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Factors that adults attribute for finishing an xMOOC on energy sustainability*

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ABSTRACT

MOOCs are mainly being used by adults with an educational background of a college degree. Despite the disappointing results in the statistics of completion of the courses, specialists suggest moving the attention from the completion of these to focus on the intentions of the students. Meanwhile, researchers have mainly studied the obstacles why students do not finish MOOCs, but little has been studied about what the success factors are for the participants. The present investigation tries to study specifically the adult participants, divided into three age groups, to compare which are the most influential factors to finish a MOOC. In this research, participants from different Spanish-speaking countries were chosen (n = 1978) to compare the factors that most influenced them to complete a MOOC. It was identified that among the age groups of adults, the most relevant factor to finish a MOOC were the personal factors; which may include the way of studying or how the student organizes her o his time.

CCS CONCEPTS

• Applied computing~Education~ E-learning

KEYWORDS

MOOC, adult learning, distance education, xMOOC, success factors.

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1 Introduction

Since their inception, MOOCs have been the focus of attention for researchers [1] [2], news media [3] [2] and higher institutions [2] [4] [5]. Considered as the phenomenon that will change the university forever [6], they are allowing a large number of people to access relevant training and education, through a virtual learning environment that serves the needs of the digital individual of the 21st century.

Massive open courses and online courses are currently being studied from different perspectives. Mainly, from administrators, professors and developers, who, from their experience, help analyze the design, use and business model of MOOCs; but the participants' voice is rarely included [2] [5]. This is why knowing the success factors from the perspective of the participants who completed a MOOC is necessary, and little research has been done about it [7] [8] [9].

Researchers have linked different factors to the success of the participant in a MOOC, among them: personal factors [2] [10] [11], family commitments [12] [13], social [14] [11], instructional design [7] [15] [16] and labor or professional factors [8] [17] [11], which affect the academic achievement, and therefore, the completion of these courses.

The objective of the present investigation is to know the perspective of the participants that completed a MOOC on energy sustainability, to know the differences between age groups of adults (Baby Boomers, Generation X, and Millennials), and the success factors that most affect them. The final survey on interests, motivations and prior knowledge in MOOCs was reviewed, precisely the answers to the question: What factors do adults participants attribute for having completed an xMOOC?

2 Theoretical framework

The academics have found some aspects or key factors so the student who takes a MOOC can finish it successfully. For example, the way of studying or how each student organizes her or his time are considered personal factors. Some students need clear instructions and constant guidance, while others prefer to learn on their own and at their own pace [2].

According to Rai and Chunrao [11], the behavior of students participating in MOOCs could be different from those studying in traditional classrooms, where students have face-to-face contact with teachers, following schedules and discipline. In open learning environments, students can set their learning objectives and define their standards for success and completion of the course [2].

Family factors, including the support that the family can provide for participants to continue studying, is considered a key factor. Some authors, such as Park and Choi [13], have found that the lack of family support is related to the non-completion of courses and is considered a barrier in online learning. For Henderikx et al. [12], the lack of family support is a component considered as a barrier in MOOCs.

The support of friends and colleagues within the MOOC is an influential social factor for success. According to Rai and Chunrao [11], students in traditional classes are motivated by face-to-face contact and interaction with their peers and teacher support; however, these characteristics are not present in MOOCs. For Bali [14], the lack of contact between teachers and students increases interaction among students, which encourages cooperation between students in a MOOC course.

The way the MOOC is designed is a valuable factor. The pedagogical design of MOOC platforms is undoubtedly one of the most relevant elements that can optimize the learning outcomes from users [15]. Some authors, such as Ramírez-Montoya [16], consider important to include in the design, the elements or resources that support the appropriation and technological immersion of the participants who, for the first time, enter a virtual learning environment.

The MOOC platforms are mainly based on three pedagogical models: behavioral, socio-cognitive, and situated learning [15]. Typically, there are two types of instructional design for a mass open and online course: cMOOC and xMOOC. On one hand, cMOOCs focus on a social learning model, while the xMOOCs focus on content, video and automated assessments [18]

The need students have to learn content so they can apply them and develop their work in a better way is an important work or professional factor for the completion of a MOOC. According to Rai and Chunrao [11], some participants of MOOCs join these courses because they want to improve their job opportunities by obtaining new knowledge or skills through them. Offering certifications or learning recognition seems to be a strong predictor of participation and termination in a MOOC [8]. For Kizilcec and Schneider [17], the intention to obtain a certificate promotes an effort on the students to finish the courses.

3 Method

The research is descriptive [19] and used the quantitative method with emphasis on descriptive statistics, to describe the results obtained in each age group regarding the research question: What factors do adult participants attribute for having completed an xMOOC?. The data was extracted from a questionnaire called: Final survey on interests, motivations and prior knowledge in MOOCs [21], applied to all participants who finished some xMOOC between 2017-2018. The sample was obtained from a total of 5,139 participants who partially answered the final survey, and only were chosen participants born between 1946 and 1996 and who thoroughly answered the survey, precisely the questions in Table 1.

Table 1. Questions analyzed from the final survey

#	Question	Options
1	What factors do I attribute to completing this course successfully? Personal factors	The response options were ordered from highest to lowest, considering that 1 is a very important factor and 5 is not an important factor
2	What factors do I attribute to completing this course successfully? Family factors	
3	What factors do I attribute to completing this course successfully? Social factors	
4	What factors do I attribute to completing this course successfully? Instructional design	

3.1 Participants

The participants analyzed were 1,978 students who completed one of the twelve MOOCs on energy sustainability, designed and created in the context of the project called "Binational Laboratory for the Intelligent Management of Energy Sustainability and Technological Training" [20]. Participants were divided by age groups according to the proposal of the generational division of Strauss, W. and Howe [23] for analysis and comparison (see Table 2).

Table 2. Age groups of students who completed a MOOC

Age group	# Participants	Birth rank
Baby Boomer	124	1946-1964
Generation X	557	1965-1980
Millennial	1297	1981-1996
	TOTAL: 1978	

The participants are from 17 Latin American countries (Colombia, Ecuador, Venezuela, Costa Rica, among others) of which 95.60% are from Mexico. Of the total participants (n = 1978), 69% represented the male gender and only 31% of the female gender. Table 3 shows the gender of the participants by age group.

Table 3. Gender of participants by age group

Age group	Male	Female	Total	%
Baby Boomer	94	30	124	6.26
Generation X	430	127	557	28.15
Millennial	848	449	1297	65.57
			1978	100

3.2 Instrument

The final survey on interests, motivations and prior knowledge was used to obtain the research data. It consists of 17 questions designed in a mixed format to assess the changes in motivation and knowledge that participants experienced after taking a MOOC related to the topic of energy sustainability [21]. Education experts evaluated the content validity of the final survey, and tests were carried out to confirm the understanding of the questions [22].

The investigation focused on the survey's question: What factors do I attribute to the successful completion of this course? This question was designed so the participants could organize their response from very important (1) to not important (5) regarding the factors they attribute for finishing the course. The factors analyzed were: personal factors (for example, my way of studying or the way I organize my time), family factors (for example, the support of my family so that I can study), social factors (for example, support from my friends and colleagues so that I can study), factors of instructional design (for example, the way in which the course is designed), labor or professional factors (for example, the need I have to learn these contents to perform my work).

4 Results

The responses of the final survey about the factors attributed by an adult participant who has completed a course on energy sustainability are presented below.

4.1 Personal factors

The personal factor includes the way of studying or how the student organizes her or his time. Table 4 reveals that the Millennial generation is the one that considers the personal factor is the highest incidence for completing a MOOC with 53%. On the contrary, Generation X is the one that holds the lowest percentage (47%) of participants that considers personal factors as having the highest incidence for finishing a course.

Table 4. Personal factors by age group

Importance	Very important (1)	2	3	4	Not important (5)
Baby Boomer	51%	20%	19%	4%	6%
Generation X	47%	23%	17%	8%	6%
Millennials	53%	18%	15%	7%	7%
Average	51%	20%	16%	7%	7%

4.2 Family factors

The support that the family can provide to participants to continue studying is a critical feature in family factors. Table 5 gives information about this. It is observed that, for the Millennial generation, family factors are the least important for concluding a MOOC on energy sustainability, representing 23% of them.

Table 5. Family factors by age group

Importance	Very important (1)	2	3	4	Not important (5)
Baby Boomer	2%	15%	15%	48%	20%
Generation X	6%	18%	18%	39%	19%
Millennials	7%	19%	19%	32%	23%
Average	7%	18%	18%	35%	22%

On the other hand, the Baby Boomers are the age group that has the lowest percentage (2%) of participants that considers family factors as higher incidence, compared to 7% of Millennials and 6% of Generation X

4.3 Social factors

The support of friends and colleagues within MOOCs is another crucial factor identified as a critical social factor for the completion of a MOOC among adults. In Table 6 can be seen that, in general, adults consider that peer support within the MOOC is of minor importance

Table 6. Social factors by age group

Importance	Very important (1)	2	3	4	Not important (5)
Baby Boomer	5%	2%	15%	22%	56%
Generation	7%	8%	12%	20%	53%

X					
Millennials	7%	8%	16%	28%	41%
Average	7%	7%	15%	26%	46%

Table 5 shows that Baby Boomers have the highest percentage of participants who consider that the support of their peers does not influence the finalization of their course. In contrast, the adults of Generation X and the Millennials have the highest percentage (7% each) of participants who believe that peer support is vital to complete a MOOC.

4.4 Instructional design factors

The way the MOOC is designed is a recognized factor as valuable for adults who complete such courses. In Table 7 can be seen that the group of Baby Boomers shows the highest percentage among the age groups; this confirms that how the MOOC is designed is of significant importance. In contrast, the Millennials group has the highest percentage (13%) among those who emphasize that instructional design is of less importance in concluding a MOOC.

Table 7. Instructional design factors by age group.

Importance	Very important (1)	2	3	4	Not important (5)
Baby Boomer	25%	37%	19%	14%	5%
Generation X	18%	27%	30%	18%	8%
Millennials	11%	28%	28%	20%	13%
Average	14%	28%	28%	19%	11%

4.5 Labor or professional factors

The need the students have to learn and be able to apply that knowledge in their work field, is a relevant factor to continue and finish a MOOC. This is demonstrated by the percentage of results in Table 8. Generation X is the one that considers as a critical factor to continue and conclude a MOOC the need to learn and apply knowledge in professional life. In contrast, the Millennials (16%) have the highest percentage of participants who consider little or no important the need to learn for applying it in their professional life.

Table 8. Labor or professional factors by age group

Importance	Very important (1)	2	3	4	Not important (5)
Baby Boomer	17%	25%	32%	13%	13%
Generation X	23%	24%	23%	15%	15%
Millennials	22%	27%	22%	13%	16%
Average	22%	26%	23%	14%	15%

5 Conclusions

The objective of the research was to know the perspective of the participants that completed an xMOOC on energy sustainability and to identify the differences between age groups of adults (Baby Boomers, Generation X, and Millennials) regarding the factors that most affect them to finish a course. Previous studies have focused on investigating the different perspectives of the designers, creators, and developers of MOOC and little from the participants [2][5], especially those factors that affect the completion of these courses.

This study analyzed quantitative data and has shown that adult participants divided into age groups consider or value as an element of influence to conclude an xMOOC. It is confirmed that adults have essential participation in learning activities through the use of technology. The age group with the highest representation is the Millennials (n = 1297) with 65% of the total number of adults who completed a MOOC. The Baby Boomers, adults born between 1946 and 1964, are those who have the least representation of the total number of adults studied. The male gender is predominant with 69%, that can be explained by the interests and career choice of men in engineering.

When using the quantitative method with emphasis on descriptive statistics, it was identified that among the age groups of adults, the most relevant factor to finish a MOOC were the personal factors. Which confirms what Rai and Chun [11] said about the students' behavior is different in open learning environments, including the way of studying or how the student organizes her o his time. Hence, the Millennials (53% of them) are the ones that, among the three age groups, consider with higher incidence the personal factors to finish a course, which confirms that Baby Boomers and Generation X have specific patterns or behaviors when participating in an xMOOC that do not consider a factor to finish an xMOOC.

On the contrary, the support of friends and colleagues within the MOOC considered as a key social factor in the adults who participate in these courses, is recognized as little or not important. The Baby Boomers is the age group with the highest percentage (56%) of adults who consider the social factor of little importance. Millennials and Generation X have the highest percentage of adults (7% each) who consider the social factor necessary following Bali [14] that mentions that the lack of contact between teachers and students increases interaction among students, which encourages cooperation between students in a MOOC course.

The present study is limited to describing in a descriptive way the participants' answers to the question about which factors they consider most influential to complete an xMOOC. However,

it is recommended for future research to consider an inferential statistical analysis to identify differences between groups. Because only Mexican adult participants were analyzed, the study could not be considered generalizable to other participants of different nationalities who finished one of the xMOOCs on energy sustainability.

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