ 0,05). So, H_0 is rejected and the alternative hypothesis H_1 is approved. This confirms that There is a statistically significant impact of ICTs on teaching innovatively at the 0,05 level.

Testing the First Sub-hypothesis

It is noticed that the calculated t (2,772) is superior to the value of the tabulated t (2,042). So, H_0 is rejected and the alternative hypothesis H_1 is approved. This confirms that the Sig (P-value) is inferior to or equals α.

Or, (Sig = 0,010 ≤ 0,05). So: There is a statistically significant impact of multimedia on innovative teaching at the 0,05 level.

Testing the Second Sub-hypothesis

It is noticed that the calculated t (2,613) is superior to the value of the tabulated t (2,042). So, H_0 is rejected and the alternative hypothesis H_1 is approved. This confirms that the Sig (P-value) is inferior to or equals α.

Or, (Sig = 0,015 ≤ 0,05). So: There is a statistically significant impact of Google Apps on innovation in teaching at the 0,05 level.

Testing the Third Sub-hypothesis

It is shown that the calculated t (1,094) is inferior to the value of the tabulated t (2,042). So, H_0 is approved and this confirms that the Sig (P-value) is superior to α.

Or, (Sig = 0,284 > 0,05). So: There is no statistically significant impact of Social media on innovation in teaching at the 0,05 level.

Testing the Second Main Hypothesis

The research adopted the method of independent samples t-test as shown in the following SPSS output:

Table 9. Testing the Second Main Hypothesis

T	Df	Sig	Test results
-1,077	28	0,291	H_0 approved

Source: SPSS 26 output.

It is shown that the calculated t (1,077) is inferior to the tabulated t (2,042). So, H_0 is approved and this confirms that the Sig (P-value) is superior to α.

Or, (Sig = 0,291 > 0,05). So, there are no significant differences in innovation implementations in education due to the variable of gender at the 0.05 level.

Testing the Third Main Hypothesis

The research relied on the analysis method of One-Way ANOVA as shown in the following SPSS output:

Table 10. The Descriptive Results of the Third Main Hypothesis

Descriptives

Axe4

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Assistant Professor -B-	8	4,0938	,29693	,10498	3,8455	4,3420	3,63	4,50
Assistant Professor -A-	10	4,2125	,49318	,15596	3,8597	4,5653	3,63	4,88
Associate Professor -B-	4	4,3438	,32874	,16437	3,8206	4,8669	4,00	4,63
Associate Professor -A-	3	3,3750	,78062	,45069	1,4358	5,3142	2,50	4,00
Professor	5	3,6500	,10458	,04677	3,5201	3,7799	3,50	3,75
Total	30	4,0208	,49685	,09071	3,8353	4,2064	2,50	4,88

Source: SPSS 26 output.

From table (10) it is noticed that the Associate Professor -B- group is the one most implementing innovative ways in teaching (with an arithmetic average of 4,34), while the group with the lowest average in implementing innovation in teaching is the Associate Professor -A- (arithmetic average = 3,37).

Table 11. Analysis of variance of the third main hypothesis

ANOVA

Axe4

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,766	4	,691	3,935	,013
Within Groups	4,393	25	,176		
Total	7,159	29			

Source: SPSS 26 output.

The above table (11) shows that the Sig (P-value) is inferior to the α.

Or: (Sig = 0,013 ≤ 0,05). So, H_0 is rejected and the alternative hypothesis H_1 is approved. So, there are significant differences in innovation implementation in education due to the variable of degree at the 0.05 level.

Testing the Fourth Main Hypothesis

The research relied on the analysis method of One-Way ANOVA as shown in the following SPSS output:

Table 12. The Descriptive Results of the Fourth Main Hypothesis

Descriptives

Axe4

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
From 0 to 5 years	10	4,2125	,39550	,12507	3,9296	4,4954	3,63	4,75
From 6 to 10 years	10	4,1875	,40931	,12944	3,8947	4,4803	3,75	4,88
More than 10 years	10	3,6625	,50707	,16035	3,2998	4,0252	2,50	4,50
Total	30	4,0208	,49685	,09071	3,8353	4,2064	2,50	4,88

Source: SPSS 26 output.

Table (12) shows that the group of teachers having an experience of less than 5 years is the one most implementing innovative teaching (arithmetic average = 4,21) while the group less implementing innovative teaching is the one having an experience of more than 10 years (arithmetic average = 3,66)

Table 13. Analysis of Variance of the Fourth Main Hypothesis

ANOVA

Axe4

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,929	2	,965	4,980	,014
Within Groups	5,230	27	,194		
Total	7,159	29			

Source: SPSS 26 output.

The above table (13) portrays that the Sig (P-value) is inferior to or equals α.

Or: (Sig = 0,014 ≤ 0,05). So, H_0 is rejected and the alternative hypothesis H_1 is approved. Hence, there are significant differences in the implementation of innovation in education due to the variable of experience at the 0.05 level.

Testing the Fifth Main Hypothesis

The research relied on the analysis method of One-Way ANOVA as shown in the following SPSS output:

Table 14. The Descriptive Results of the Fifth Main Hypothesis

Descriptives

Axe4

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Department of English	11	4,3182	,40836	,12313	4,0438	4,5925	3,75	4,88
Department of French	10	4,0500	,39616	,12528	3,7666	4,3334	3,50	4,63
Department of Arabic	9	3,6250	,45928	,15309	3,2720	3,9780	2,50	4,13
Total	30	4,0208	,49685	,09071	3,8353	4,2064	2,50	4,88

Source: SPSS 26 output.

Table (14) portrays that teachers from the department of English are the ones most implementing innovative ways in teaching (arithmetic average = 4,31) while the group with the lowest average in implementing innovative teaching consists in teachers from the department of Arabic (arithmetic average = 3,62)

Table 15. Analysis of Variance of the Fifth Main Hypothesis

ANOVA

Axe4

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,391	2	1,196	6,771	,004
Within Groups	4,768	27	,177		
Total	7,159	29			

Source: SPSS 26 output.

The above table (15) shows that the Sig (P-value) is inferior to or equals α.
Or: (Sig = 0,004 ≤ 0,05). So, H_0 is rejected and the alternative hypothesis H_1 is rather approved. Thus, there are significant differences in innovative teaching due to the variable of department affiliation at the 0.05 level.

5. Discussion of the Findings

1. The results showed that the higher average of all the 25 items was the eighth (4,47) suggesting that most teachers use the internet to get additional information or resources. Nonetheless, the internet space is actually vague encompassing many different forms of software to present material; namely media, apps, presentation software by Microsoft and different file formats such as PDF documents. Hence, this implies that teachers may be using the internet (in general) to impart knowledge but not necessarily to communicate with

colleagues from the different parts of the world, in the way to exchange ideas and experience.

2. The eighteenth and the nineteenth items received the same average (4,33) where teachers asserted that they often make adjustments to both, programs and teaching methods, that is to say; teachers do constantly long for the systemic change implementation. They are actually aware of the fact that there is a need to cope with and face the new information age challenges.
3. The eleventh item, with the average (4,13) suggests that most teachers do provide students with websites to further their researches, meaning that they do incite students to use and get acquainted with the internet, but websites unfortunately do not imply communication either, they might be equal to e-books or PDF documents, allowing no room for discussions or feedbacks. This is, in effect, confirmed by the items 10 and 15 through which most teachers assert that they neither welcome students' feedback through Google apps, nor do they launch Wiki Pages for collaborative assignments.
4. The fourteenth item, with the average (1,97), also confirms the noticed lack of communication between teachers and students as most of the teachers declared that they rarely use social media to receive students' questions.
5. The item receiving the lowest average is the third item (1,87) claiming that teachers rarely teach online through videoconferencing. Actually, this item has another dimension or aspect implying that the contact between teachers and students, in the virtual world, is very weak.
6. Through the results, it has also been discovered that novel teachers, those having an experience of less than 5 years are actually the ones longing for the implementation of the new technological advancements in their classes more eagerly than the other groups. This may actually be due to the fact that this group may be proportionally younger than the others and thus more influenced by technology (table 12).
7. The results also portrayed that teachers from the department of English are the most motivated to implement ICTs in their teaching to enhance their performance, this might be explained in reference to the factor of language per se; as the English language is mostly considered as an international and technological one, and since teachers of English do master the language as a specialty, this has most probably facilitated the task for them (table 14).
8. The results showed that there is a statistically significant impact of multimedia on innovative teaching efficiency.
9. The results showed that there is a statistically significant impact of Social media on innovative teaching.
10. The results showed that there is a statistically significant impact of Google Apps on innovative teaching.

11. The results showed that there is a statistically significant impact of ICTs on innovative teaching and this represents the answer to the problem of the study.
12. The results showed that there are no significant differences in innovative teaching due to the variable of gender.
13. The results showed that there are significant differences in innovative teaching due to the variable of degree.
14. The results showed that there are significant differences in innovative teaching due to the variable of experience.
15. The results showed that there are significant differences in innovative teaching due to the variable of department affiliation.

6. Conclusion

This study focused on the impact of multimedia, social media and Google apps as major aspects of Information and Communications Technology, on the implementation of innovative methods in teaching to promote education. After studying the phenomena that are of interest to this study and analysing teachers' responses through the questionnaire, the results revealed that there is a statistically significant impact of ICTs on innovative teaching. In addition to that, all of the three mentioned aspects of ICTs are of a major importance not only in the implementation of innovation in teaching but also in assisting both students and teachers to pinpoint their strengths and weaknesses mainly through dialogue and communication.

The only limitation of this study was the number of participants involved, since only 30 teachers answered the questionnaire while the total number of teachers at the ENSL is above 100.

Some recommendations may be suggested regarding the atmosphere of teaching and learning and its impact on teachers' and students' performances to enhance the academic achievement and educational outcomes:

- Teachers and educators need to take into consideration the impact of the ICTs on innovation in the field of education.
- Educators and researchers need to highlight the importance of the technological advancements in the development of education.
- Even if it seems somehow difficult to shift from the traditional ways and methods of teaching, the systemic implementation of change is highly required to effectively enhance the learning/teaching processes.

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