A case study of learning styles of older adults attending an English course

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ABSTRACT

The education of older adults is of special interest to instructors and researchers involved in lifelong education. There is not an overabundance of research in the area of the learning styles of this age group, and the exploration of it might produce significant insights about materials and methodologies that may meet their learning needs successfully. This study analyses the learning styles preferred by a group of older adults in the city of Cuenca, Ecuador. Sixty-six participants (with an average age of 71.05) taking English as a foreign language course responded to the 44-item questionnaire on learning styles by Felder & Soloman (1997). The information of the respondents using statistical and correlation analyses permitted to define the prevailing learning styles and its relation with the sociodemographic characteristics of the participants. The results indicate that older adults express preference for the sensing, active, visual, and sequential styles, being people who tend to work better with facts rather than theories. They also like teamwork, prefer images to sounds, and are methodical in their learning process. In addition, the results reveal the positive correlation of the variables age, level of English, and level of education and occupation before retirement. The two last-mentioned were found to be determinant in the preferences of the participants.

Keywords: Older adults, learning styles, lifelong learning, EFL.

RESUMEN

El aprendizaje en la tercera edad es de especial interés para docentes e investigadores involucrados en la educación permanente. Un ámbito probablemente poco conocido es el de los estilos de aprendizaje de este grupo etario, cuyo estudio podría desvelar aspectos significativos sobre materiales y metodologías que podrían cubrir sus necesidades de aprendizaje. Este trabajo analiza los estilos de aprendizaje preferidos por un grupo de adultos mayores en la ciudad de Cuenca, Ecuador. Un total de 66 participantes (con edad promedio de 71.05 años), que tomaron un curso de inglés como lengua extranjera, respondió el cuestionario de 44 ítems sobre estilos de aprendizaje de Felder & Soloman (1997). Se llevó a cabo análisis estadísticos y análisis de correlación entre variables sociodemográficas con el propósito de determinar los estilos de aprendizaje preponderantes del grupo intervenido y su relación con las características sociodemográficas de los participantes. Los resultados señalan que los adultos mayores, en su mayoría, tienen preferencia por los estilos sensitivo, activo, visual, y secuencial, siendo así personas que tienden a trabajar mejor con hechos antes que con teorías, que gustan del trabajo en equipo, que prefieren imágenes a sonidos, y que son metódicos en su proceso de aprendizaje. Además se evidenció la correlación positiva de las variables edad, nivel de inglés, y nivel de educación y ocupación antes de la jubilación, siendo las dos últimas variables las determinantes en las preferencias de los participantes.

Palabras clave: Adultos mayores, estilos de aprendizaje, aprendizaje permanente, EFL.

1.   INTRODUCTION

Older adults interested in learning a foreign language is a worldwide phenomenon (Kim & Kim, 2014) and, particularly, in Ecuador there is an increasing tendency of senior citizens not only interested in learning languages, but also other fields like gerontology or electronic communication ("Nuevo", 2014). However, little is known about the learning styles of older adults and whether the teaching styles of their instructors fit the needs of this specific category of students.

Several studies reported the benefits of knowing the learning styles for both teachers and learners. On the one hand, when teachers are aware of their students' learning styles, they can adapt their own materials and strategies to enhance the classroom environment (Baleghizadeh & Shayegui, 2014; Keefe, 1979; Guild & Garger, 1998; Nogales, 2001; Popescu, 2009; Moussa, 2014; Feldman, Monteserin & Amandi, 2014). Additionally, the instructors might accommodate their evaluation tools to fit their students' way of learning to help them improve their test scores (Sims & Sims, 1995; Pitts, 2009; Arias, Zerraga & Justo, 2014). Some researchers even state that when teachers realize the importance of knowing the learning styles of their students, teachers become more sensitive and receptive and, therefore, more effective since they are willing to change their way of teaching in order to meet such styles (Price & Griggs, 1985; Alecu, 2011). On the other hand, when students are conscious of their learning styles and start to use their preferred ones when being taught, they tend to improve their grades and their attitude in the classroom, and they even show better discipline than when they are taught and use styles they do not feel comfortable with (Dunn *et al.*, 1982; Dunn & Dunn, 1992; Kazu, 2009). As a result, students feel more motivated, learn more easily and faster, and they become successful learners (Brown, 1994; Biggs, 2001; Popescu, 2009; Kharb, Samanta, Jindal & Singh, 2013; Abbasian, Khajan & Rahman, 2014). All these findings seem to demonstrate the importance and, maybe, the necessity, for both educators and learners, of being aware of the styles of students in order to achieve better outcomes in their learning process.

The first thorough study of learning styles can be traced back to the 1920s when Jung (1921) published his work, *Psychological Types,* in which one of the most relevant conclusions is that learning styles result from people's preferred ways of adapting in the world. From then the field of learning styles continued to be extensively researched, and in the 1970s key findings were widely reported. These findings helped us to have a deeper understanding of the particularities of the learning process. Several authors have done in-depth research into learning styles; those most frequently cited are briefly summarized in the following.

Dunn *et al.* (1982) designed the Learning Style Inventory, a 100-item questionnaire to determine the learning preferences of individuals. This instrument was developed after Dunn and Dunn identified twenty-two basic elements as important components of learning style. These elements were organized into five main categories that influence the learning process, respectively: environmental (like sound, light, or temperature), emotional (motivation, persistence, or responsibility), sociological (grouping configurations), physiological (perceptual strengths, food or drinks, time of day, and need for mobility), and psychological (strategies to deal with learning problems) (Dunn, Rundel & Burke, 2007).

Another view is that of Kolb (1984), whose research on learning styles is based on his experiential learning theory, in which he introduces a definition of learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). This theory suggests that effective learning occurs when a person goes through the four stages included in that process, i.e., concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). That person's experiences lead them to reflection and observation; then "an individual uses these observations to build an idea, generalization, or theory from which new implications for actions can be deduced; these implications or hypotheses serve then as guides in creating new experiences" (Kolb, 1981, p. 235). As a result of this approach, Kolb suggests the existence of four types of learning styles: a) Converging, featuring AC and AE abilities, i.e., individuals who prefer to solve problems and work on technical tasks; b) Diverging, featuring CE and RO abilities, i.e., individuals who prefer to deal with things rather than people, and work on practical applications of ideas; c) Assimilating, featuring AC and RO abilities, i.e., individuals who prefer to create theoretical

models and work on abstract concepts; and d) Accommodating, featuring CE and AE abilities, i.e., individuals who prefer to get involved in new experiences and can easily adapt to unexpected situations.

Lastly, Richard Felder's studies on learning styles have widely been reported. His findings oriented the development and completion of this work. Felder & Silverman (1988) state that students' learning processes work according to values included in four dimensions (each of which defines two opposite learning styles):

1) Perception: the type of information preferred to perceive; individuals can be either sensing (they like facts and prefer to solve problems through conventional methods; they are cautious but slow sometimes), or intuitive (those who prefer theories; intuitors like innovation and are good at understanding new concepts).

2) Processing: how perceived information turns into knowledge; individuals can be either active (they prefer hands-on activities, work in groups, and tend to be experimentalists), or reflective (these learners work better when they have enough time to think about the information presented; they prefer to work alone and tend to be theoreticians).

3) Input: how external information is perceived; individuals can be either visual (their best way to remember data is through images like pictures, diagrams, films, charts, among others), or verbal (they remember well what they hear and say).

4) Understanding: how individuals progress towards knowledge; they can be either sequential (when solving problem, they follow linear reasoning processes and are able to understand information coming from incomplete data), or global (they learn in large jumps, solving problems quickly but also being unable to explain how they did it).

These findings led Felder & Soloman (1997) to formulate their Index of Learning Styles (ILS), a 44-question instrument featuring 11 items for each dimension: perception, processing, input, and understanding (see Appendix). This questionnaire is thoroughly explained in the methodology section.

All these studies provide rich information about how individuals learn and what their preferred way(s) of learning is/are, which might be very useful for students and instructors to improve the quality of their learning and teaching outcomes (Felder & Silverman, 1988; Kolb & Kolb, 2005). With respect to older adults, some studies suggest that their way of learning is just similar to that of adults (Gómez, 2008); others have found that older adults are people who primarily prefer to learn things for practical applications (Keir, 1987; Bissland, 2013); and others indicate that senior men prefer to learn in a significantly different way from senior women, especially in regard to the subjects they choose to take: older women prefer personal or self-fulfillment type topics (Hiemstra, 1993; Van Wynen, 2001). However, there is limited information about the preferred styles of older adults when learning a foreign language. In an attempt to deepen the understanding of the way senior citizens learn, particularly in foreign language courses, this study aims to determine the learning styles of a group of older adults who took an English course in Cuenca, as well as to ascertain to what extent those preferences are influenced by the socio-demographic variables such as age, knowledge level of English before taking the course, level of education and occupation before retirement.

2.   METHODOLOGY

2.1.   *Participants and context*

The target population consisted of 66 senior citizens taking a six-month English course at the University of Cuenca, in Ecuador, during the 2014-2015 academic year. This course was taught as part of a research project aiming to assess the effects of learning English upon the cognitive processes of older adults (Estévez, Webster, Mora, García, Cisneros *et al*., 2016). The participants took a placement test before the beginning of the course and then three classes were offered: one called *Starter,* for those who had never taken English classes before (32 participants); another called *Elementary,* for those who had some knowledge of English, equivalent to level A1 of the Common European Framework of References for Languages (CEFR) (Council for Cultural Cooperation, 2001) (15 participants); and one called *Pre-*

Intermediate, featuring older adults who could have conversations in English about topics that were familiar or of personal interest, equivalent to level B1 of the CEFR (19 participants).

The average age of the sample population was 71.05, of which 5 participants had attended primary school, only 40 matriculated from secondary school, and 21 went to college. Furthermore, 23 were blue-collar workers before retirement, while 43 were white-collar workers. Table 1 summarizes the participants' socio-demographic profile.
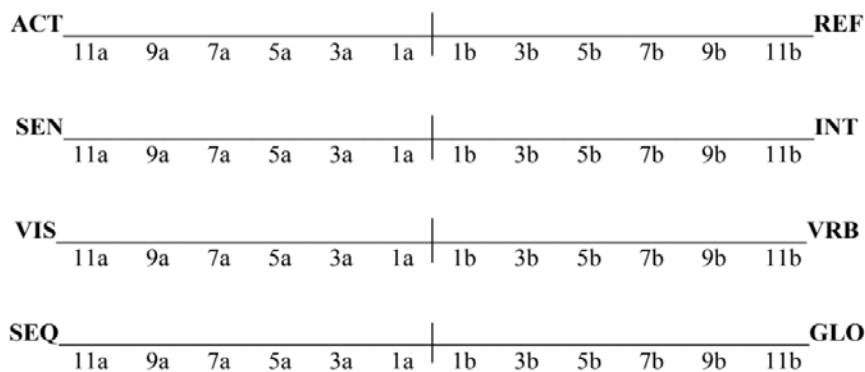
Table 1. Participants' socio-demographic profile.

Parameter	Group	n	%
Age range	65-70 years	39	59
	71-80 years	25	38
	81-85 years	2	3
Gender	Male	28	42
	Female	38	58
School level	Elementary	5	8
	High school	40	60
	University	21	32
Occupation before retirement	Blue-collar workers	23	35
	White-collar workers	43	65

2.2. Data collection

The instrument used to determine the learning styles of the participants was the ILS by Felder & Soloman (1997), a questionnaire featuring 44 dichotomic questions. Each question (11 for each of the four dimensions explained above) has two choices (*a* or *b*), which are opposing learning styles: sensing or intuitive, active or reflective, visual or verbal, and sequential or global. After selecting either *a* or *b* throughout the questionnaire, each section corresponding to those dimensions, displays a larger number of *a*'s and a smaller number of *b*'s -or the reverse-. Then, the smaller total is subtracted from the larger one, and the difference (an odd number between 1 and 11 per dimension) and the letter *a* or *b,* for which the total is larger, represents the final score, which shows which style prevails. For instance, if under the dimension perception (*a) sensing* or *b) intuitive*) there are 8 *a*'s and 3 *b*'s, the score is 5 *a*'s, meaning that there is a preference for the sensing style. The score obtained from the ILS is interpreted according to three levels of preference: those with a low score (1-3) are well balanced on the two learning styles of a specific dimension; those with a score of 5-7 have a moderate preference for one of the styles; and those with a high score (9-11) have a strong preference for one learning style of that dimension (Felder & Spurlin, 2005).

Table 2. Levels of preference according to the score obtained from the ILS.

ACT											REF
11a	9a	7a	5a	3a	1a	1b	3b	5b	7b	9b	11b

SEN											INT
11a	9a	7a	5a	3a	1a	1b	3b	5b	7b	9b	11b

VIS											VRB
11a	9a	7a	5a	3a	1a	1b	3b	5b	7b	9b	11b

SEQ											GLO
11a	9a	7a	5a	3a	1a	1b	3b	5b	7b	9b	11b

Since this course was taught within the framework of a research project, the participants had already been told at the beginning of the course that, besides usual English tests, a number of surveys and questionnaires would be administered in the classroom at different times. The researchers had the participants engaged in different course activities for several weeks, expecting that their responses would resemble the experience they were undergoing during the course. Then, in the fourth month of the course, the ILS questionnaire was applied.[1] This instrument was translated into Spanish by the researchers so that the senior citizens, especially those in the Starter and Elementary groups, could feel confident enough to fully understand the questions and give suitable answers.

3. ANALYSIS AND RESULTS

The average response of the participants regarding their preferred way(s) of learning English is shown in Fig. 1. The results feature the four dimensions established by Felder & Soloman (1997): perception, processing, input, and understanding. As can be seen, 94% of the participants are sensing and only 6% are intuitive, meaning that almost all of them prefer to deal with learning problems through methods they already know to avoid further difficulties when attending an English course; thus, they are patient and more practical than intuitive learners. On the other hand, 71% of the participants are active learners, almost three times more than those deemed reflective (29%); this implies that this group of older adults prefer to analyze new information by discussing it with their peers, rather than working on their own; hence there is an evident greater tendency to group work, which might be explained because of common difficulties faced either when learning a foreign language for the first time or when recalling what was learnt a long time ago. In either of those circumstances, students tend to get together to help each other. In the same vein, almost two-thirds of the older adults (65%) prefer to study aided by images, diagrams, and videos, among others, rather than listening when learning English, which might also be explained because of the difficulty of understanding someone speaking a foreign language by solely listening to them. Seeing words and images seems to mitigate such difficulty. Lastly, Figure 1 shows that 73% of the participants tend to grasp new information sequentially rather than globally: the complexity that learning a foreign language might represent to some students, especially beginners, seems to compel them to go step by step when trying to understand grammar rules, syntactic structures, and concepts, among others.
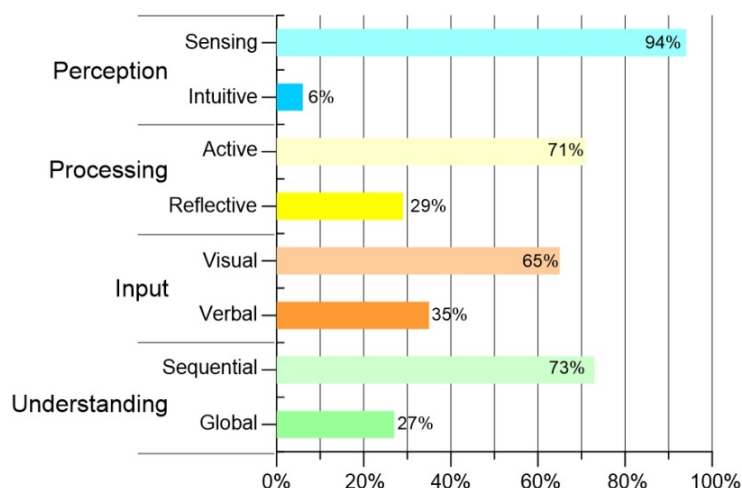

Figure 1. Overall percentages of learning style preferences of older adults.

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[1] This questionnaire is currently available online and for free (https://www.webtools.ncsu.edu/learningstyles/).

Besides determining the preferred learning styles of the participants, a correlation of those preferences with some sociodemographic variables was carried out. The statistically significant correlations are as follows:

Level of English language proficiency and learning style preference

As it was indicated in the methodology section above, three classes were opened according to the results of an English placement test. Figure 2 shows that the starters have a moderate preference for the sensing, visual, and active styles; on the other hand, there is a mild preference for the remaining learning styles, and no strong preference for any of them. In regard to the elementary students, the data indicate that they have a mild preference for almost all the learning styles, and consequently they are able to adapt to the opposite style of each of the corresponding dimensions; however, there is a moderate preference for the sensing, active, and sequential styles. With reference to the pre-intermediate students, they tend to have a moderate preference for the sensing, active, and verbal styles, but mostly, they actually have a mild preference for all the styles.
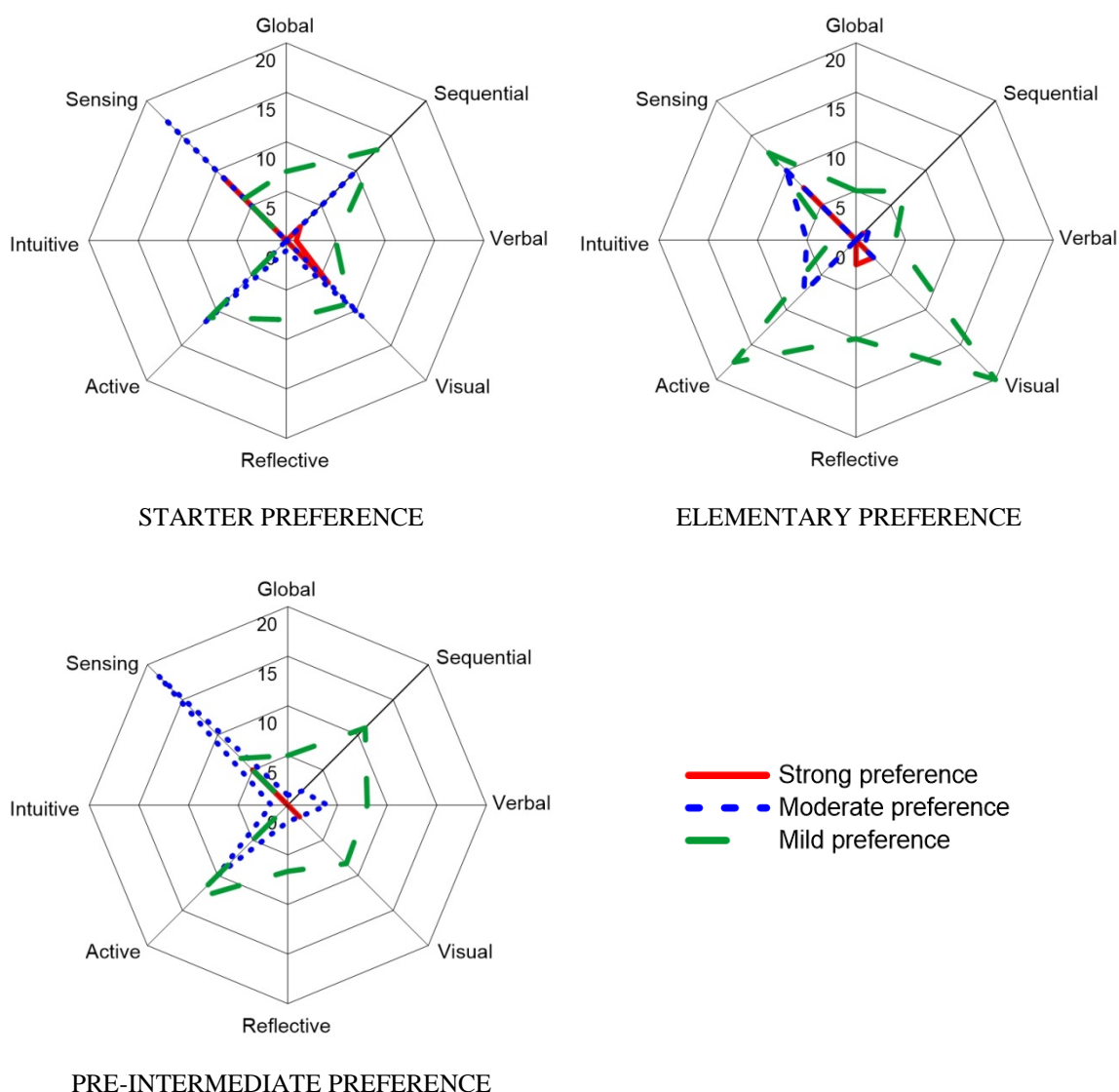

STARTER PREFERENCE

ELEMENTARY PREFERENCE

PRE-INTERMEDIATE PREFERENCE

Figure 2. Levels of preference according to the students' English proficiency.

Age and learning style preference

To reveal this correlation, the data were subjected to an analysis based on the Pearson correlation coefficient.[2] According to Table 3, age is positively, moderately and significantly correlated with the reflective style, i.e., the older a person the more likely they are to be reflective. Likewise, the data show that if a student has a moderate or strong preference for the visual style, they are also going to have the same level of preference for the sequential style.

In order to shed light on the importance of the variables mentioned above, a correlation between them and the learning preferences of older adults reveals that the starters do not show a statistically significant correlation in regard to their sociodemographic characteristics. On the other hand, the analysis indicates a positive (0.915) and significant (p=0.03) correlation between the age of elementary learners and the reflective style; data also show that the younger the pre-intermediate learners are, the stronger their preference for the sequential style is (Pearson correlation= -0.657; significance= 0.015).

Table 3. Correlation between age and learning styles.[3]

		Sensing	Active	Reflective	Visual	Verbal	Sequential	Global
Age	Pearson correlation	-.086	.057	.392	-.136	-.297	-.223	-.281
	Significance (two-tailed)	.508	.703	.097(*)	.385	.169	.128	.259
	N	62	47	19	43	23	48	18
	N	17	0	19	12	7	11	8
Visual	Pearson correlation	.207	.251	.032	1	.a	.468	0.000
	Significance (two-tailed)	.195	.173	.921			.008(**)	1.000
	N	41	31	12	43	0	31	12

(**) Correlation is significant at 0.01 level (two-tailed)
(*) Correlation is significant at 0.1 level

Table 4. Correlation between age of elementary learners and learning styles.

		Age	Sensing	Intuitive	Active	Reflective	Visual	Verbal	Sequential	Global
Age	Pearson correlation	1	-.108	.945	-.363	.915*	-.003	-.261	-.435	-.300
	Significance (two-tailed)		.739	.212	.303	.030	.994	.671	.209	.623
	N	15	12	3	10	5	10	5	10	5

Table 5. Correlation between age of pre-intermediate learners and learning styles.

		Age	Sensing	Intuitive	Active	Reflective	Visual	Verbal	Sequential	Global
Age	Pearson correlation	1	-.246	.a	.139	.305	-.077	-.142	-.657*	-.296
	Significance (two-tailed)		.325		.637	.618	.870	.659	.015	.569
	N	19	18	1	14	5	7	12		13

Educational level/Occupation before retirement and learning style preference

In regard to the level of instruction of the participants and their occupations before retirement, these variables correlate significantly with the sensing style, meaning that people who did not go on to higher education and worked as crafts persons, drivers, self-employed administrators, and those engaged in household chores, among others, have a stronger preference for that style than for the remaining ones. This is shown in Table 6, which also indicates that the participants who got involved in higher academic studies tend to be global learners.

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[2] The Pearson correlation coefficient ranges from -1 to +1; the nearer the coefficient is to 0, the lower the evidence of correlation between the variables.

[3] The intuitive style is not shown in this table because the level of preference for this style according to the Pearson correlation coefficient is not significant.

Table 6. Chi-Square test between educational level/occupation before retirement and style preference(s).

Chi-square test: Occupation before retirement and the sensing learning style				Chi-square test: Educational level and the global learning style			
	Value	df	Asymptotic sign. (two-tailed)		Value	df	Asymptotic sign. (two-tailed)
Pearson Chi-Square	20.477	8	0.009**	Pearson Chi-Square	11.571	2	.003**
Likelihood Ratio	24.893	8	0.002	Likelihood Ratio	14.539	2	.001
Linear-by-Linear Association	1.403	1	0.236	Linear-by-Linear Association	8.862	1	.003
Number of Valid Cases	62			Number of Valid Cases	18		

(**) Significant at 0.01 level (two-tailed)

4.   DISCUSSION

The purpose of this study was to determine the learning styles of a group of older adults who took an English course in Cuenca, and their possible correlation with the variables age, level of English, and level of education and occupation before retirement. Even though this study is exploratory, which could be considered not representative, it may offer useful information on the correlations between the preferred styles of senior citizens and their socio-demographic characteristics, and thus, provide research questions for future studies on lifelong learning.

In order to find out the learning styles preferred by the group of older adults, the ILS by Felder & Soloman was used. The results of this survey reveal that the participants are mainly sensing, active, visual, and sequential learners, meaning that the type of information they prefer to learn when dealing with an English course is facts rather than theories; they like working on activities which allow them to experiment with the target language; they prefer images rather than sounds when learning it; and they also prefer going step by step when dealing with solving problems regarding the language course. These findings are consistent with those by Truluck & Courtenay (1999), which revealed that in a group of 172 older adults, a large percentage preferred the accommodator, assimilator, and diverger styles, according to Kolb's LSI; these styles feature active participation and a combination of abstract, concrete and reflective abilities when involved in learning activities. Similarly, a study by Martín-García (2003) suggests that seniors are mainly assimilators and divergers: they tend to prefer learning abstract concepts and look at things from different perspectives. These studies, however, differ from those by Bissland (2013), which indicated that older adults tend to be primarily theorist and reflector (according to the categorization of Honey & Mumford (1986)), meaning that they want to understand the theory behind the actions and consider different options before trying them out. Mathews & Yoong (2014), on the other hand, state that older adults tend to be verbal rather than visual learners, and look for interaction when engaged in a learning environment. Even though the studies previously mentioned feature the styles of older adults in nonspecific subjects, they also suggest the potential preferences elderly people might have when dealing with learning activities in an English course.

When analyzing the learning styles of the present group of older adults and their sociodemographic variables, three correlations were found to be statistically significant:

1. Level of English proficiency and learning style preference: the data of this study indicate that the learning styles of the participants are likely to vary as their proficiency increases. In the same way, their level of preference for certain styles tend to vary, as well. These interpretations are supported by similar findings like those of Becher (2001), who states that when students interact with their peers and instructors, they often adopt certain strategies which allow them to be in line with the demands of the course they are taking; as a result, their learning styles are likewise to vary. Similarly, the findings of Kolb (1981), Ventura (2010), Juárez-Muñoz, Gómez-Negrete, Varela-Ruiz, Mejía-Aranguré, Mercado-Arellano, Sciandra-Rico, and Matute-González (2013), and

Freiberg & Fernández (2015) in this field suggest that people have the tendency to modify their learning preferences as they age. Felder & Spurlin (2005) also support this assertion by stating that educational experiences can affect learning style preferences, as when a student with a strong preference for a particular style is exposed to a learning environment where the opposite style is emphasized, this student might increase the preference for the latter while the former preference might decrease as a result of the different learning experience.

2. Age and learning styles preference: age also seems to influence learning style preferences among older adults. Even though the overall results of the ILS indicate that one of the styles most of the participants prefer is the active one (in the processing dimension), the statistical analysis shows that the older seniors (those over 70) are mostly reflective. This might mean that their learning preferences vary as they get older (at least in the dimension mentioned before). This variation in learning style preferences is supported by the findings of Dorsey & Pierson (1984) and Gardner (1987), who state that younger people are usually active learners while older ones are mainly reflective and abstract. Other studies of the same nature confirm this alteration (Mickler & Zipper, 1987; Reid, 1987; Miglietti & Strange, 2002; Bista, 2008; Ventura, 2010; Tuan, 2011; Karthigeyan & Nirmala, 2013; Major, 2014). In this context, Tuan (2011) argues that "learning styles vary with age" (p. 315); and Dunn and Griggs (1998) claim that the auditory and visual abilities of people in older age tend to become stronger.

3. Educational level/Occupation before retirement and learning style preference: according to the findings of this study, the participants with some high school education or less (being *blue-collar workers* mainly) prefer facts when perceiving information; on the other hand, those with higher educational levels (mainly *white-collar workers*) tend to perform global analyses of the information provided. This might mean that the participants who did not finish high school, did not acquire knowledge necessary to cope with abstract/theoretical information and took up occupations that did not require a high school diploma. The ones who did obtain a degree, on the contrary, got engaged in jobs requiring complex reasoning abilities. Therefore, the learning styles of the latter group differ from those of the former one in some respects. This finding is consistent with the results in prior studies (Truluck & Courtenay, 1999; Roberts, 2013) in which the participants with lower educational levels showed somewhat different learning preferences from those with higher levels.

5.   CONCLUSIONS

The results of this study may be of special interest to people and/or organizations dealing with lifelong learning. By knowing the learning styles of older adults engaged in learning processes, instructors might be able to devise effective strategies to create an atmosphere that suits their students' preferences. In this way, if instructors want to be successful when teaching English to older learners, they should take into consideration the materials they provide their students so that they feel comfortable, as well as the classroom activities implemented. Some of the materials and activities preferred by sensing, active, visual, and sequential learners, who seem to be most of the participants in this study, include but are not limited to providing specific examples (by the instructor), group work, visual representation of course material, and outlining lecture material in logical order and relating it to things already known, among others. This does not mean, however, that instructors cannot try strategies featuring materials and/or activities suiting different learning preferences. Even though the majority of the participants in this study showed the aforementioned features (the same as the results of some studies cited previously), older learners might modify their styles in such a way that their preferences change as time goes by due to factors like the progress of their English proficiency and/or aging. Conducting the ILS might shed light on the actual preferences of students taking a specific course to help instructors plan their syllabus accordingly. In this context, future studies should attempt to corroborate whether the learning styles preferred by older adults -in English and other areas- are similar to the ones indicated in this work.

One of the limitations of this study was the small size of the sample, which restricted the use of other statistical indicators and turned it difficult to find significant relationships from the data. This

sample size issue is a result of another limitation regarding the small number of language courses for older adults existing in Cuenca, Ecuador. Actually, the senior centers in the city do not offer them foreign language courses. The only institution currently providing English language courses for older adults is the University of Cuenca by means of the Continuing Education Department. These training courses are new and that might explain the limited number of participants. All these limitations make this study exploratory, which suggests the need of further research on the way older adults learn.

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Appendix

Index of Learning Styles (ILS), Felder & Soloman (1997)

Directions

To complete the questionnaire please circle "a" or "b" to indicate your answer to every question. You may only choose one answer for each question and you must answer every question. If both "a" and "b" seem to apply to you, please choose the one that applies more frequently.

1. I understand something better after I
   (a) Try it out.
   (b) Think it through.
2. I would rather be considered
   (a) Realistic.
   (b) Innovative.
3. When I think about what I did yesterday, I am most likely to get
   (a) A picture. (b) Words.
4. I tend to
   (a) Understand details of a subject but may be fuzzy about its overall structure.
   (b) Understand the overall structure but may be fuzzy about details.
5. When I am learning something new, it helps me to
   (a) Talk about it.
   (b) Think about it.
6. If I were a teacher, I would rather teach a course
   (a) That deals with facts and real life situations.
   (b) That deals with ideas and theories.
7. I prefer to get new information in
   (a) Pictures, diagrams, graphs, or maps.
   (b) Written directions or verbal information.
8. Once I understand
   (a) All the parts, I understand the whole thing.
   (b) The whole thing, I see how the parts fit.
9. In a study group working on difficult material, I am more likely to
   (a) Jump in and contribute ideas.
   (b) Sit back and listen.
10. I find it easier
    (a) To learn facts.
    (b) To learn concepts.
11. In a book with lots of pictures and charts, I am likely to
    (a) Look over the pictures and charts carefully.
    (b) Focus on the written text.
12. When I solve math problems
    (a) I usually work my way to the solutions one step at a time.
    (b) I often just see the solutions but then have to struggle to figure out the steps to get to them.
13. In classes I have taken
    (a) I have usually got to know many of the students.
    (b) I have rarely got to know many of the students.
14. In reading non-fiction, I prefer
    (a) Something that teaches me new facts or tells me how to do something.
    (b) Something that gives me new ideas to think about.
15. I like teachers
    (a) Who put a lot of diagrams on the board?
    (b) Who spend a lot of time explaining?

16. When I am analyzing a story or a novel
    (a) I think of the incidents and try to put them together to figure out the themes.
    (b) I just know what the themes are when I finish reading and then I have to go back and find the incidents that demonstrate them.
17. When I start a homework problem, I am more likely to
    (a) Start working on the solution immediately.
    (b) Try to fully understand the problem first.
18. I prefer the idea of
    (a) Certainty.
    (b) Theory.
19. I remember best
    (a) What I see.
    (b) What I hear.
20. It is more important to me that an instructor
    (a) Lay out the material in clear sequential steps.
    (b) Give me an overall picture and relate the material to other subjects.
21. I prefer to study
    (a) In a group.
    (b) Alone.
22. I am more likely to be considered
    (a) Careful about the details of my work.
    (b) Creative about how to do my work.
23. When I get directions to a new place, I prefer
    (a) A map.
    (b) Written instructions.
24. I learn
    (a) At a fairly regular pace. If I study hard, I'll "get it."
    (b) In fits and starts. I'll be totally confused and then suddenly it all "clicks."
25. I would rather first
    (a) Try things out.
    (b) Think about how I'm going to do it.
26. When I am reading for enjoyment, I like writers to
    (a) Clearly say what they mean.
    (b) Say things in creative, interesting ways.
27. When I see a diagram or sketch in class, I am most likely to remember
    (a) The picture.
    (b) What the instructor said about it.
28. When considering a body of information, I am more likely to
    (a) Focus on details and miss the big picture.
    (b) Try to understand the big picture before getting into the details.
29. I more easily remember
    (a) Something I have done.
    (b) Something I have thought a lot about.
30. When I have to perform a task, I prefer to
    (a) Master one way of doing it.
    (b) Come up with new ways of doing it.
31. When someone is showing me data, I prefer
    (a) Charts or graphs.
    (b) Text summarizing the results.
32. When writing a paper, I am more likely to
    (a) Work on (think about or write) the beginning of the paper and progress forward.
    (b) Work on (think about or write) different parts of the paper and then order them.
33. When I have to work on a group project, I first want to
    (a) Have a "group brainstorming" where everyone contributes ideas.
    (b) Brainstorm individually and then come together as a group to compare ideas.

34. I consider it higher praise to call someone
    (a) Sensible.
    (b) Imaginative.
35. When I meet people at a party, I am more likely to remember
    (a) What they looked like.
    (b) What they said about themselves.
36. When I am learning a new subject, I prefer to
    (a) Stay focused on that subject, learning as much about it as I can.
    (b) Try to make connections between that subject and related subjects.
37. I am more likely to be considered
    (a) Outgoing.
    (b) Reserved.
38. I prefer courses that emphasize
    (a) Concrete material (facts, data).
    (b) Abstract material (concepts, theories).
39. For entertainment, I would rather
    (a) Watch television.
    (b) Read a book.
40. Some teachers start their lectures with an outline of what they will cover. Such outlines are
    (a) Somewhat helpful to me.
    (b) Very helpful to me.
41. The idea of doing homework in groups, with one grade for the entire group,
    (a) Appeals to me.
    (b) Does not appeal to me.
42. When I am doing long calculations,
    (a) I tend to repeat all my steps and check my work carefully.
    (b) I find checking my work tiresome and have to force myself to do it.
43. I tend to picture places I have been
    (a) Easily and fairly accurately.
    (b) With difficulty and without much detail.
44. When solving problems in a group, I would be more likely to
    (a) Think of the steps in the solution process.
    (b) Think of possible consequences or applications of the solution in a wide range of areas.