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The Impact of Demographic Variables on Students' Scholastic Achievement in Technology-Based Learning

Azize El Ghouati[1], Bani Koumachi[2], Abderrahim Khoumich[3]
[1]*School of Arts and Humanities, Ibn Tofail University, Kenitra,* Morocco
[2]*School of Arts and Humanities, Ibn Tofail University, Kenitra,* Morocco
[3]*School of Arts and Humanities, Moulay Ismail University of Meknes, Morocco*

Abstract: This study investigates the potential impact of students' demographic variables, namely gender, age, computer experience, and computer use on achievement in English among convenience-sampled 81 students within the School of Arts and Humanities, the Department of English Studies in Moulay Ismail University of Meknes. To this end, achievement tests are analyzed and interpreted quantitatively; whereas the follow-up interviews are treated qualitatively. The statistical tools used in order to help analyze and interpret data include descriptive and inferential statistics which make use of frequencies, percentage, Independent Samples t-Tests, and ANOVA tests. Following what has been hypothesized, the test results do not support the four research hypotheses claiming there is no statistically significant relationship between gender, age, and computer experience and computer frequency of use on students' level of achievement.

Keywords: *computer experience, computer use, demographic variables, English achievement, gender, scholastic achievement, technology-based learning,*

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I. INTRODUCTION

Information and communication technology (ICT) has widely enriched the learning and teaching experiences across the world. Morocco as a developing country must be involved in the new digital change, and join the global educational community. Therefore, the educational GENIE program is one of the fundamental programs projected by e-Morocco 2010, having its main objectives the generalization of ICT in all public schools with the aim of improving the quality of education. Internet access, training, and the improvement of pedagogy are parts of this program (Fatmi, 2012). Nevertheless, the urgent need for a significant pedagogical account in educational technology has become very critical. Plainly put, our language teaching philosophy, method, or approach needs to be broadened to encompass technology use in relation to students' demographics, and their inter-relationship between computing needs to be carefully explored. This study, therefore, primarily has the objective to explore students' demographic variables (henceforth DVs) and English achievement (EA) as reflected in the four language skills within a Moroccan institution of higher education.

II. LITERATURE REVIEW

In fact, ICT refers to the computer use potentially with reference to language learning and teaching. This section is an attempt to review ICT by seeking definitions recognized in the literature. In that, Serdiukov's (2000) definition of educational technology focuses on three distinctive types of educational tasks. These are (i) methods of course instruction, (ii) research, and (iii) curriculum and pedagogy. By this definition, the lines are so clear-cut to determine what educational technology includes. Much emphasis is given to methods of course instruction, and the creative use of ICT to develop students' competencies, and improve the efficiency of their learning. Differently, Paul (2000) finds it hard to distinguish between technology education and education technology. For him, it is easy to say technology education is a curriculum, and education technology is a tool. However, the lines aren't so clear cut. The most compelling evidence is that, the acronym ICT has been recognized across the world, and hence taking the place of the outdated acronym IT (information technology), which refers to hardware, software and data processing. Henceforth, though ICT is closely similar to IT, the term covers different technological systems and communicating networks, the Internet network as an example.

The development in the scope of educational technology with the emphasis on CALL, referring to computer-assisted language learning, specifies both general education and language education. By general education, the focus is placed on content subjects in both learning and teaching different literatures, science, engineering, fiction, chemistry, and electronics. However, the focus of language education is given to language-

based instructions through which the aforementioned courses are delivered. The language of instruction is the focal point to pursue content-based learning and teaching. Today, emphasis is put on the different uses of technology in education and its implications. In the past, using computers for teaching and learning is not new. In 1950s, Skinner (1950) acknowledges the potential evolution of using computers in language learning. Still, this process was very limited. A case in point, the multimedia had not been discovered yet, and the oral abilities, namely speaking and listening, could not be promoted by technology-based use. Therefore, technology was exclusively used for teaching grammar, and practice in the form of drilling exercises. Simultaneously, teaching and learning was restricted to the classroom or labs. Only after the gradual beginning of the Internet, the concept of the physical space in language education shifted gradually. Ultimately, the change influenced the scope of educational technology, which in turn brought changes at the level of virtual classroom and self-directed learning.

It is worth noting that in a teacher-centered approach of instruction, the instructor is responsible on the stage while students are passive learners. The ultimate aim of introducing such a duality is to consider the potential change in the wave of computer integration, particularly in the operation of teaching and learning. Now, learner-centered approach has changed the focus of activities from the teacher to the learner. That is to say, while using technology, the learner is responsible for his/her learning. Nevertheless, teacher's engagement is only to pursue students' learning activities either online or offline. In principle, in a learner-centered approach, the instructor is "a guide on the side", and the learner is responsible for his/her own learning. Thus, learner-centered approach is considered as an alternative to the classical teacher model with a particular emphasis on individual differences (Dickinson, 1987). Overall, autonomy does not necessarily involve learning in isolation. Contrary to expectations, autonomous learning calls for teachers, but with roles different from those attributed to the teacher-centered traditional mode. To explain, the more facilitator or counselor the teacher is, the closer both the learner and the teacher become. Likewise, peer support is a crucial attribute among learners. Therefore, learners who share the same difficulties and exert much effort to achieve their learning goals will ultimately gain confidence.

According to Zhao (2000), the computer is at the disposal of the learners to solve their language problems and help them learn better. Similar to what has been said, Nunan (1995) claims that "it is the learner who must remain at the center of the process, for no matter how much energy and effort we expend, it is the learner who has to do the learning" (p. 155). The focus on the learners as responsible individuals and autonomous learners paves the way to concomitant change in the teaching methodology. As Shuell (1996) argues, "what the student does is actually more important in determining what is learned than what the teacher does" (p. 429). With a focus on the learners' individual differences, the learner-centered model gives individual learners opportunities to learn according to their responsibility and independence for their own learning (Omaggio-Hadley, 2001). Thus, courseware designers are recommended to give more space for learner autonomy and less for teacher control.

More importantly, computer applications can be used by teachers or learners in any learning environment. Many researchers (e.g., Hanson-Smith, 1997; Ager, 1998) demonstrate that general-purpose software programs are academically effective and useful. Admittedly, the most recognized software programs in educational field include word-processors, spreadsheets, databases, etc. Word-processors are perhaps the most frequently used tool for educational purposes. They help users organize their documents through making use of tables, graphics, and photographs. To a larger extent, learners can benefit from writing utilities such as spelling, and grammar checkers, dictionaries, and utilities for writing web pages. In the same way, Spreadsheets and databases are extremely valuable. Be it spreadsheet or database, the tools can be used for assessment, sorting, and storing data in a set of organized formats. As a case in point, column manipulation and the numbering facility enable users to record, store, add up, retrieve, and refer to particular data, and/or information for remedial work (Warschauer & Meskill, 2000). That is to say, when the spreadsheet enables users to classify, sort out, and deal with data in an organized and planned way, database helps learners manage educational information, locate it, and question sources of that particular information. According to Warschauer and Meskill (2000), Microsoft excel, via its statistical and graphical utilities, helps learners opt for very well-organized and neat presentations by incorporating figures, graphs, and other computing facilities.

Other effective educational types of stand-alone applications are CD-ROMs, and DVDs (Jones, 1986). The computer-assisted language learning initially concentrates on drill and practice-based courseware, which is meant to give special emphasis on vocabulary as well as discrete grammar structures. Nevertheless, with the development of a variety of innovative technologies such as multimedia and speech recognition, many interactive applications, and programs have begun to flourish and benefit the educational field. Despite their focus on language structures, simulation programs provide learners with real-life environments. Such situations help students learn about the target culture and linguistic context of various environments (Rand, 1997). To illustrate, a CD-ROM has many educational functions, including information retrieval, interactive audio, games,

and interactive multimedia activities. Thanks to the emergence of the CD-ROM application as computing storage device, multimedia content has been discovered to be an effective tool among a wide range of students.

Unlike stand-alone computers, networked computers extend the ways in which language teaching and learning are approached. The pedagogical benefits of networked computers over stand-alone computers are diverse. Having an access to networks, students can increase their interaction, and communication among other learners, teachers, parents, and other members of the world community (Collins, 1995). Additionally, the networking culture necessitates users to be contributors rather than consumers of knowledge and information. *On-line CALL*, as distributed learning tool, is based mainly on Wide Area Networks (WANs). It refers to the characteristics of a learner-centered context, which makes use of a number of technologies and offer opportunities for activities and interaction in asynchronous and synchronous modes. According to Wagner (1997), this model focuses on blending appropriate technologies with aspects of campus-based delivery in open learning systems and distance learning. For instance, distributed learning is namely concerned with the needs of learners opting for information searching, performance support tools, instructional modes, and coverage modalities like graphics, print, video, audio, and other data transmission through the Internet (Wagner, 1997). Kaye (1991) highlights the use of computer networks as a communication means by individuals collaborating with one another to achieve a particular goal does not require the physical presence. Such communication is free from time constraints. It is worth noting that computer-mediated communication is categorized into two types: Synchronous communication and asynchronous communication (Abrams, 2003). The former requires the two parties to be online simultaneously, and the latter takes place without the involvement of the communicating parties being available at the same time. Generally, CMC is advantageous as it reduces tuition fees, overcomes geographical barriers, and has more time flexibility. Besides, there are many other terms used to refer to the same type of learning: Distance learning, distance education, e-learning, online learning, Internet-based learning, and web-based learning. All of these have different meanings as well as an unavoidable overlap.

III. METHODOLOGY

The purpose of the present study is to investigate demographic variables, namely gender, age, computer experience, and frequency of computer use, and their potential impact on achievement as reflected in the four language skills among Moroccan university students within the English Department. Based, then, on the purposes of the study, the aims of the present study are to be explored in the light of the following formulated research hypotheses:

Research Hypothesis 1: There is a significant predictive link between gender and students' achievement score.

Research Hypothesis 2: There is a significant difference between the age categories of the respondents and achievement scores.

Research Hypothesis 3: There is a significant difference between computer experience and students' achievement scores.

Research Hypothesis 4: There is a significant impact of students' existing computer frequency of use and their achievement scores.

Initially, the sequential mixed method research design is adopted in this study. It is sequentially quantitative and qualitative through the use of quantitative data collection instruments, and a qualitative data collection tool. A sequential triangulation strategy is adopted on the ground that exploratory procedures begin with quantitative data as measured by the questionnaire and language tests, followed by the sequential collection of qualitative data by the semi-structured interview across two phases. In a thorough manner, the two methods are integrated in the analysis and the interpretation phases with a focus on how the results from both methods are similar or different, and a primary purpose to cross-check data through multiple modes of inquiry. Essentially, the purpose of using sequential triangulation strategy is to understand the inconsistencies that might be produced by different data sources and inquiry approaches and to offer "opportunities for deeper insight into the relationship between inquiry approach and the phenomenon under study" (Patton, 2002, p. 248).

The respondents of the current investigation are convenience-sampled 81 semester six university students within the Department of English Studies. They are targeted on the basis of: (1) their availability and willingness, and (2) this specific group of students are expected to give unique and rich information of value to the study. Besides, (3) their learning experience of English exceeds five years, a situation which helps them communicate with English effectively.

IV. RESEARCH FINDINGS

To achieve the research purposes in terms of interpretation of the data obtained, two different types of data analysis are used. As a case in point, both the demographic questionnaire and achievement tests are analyzed quantitatively using different statistical tools assisted by the Statistical Package of the IBM statistics program (SPSS), version 22. *Cronbach Alpha Coefficient (α)* is calculated to ensure the reliability of the test constructs. Descriptive statistics such as frequencies, means, and standard deviations are also measured for all

tests parts. Second, analyses targeting statistical differences between the two groups (gender) of respondents are performed making use of *Independent Samples t-Test* and *One Way ANOVA* for more than two groups (age, computer experience, and computer frequency of use). A statistically significant difference is shown by a probability "Sig." value which is less than .05 indicating that the relationship between the two variables is not due to chance (Hayes, 2005).

1.1.1. Findings of the Demographics Questionnaire

Noteworthy is that there are three main reasons behind investigating the selected background variables. First, to discover what kind of group of respondents is behind the responses provided. The second reason is to specify some factors which may influence the results through summarizing all obtained responses. The descriptive results for gender are displayed in Table 1.

Table 1: *Distribution of Respondents by Gender*

Gender	Frequency	Percent
Male	33	40,7
Female	48	59,3
Total	81	100

The first question asks the respondents to indicate their gender. Answers are reported and summarized using frequency distribution. Out of (N=81), there are 33 male and 48 female respondents representing (40.7%) and (59.3%), respectively. It should be mentioned that there are more female respondents (N=48) than males (N=33). The researcher of the present study cannot control such inequality among the two genders.

Table 2: *Distribution of Respondents by Age*

Age	Frequency	Percent
Under 20 years	11	13,6
21---24 years	64	79,0
25---28 years	06	7,4
Total	81	100

The second question is related to the respondents' age. From the frequency distribution shown in Table 2, a total of (N=64) 79 % of the (N=81) cases in the sample are between "21-24 years" suggesting that the lion's share in this sample belongs to that age category. This is followed by both the "under 20 years" group of age into which 13.6% (N=11) of the respondents fall, and the "25-28 years" age category to which 7.4% (N=6) of the respondents belong while no one of the informants indicate that s/he is "more than 29 years". The results, therefore, indicate a relatively younger sample of respondents. However, it has to be taken into consideration that the sample is selected through a non-probability sampling technique.

Table 3: *Distribution of Respondents by Computer Experience*

Computer Experience	Frequency	Percent
Less than 1 year	4	4.9
2----4 years	13	16.0
5----7 years	22	27.2
8 years or more	42	51.9
Total	81	100

The third demographic question is about the respondents' years of computer experience. The highest number of the respondents is reported to have "8 years or more" (N=42) and "between 5 and 7 years" of computer experience (N=22) representing (51.9%) and (27.2%), respectively. However, respondents report to have either "between 2 and 4 years" (N=13), and "less than 1 year" (N=4) of computer experience represent (16 %), and (4.9 %) in the order given. What could be said is that the fact that (N=42, 51.9%) of the respondents whose computer experience is more than 8 years is possibly because technology is increasing continuously at the university level.

Table 4: *Distribution of Respondents by Computer Frequency of Use*

Computer Frequency of Use	Frequency	Percent
Once a while	24	29,6
Occasionally	30	37,0
Frequently	11	13,6
Almost everyday	16	19,8
Total	81	100,0

Finally, respondents are asked about how often they use computers for class-related activities within the English Department. As detailed in Table 4, (N=30) of the largest number of the respondents "occasionally" use computers for class activities representing (37%). This is followed by (N=24), (N=16), and (N=11) of the respondents who "once a while", "almost every day", and "frequently" use computers for learning purposes with (29.6%), (19.8%) and (13.6%), respectively. Given this fact, the present research sample adopts a relatively varied level of computer frequency of use.

In a nutshell, the findings of the demographic variables display a big difference between the numbers of the respondents. Among them 40.7 % (N=33) are males and 59.3% (N=48) females. The overwhelming percentage of 79 % among the respondents (N=64) falls into the age category between "21-24 years", but no one has indicated that s/he is "more than 29 years". In terms of computer experience 51.9% (N=42) have "more than 8 years" of computer experience; and only 4.9% (N=4) of the respondents have "less than 1 year". Finally, when asked about their computer frequency of use, 37% (N=20) of the participants indicate that they "occasionally" use their computers for school activities.

4.1.2. Findings of the Achievement Tests

A four-section achievement test is designed to examine the relationship between the demographics and listening, reading, writing, and speaking scores among university students studying within the Department of English Studies. Listening and reading sections consist of multiple choice questions, while writing section deals with a short paragraph. In speaking section, however, participants are invited to discuss randomly selected topics.

A *Cronbach alpha* (α) is performed on a sample size of 81 respondents, and the primary aim is to test whether all the test parts are valid and reliable. Crucially, the results of the Cronbach's (α) reliability evidence for the whole tests construct as well as listening, reading, writing, and speaking tests are reported in Table 5.

Table 5: *Reliability Evidence for Achievement Tests*

Variables	Alpha Coefficient (α)
Listening Test	.67
Reading Test	.62
Writing Test	.60
Speaking test	.61
Total	.67

Reliability evidence for all the four test sections is demonstrated by Alpha coefficients Table 5, with listening test indicating the highest reliability α=.67, and writing test the lowest α=.60. Reading, and speaking test sections have α=.62 and α=.61, respectively. The overall language test has an alpha coefficient of α=.67 indicating, therefore, a sufficient internal consistency of the tests constructs in the analysis.

The adopted IELTS provides a profile of a student's ability to use English language. Four language skills are covered. In order to draw a detailed picture of students' English achievement, it is essential to determine their level on the basis of both the four individual language skills, and overall English achievement. The responses are calculated after having tested the participants in listening, reading, writing, and speaking.

The total score of the English test in the present investigation is 40, ten out of ten for each of the four language skills: Listening, reading, writing, and speaking. The overall achievement scores obtained through the English test are grouped as the minimum (10.00), and maximum (32.50). The average mean scoring of the overall test scores is identified as (M= 22.11) with (SD= 5.16). Specifically, the mean scores for the four language skills are presented in the following table:

Table 6: *Descriptive Statistics for English Achievement*

Descriptive Statistics

Achievement	Minimum	Maximum	Mean	Standard Deviation
Listening (L)	2,00	10,00	5,9506	2,21304
Reading (R)	2,00	10,00	6,3210	2,15538
Writing (W)	2,00	8,00	4,9012	1,45220
Speaking (S)	2,00	7,00	4,9444	1,22729
Overall	**10,00**	**32,50**	**22,1173**	**5,16313**

Table 6 indicates that the highest mean score is reading (M=6.32, SD=2.15). This is followed by listening (M=5.95, SD=2.21), speaking with (M=4.94, SD=1.22), and finally writing with (M=4.90, SD=1.45).

5.1. DVs Relationship with EA

The present research hypothesis assumes there is statistical difference in students' English scores based on a set of demographic variables. To address this research hypothesis, *Independent Samples t-Test* is used to determine whether students' achievement scores differ based on their *gender*. However, to explore the potential statistical difference in students' achievement scores based on their *age*, *computer experience*, and *computer frequency of use*, *One-Way ANOVA* test is conducted.

5.1.1. Gender Factor

Gender is examined to determine whether it influences the respondents' level of English attainment. An Independent Samples t-Test is conducted to compare the males' and females' achievement scores. In the sample data, two variables are used: *Gender* and achievement. The independent variable has values of either "1" or "2" which correspond to "male" or "female", respectively. Achievement score is a numeric variable, including the four individual skills as well as overall achievement. The first table below provides basic information about the group comparisons.

Table 7: *T-Test Table: The Four Language Skill Scores by Gender*

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sg.	T	df	Sig. (2-tailed)	Mean Difference
Listening	Equal variances assumed	,004	,953	-1,269	79	,208	-,63258
	Equal variances not assumed			-1,266	68,321	,210	-,63258
Reading	Equal variances assumed	,034	,853	,147	79	,884	,07197
	Equal variances not assumed			,147	69,660	,883	,07197
Writing	Equal variances assumed	,074	,787	,195	79	,846	,06439
	Equal variances not assumed			,195	68,899	,846	,06439
Speaking	Equal variances assumed	,273	,603	-,397	79	,692	-,11080
	Equal variances not assumed			-,395	67,919	,694	-,11080
Overall	Equal variances assumed	,106	,746	-,518	79	,606	-,60701
	Equalvariances not assumed			-,516	68,159	,608	-,60701

However, as displayed in the Independent Samples t-Test results (Table 7), there is no statistically significant difference t(79)=-1,269, *p*=,20) between females (M=6.20, SD=2.19) and males (M=5.57, SD=2.22) and their listening skill. The same result is echoed with females (M=6.29, SD=2.18) and males (M=6.36, SD

2.14) and reading skill t(79)= ,147, *p*=,88), females (M=4.87, SD=1.46) and males (M=4.93, SD=1.46) and their writing skill t(79)= ,195, *p*=,84), and finally females (M=4.98, SD=1.22) and males (M=4.87,SD=1.25) and their speaking skill t(79)= -,397, *p*=,69). Overall, the mean difference in overall achievement score based on females (M=22.36, SD=5.15) and males (M=21.75, SD=5.23) is not significant t(79)= -,518, *p*=,60). Given the fact that the *p*-value, labeled Sig. (2-tailed), is larger than the significance level $\alpha = 0.05$, we can conclude that there is no statistically significant difference between the respondents' achievement scores based on their gender. That is to say, the mean difference between the overall achievements score based on gender is likely due to chance rather than the "gender" manipulation.

5.1.2. Age Factor

If the Independent Samples t-Test is used to compare the scores of two different groups, One-Way ANOVA is conducted to compare the means of more than two groups. Identically, an F ratio[i] is calculated and represents the variance between the groups and is divided by the variance within the groups. It should be noted that a significant F indicates that the null hypothesis can be rejected; however, it does not tell which of the groups differ from the others.

Table 8: *One-Way ANOVA for Age and English Achievement*

ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Listening	Between Groups	11,810	2	5,905	,212	,303
	Within Groups	379,992	78	4,872		
	Total	391,802	80			
Reading	Between Groups	8,974	2	4,487	,965	,385
	Within Groups	362,680	78	4,650		
	Total	371,654	80			
Writing	Between Groups	4,642	2	2,321	,103	,337
	Within Groups	164,068	78	2,103		
	Total	168,710	80			
Speaking	Between Groups	8,153	2	4,077	,830	,065
	Within Groups	112,347	78	1,440		
	Total	120,500	80			
Overall	Between Groups	120,492	2	60,246	,335	,104
	Within Groups	2012,143	78	25,797		
	Total	2132,636	80			

To determine whether there is a potential significant difference in the participants' achievement scores based on their age, the ANOVA test below indicates, there is statistically non-significant difference between the age categories on listening [F(2,78)=1,21, *p*=,30], reading [F(2,78)=,965 *p*=,38], writing [F(2,78)=1,103, *p*=,33], speaking [F(2,78)=2,83, *p*=,06], and finally overall achievement [F(2,78)=2,335, *p*=,10]. Accordingly, given the fact that the p-value is larger than the theoretical level *p*=.05, the null hypothesis is accepted. Thus, we conclude that the null hypothesis is opposed to the research alternative which states that there is a significant difference between respondents' language achievement, and the age category to which they belong.

5.1.3. Computer Experience Factor

Table 9: *One-Way ANOVA for Computer Experience and English Achievement Scores*

ANOVA

		Sum of Squares	**F**	**Mean Square**	**F**	**Sig.**
Listening	Between Groups	18,141	3	6,047	,246	,299
	Within Groups	373,661	77	4,853		
	Total	391,802	1			
Reading	Between Groups	15,668	3	5,223	,130	,342
	Within Groups	355,987	77	4,623		
	Total	371,654	81			
Writing	Between Groups	1,615	3	1,538	,248	,862
	Within Groups	167,095	77	2,170		
	Total	168,710	81			

Speaking	Between Groups	,810	3	,270	,174	,914
	Within Groups	119,690	77	1,554		
	Total	120,500	81			
Overall	Between Groups	13,055	3	4,352	,158	,924
	Within Groups	2119,581	77	27,527		
	Total	2132,636	81			

The next variable which is investigated in relation to students' level of achievement is their computer experience. Table 9 of the analysis of variance shows that there is a statistically insignificant effect of computer experience based on students' achievement scores at the p-value which is higher than the significance level .05 for listening [F(3,77)=1,246, *p*=.29], reading [F(3,77)=1,130, *p*=.34], writing [F(3,77)=,248, *p*=.86], speaking [F(3,77)=,174 *p*=.91], and overall achievement [F(3,77)=,158 *p*=.92]. Because of the non-significant effect, then the difference between the computer experience and achievement is not great enough to allow the researcher of the present study to rule out a chance or sampling error explanation. In this case, no further interpretation is attempted.

5.1.4. Computer Frequency of Use Factor

Table 10: *One-Way ANOVA for Computer Frequency of Use and English Achievement*

ANOVA

		Sum of Squares	F	Mean Square	F	Sig.
Listening	Between Groups	4,840	3	1,613	,321	,810
	Within Groups	386,962	77	5,025		
	Total	391,802	81			
Reading	Between Groups	22,173	3	7,391	1,628	,190
	Within Groups	349,482	77	4,539		
	Total	371,654	81			
Writing	Between Groups	6,115	3	2,038	,965	,414
	Within Groups	162,594	77	2,112		
	Total	168,710	81			
Speaking	Between Groups	6,913	3	2,304	,562	,205
	Within Groups	113,587	77	1,475		
	Total	120,500	81			
Overall	Between Groups	90,530	3	30,177	,138	,339
	Within Groups	2042,106	77	26,521		
	Total	2132,636	81			

One way ANOVA is conducted, Table 10, to compare the effect of computer frequency of use on achievement scores in English. The ANOVA result reveals statistically insignificant difference between the four groups and listening [F(3,77) =,321, p= .81], reading [F(3,77) =,1.62, *p*= .19], writing [F(3,77) =.965, *p*= .41], speaking [F(3,77) =1,562, *p*= .20], and overall achievement [F(3,77) =1,138, *p*= .33]. Because the p-value is higher than the critical Sig value, we accept the null hypothesis and conclude that there is statistically insignificant effect of the independent variable on achievement score.

5.2. The Follow-up Interviews

Subsequent to the administration of the questionnaire and language tests, interviewees are invited to participate in face-to-face semi-structured interviews. Eight interviewees are asked about their demographic background: Gender, age, computer experience, and computer frequency of use and the potential effect of these variables on their English achievement. This section summaries the themes arising from the interview questions upon which the four research hypotheses are based.

5.2.1. Gender Impact on English achievement

The majority of the interviewees, (N=6, 75%), *Jamal*, *Samia*, *Abdelhadi*, *Zineb*, *Mohamed*, and *Jamal Eddine*, believe that ICT is very meaningful for language skills. That is to say, the use of ICT does not only function as a learning facilitator tool, but also as a tool that paves the way for being a good learner. In the same vein, *Zineb* affirms that she benefits a lot from ICT because it namely develops her reading skill, while *Jamal Eddine* argues that ICT use has become a necessity because it helps a lot in developing, notably his receptive

skills: Reading and listening. However, (N=7, 87,50%) of the respondents believe that their achievement in the four language skills and the way ICT is used for learning purposes within their institution has nothing to do with their being male or female.

Even though *Marwa* and *Jihane* have the same tendency of appreciating the ICT tools they use for learning, their opinions are neutral as they do not think that ICT has always been a helpful tool in developing their four language skills. According to *Marwa*, she often uses ICT for learning, but only because she has to, claiming that *"I do not use ICT because it develops my language skills"*. For the two female interviewees, *Marwa* and *Jihane*, being a female means nothing when it comes to ICT, and their achievement in the four language skills. This is a piece of evidence about the non-existence of a significant link between respondents' gender and their ICT these respondents use to develop their four language skills.

5.2.2. Age Impact on English Achievement

Most of the interviewees (N=5, 62.5%) think that the variable of age does not have a strong effect on the degree of meaningfulness of ICT for developing the four language skills in ICT-based context. However, the exception (N=3, 37.5%) is made by *Samia, Mohamed* and *Jamal Eddine*. They think that age is very critical for higher English achievement. *Mohamed* shares a similar opinion when he says, *"the older you get, the more you find out how to appropriately use ICT*". He goes on saying, *"this has to do with the sense of responsibility that grows more with age and the challenges the academic achievement I have to acquire"*. *Jamal Eddine* argues that *"as I grow older, I pay more attention when technology is used in the classroom. ICT creates a stimulating and motivating learning atmosphere, and yields higher achievement in the four language skills".*

However, for the majority (N=5, 62.5%) of the interviewees, *Jihane, Marwa, Jamal, Abdelhadi, and Zineb*, age is meaningless when it comes to ICT use. In other words, there is no link between the age variable and the interviewees' English language achievement though they often prefer using technology for learning purposes. *Jihane*, an experienced student who is 28 years, claims that *"when I get older, ICT serves as a tool to save my time and effort, but it does not promote my achievement in the four language skills".* As a 24-year student, *Jamal* believes that *"the use of ICT within my English Department is meaningful for one good reason: It helps us keep up with the evolution of technology".* Thus, it is clearly concluded that there are insignificant differences between the age groups represented by the respondents interviewed on their achievement level in the four language skills. The same findings have been echoed in the quantitative data results.

5.2.3. Computer Experience Impact on English Achievement

The third question aims at investigating whether there are any substantial differences between the respondents having different years of computer experience and their English achievement. Four interviewees out of eight (50 %) whose experience is more than 3 years, *Samia, Jamal Eddine, Abdelhadi,* and *Jamal*, strongly agree that more years of computer experience yields higher English Achievement. *Abdelhadi*, the most computer experienced student, absolutely thinks that *"being an expert computer user allows you to be able to find the required tools to achieve better language achievement, namely in the four language skills". Jamal* the least computer experienced user makes no exception as to the effect of computer experience variable on English proficiency.

However, the other remaining interviewees, (N=4, 50%), do not seem to be in favour of years of computer experience as a strong variable influencing respondents' achievement in English. They specify that more years of computer experience may, but does not have to promote respondents' achievement in English. In other words, *Mohamed* whose computer experience is 4 years thinks that one's language skill does not require a significant computer experience; it just requires some computer literacy basics. Differently, *Jihane* whose computer experience exceeds 6 years puts it plainly as that computer experience helps you use the computer in a more efficient way, but this does not necessarily help you foster the four language skills. Therefore, it seems that *Mohamed* and *Jihane* do not follow the same line as the already mentioned four interviewees: *Samia, Jamal Eddine, Abdelhadi*, and *Jamal*. Like the quantitative results, it could be safely concluded that there are no differences between the interviewees' level of English proficiency based on their computer experience.

5.2.4. Computer Frequency of Use Impact on English Achievement

Three (37.5%) out of the eight respondents interviewed, *Marwa, Abdelhadi,* and *Jamal* reason that the type of computer frequency of use has a strong effect on the achievement level of the four language skills. The same respondents argue that their high computer frequency of use has a great contribution to their English proficiency within the Department of English Studies. As she always opts for using computers, *Marwa* believes that *"computer as a learning device has done much for me in terms of writing, speaking and listening". Abdelhadi* holds the same attitude as he contends that *"thanks to my high computer frequency of use, I am excellent at the four language skills"*. *Jamal* shares the same view claiming that because he usually uses ICT for learning, he is good enough at reading, speaking, writing, and excellent at listening.

However, the other interviewees (62.5%) forming the majority, *Samia, Jamal Eddine, Mohamed*, and *Jihane,* express their satisfaction with their level of the four language skills, possibly without the mediation of ICT. The interviewees claim that there are other factors which may foster English language skills. In a lesser extent, *Jamal Eddine* thinks that the high use of computers has helped him a lot in developing his language skills, but high computer frequency of use is not the only reason for his good English achievement. The same is expressed by *Mohamed* and *Jihane* who believe that the frequency of using a computer is only one of the contributing factors to excellence at the four language skills. However, they do not unveil one of these factors. These findings do not run counter to what the quantitative results have indicated as there are insignificant differences between students' computer frequency of use and level of English proficiency.

V. DISCUSSION OF THE FINDINGS

Initially, the respective question that is worth asking is why have both genders almost identical mean scores on their gender and level of English achievement? There is no evidence on the impact on girls' English achievement or the difference between the two genders and their language attainment in technology-based learning. One possible reason why the role of gender in computer-based learning is still unclear may be due to the fact that research results are very difficult to interpret. Possible interpretations should refer to such complex concepts as neurological differences, cognitive gender differences, intelligence, aptitude and environmental influences on gender. As evidenced by some researchers (e.g., Yang, 2007), the impact of gender on language achievement in computer-mediated learning could be attributed to various socio-cultural, and educational factors. Yet, these factors are not within the scope of the current study.

Contrary to what has already been shown by the findings of the present study where gender is not associated with students' achievement, gender issues in computer and technology acceptance have been the source of significant research interest (Acker & Oakley, 1993). Accordingly, Khedekar and Magre (2012) in their study of ICT awareness and academic performance of their respondents with respect to gender have shown a significant difference, it seems to have a greater positive effect on boys than it does on girls. Additionally, some researchers have revealed that there is a difference between language achievement and the way male and female students react to computers (Simon & Werner, 1996).

To this end, the field of research in technology and learning has been described as a male area where females are under-represented (Craig, Fisher & Lang, 2007), suggesting that males have more opportunities and access to computers (Gunn, McSporran, Macleod & French, 2003). However, other studies have suggested that females tend to favour online courses because they are generally more motivated, and better at communicating online and planning their learning (Young & McSporran, 2001).

Based on One-Way ANOVA tests and the follow-up interviews, the results have shown that there is no statistically significant difference between respondents' age groups, and listening, reading, writing, and speaking. Possible reasons behind such slight differences are due to the fact that the older ICT users are less familiar with computer skills when it comes to ICT for learning purposes. Probably, this has to do with their being bored, with the new technology tools, and their being used to their traditional ways of learning. Furthermore, ICT tools do not create a stimulating and motivating learning environment for this specific group of respondents.

The results of the present study are not in line with the literature which has found that age has a significant impact on language achievement. According to Hoskins and Hooff (2005), the existing research demonstrates that age is a powerful predictor of language achievement in technology-based learning, with older users doing better than younger students. The amount of time learners spend online, and the time devoted for reading increases with students' age. In like vein, Lim and Morris (2009) find out that mature-aged students have significantly higher mean scores in learning outcome, learning application, and learning involvement scores before and after each semester in computer-based learning than those who are between 18 and 19 years. Unlike these circumstances, Alstete and Beutell (2004) report student's age to be a significant factor, with older students more likely to use online conferences, and tend to get better scores in e-learning. This suggests that immature students may not be ready for self-directed nature of online learning and may need help on the part of their teacher in online learning.

According to both quantitative and qualitative data results, respondents do not differ in their years of computer experience categories in relation to their achievement scores. The same respondents do not seem to be in favour of years of computer experience as a strong variable influencing their proficiency. This is further confirmed by Ventura and Ramamurthy (2004). The two scholars investigate the effect of computer experience on students' achievement, and reveal that there is no statistically significant relationship between computer frequency and English attainment.

The objective of this research theme is to discuss and to interpret the whys and the wherefores behind such a non-significant relationship. In the present study, Moroccan university students lack high levels of computer experience which may not, therefore, reduce the level of computer anxiety. Gayle and Thompson

(1995) suggest that both the type and amount of computer experience are linked to lower levels of computer anxiety. Further studies such as the one conducted by Dyck and Smither (1994) find that there is a significant relationship between computer experience and computer anxiety. That is to say, higher levels of experience are associated with lower levels of computer anxiety and high academic achievement. Jackson, von Eye and Biocca (2003) argue that, students with greater computer experience are considerably associated with better performance on standardized reading test. Rather, computer experience depends on several factors: Taking computer courses, spending enough time on computers, having a computer at home, and being able to use computers for various purposes (Anderson, 1987). In a study, Loyd and Gressard (1984) assert that there is a significant relationship between developing positive attitudes towards computers and being experienced on computers.

Other studies have reported that previous computer experience and the quantity of online courses taken better predict students' learning achievement (Lim & Kim, 2003), and confidence in using computers (Contreras, 2004). It could be concluded that students with access to computers at home demonstrate an increased level of confidence, and comfort when using their computers. These students have an advantage of computer knowledge and skills. This is consistent with Tsikalas, Lee, and Newkirk (2007) who find that 74% of the students they questioned feet more confident at school as a result of having a home computer.

The ANOVA tests and qualitative tools have shown insignificant differences between the four groups and listening, reading, writing, speaking and overall achievement. Contrary to what has already been revealed by the findings of the present study where the quantity of use is not associated with the level of the respondents' achievement, Krentler and Willis-Flurry (2005) examined a sample of 445 American students, and found out that there is a positive correlation between the frequency of computer use in technology-related courses, and English academic achievement. However, this study gains limited results as it ignores the quality of ICT use, and failed to control major demographic differences such as gender, age, and socio-economic status. Presumably, these variables could affect the level of significance of the correlation.

Additionally, other scholars like Lei and Zhao (2007) seem to be very convinced about the strong connection that binds frequency of use to English achievement. They used a sample of 130 students to investigate the correlation between quantity and quality of computer use on English achievement. Their results show that both quantity and quality are significant predictors of academic achievement. For quantity of use, they found that students who very often used computers experience a decrease in achievement while students who frequently use computers experience an increase.

VI. CONCLUSIONS

The ultimate aim of the present study is to examine the potential impact of students' demographic variables on their level of EA in ICT-based environment. By addressing our research hypotheses, it has been demonstrated that there is no statistically significant difference between the four types of demographics, and EA as reflected in the four-skill scores. The present study is therefore an attempt to explain and understand better respondents' suggested demographics and fix any flaws affecting their EA. Among its top implications, courseware designers and decision makers should get involved in the process of devising content of courseware with considerable attention to students' gender, age, linguistic and cultural background, computer experience, and the language skills being taught.

Azize EL GHOUATI graduated with an M.A in Applied Linguistics from Moulay Ismail University of Meknes, and a Ph.D in Language and Society from Ibn Tofail university of Kenitra. El Ghouati is a part time professor at the school of Arts and Humanities within the English Department, Ibn tofail University of Kenitra. His main research interests are in the areas of applied linguistics, ICT, intercultural communication, and English for specific purposes.

Bani KOUMACHI graduated with an M.A. in applied linguistics from Moulay Ismail University, Meknes, Morocco and a Ph.D. in organizational communication from Sidi Mohamed Ben Abdellah University, Sais Fes, Morocco. He is currently an associate professor at the School of Arts and Humanities, Ibn Tofail University, Kénitra, Morocco. His main interests are: intercultural communication, organizational communication, knowledge management, professional development, ICT as well as applied linguistics issues.

Abderrahim KHOUMICH graduated with an M.A. in applied linguistics from Moulay Ismail University, Meknes, Morocco and a Ph.D. candidate in the same university. Khoumich is a part time professor at the school of Arts and Humanities within the English Department, Moulay Ismail University of Meknes. His main interests are: Learning Strategies, Multiple intelligences, self directed learning, as well as Gender studies.

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