



Article

The Social and Transfer Massive Open Online Course: Post-Digital Learning

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Abstract: This research provides a current view on post-digital learning experiences with a massive open online course (MOOC), in relation to user profiles, universal instructional design, digital resources, inclusive activities and collaborative assessment. The study is based on a mixed research methodology, creating a questionnaire aimed at people with experience in any MOOC typology, in which the learning methodology, the instructional didactic design of the MOOCs, the resources, proposed activities, and accessibility are analyzed. Additionally, interviews and focus groups were carried out with the creators of massive open online social courses alongside the students of the official Master of Communication and Education on the Internet, offered by the UNED (Universidad Nacional de Educación a Distancia—Spain), with the subject of virtual participation scenarios. The data obtained are subjected to statistical tests to determine the scientific rigor, such as Cronbach's alpha, the Kolmogorov-Smirnov normality test, and the non-parametric tests of Spearman's correlation coefficient and Kendall's Tau b. In conclusion, the social massive open online course/transfer massive open online course model is evidenced as a projected approach in social networks. The sMOOC and tMOOC are online training models, which are in constant development and evolution, as a social, creative, collaborative, interactive, and inclusive learning methodology, offering new challenges for the digital distance education of the future. The research carried out is only related and linked to the experiences of different people with the sMOOC and tMOOC.

Keywords: digital education; MOOC; sustainable distance education; social networks; virtual learning communities; social learning



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1. Introduction

It is an unavoidable reality that digital technologies are part of our daily life and have virtualized our world, displacing it from a more analog or digital life, giving rise to the concept and era of the post-digital [1]. This concept, whose definition is currently under continuous development, emerged at the beginning of the 21st century, with the intention of recognizing the state of the integration of technology in our daily lives, and the rejection of the conceptual change, implicit in the “digital revolution” [2]. The transition from the digital age to the post-digital condition is due to the massive expansion of various digital technologies. This current post-digital condition is characterized by an unprecedented daily presence of digital and computerization, by its ubiquity (integrated in the environment and in the subjects), as well as by permanent connectivity and by the new analog-digital continuities. The use of digital technologies in multiple daily practices has become so normalized that there is no clear separation between digital and analog, or between old and new media, giving rise to new ways of relating and communicating. This term significantly points to our rapidly changing relationships with digital technologies

and ways of communicating. The post-digital concept is not intended to describe a life after digital but rather tries to detail today's opportunity to explore the consequences of digital and the computer age. In this sense, with each passing day, the technology in our lives becomes more invisible. This post-digital society focuses on the study of cultural practices [3], in which digital technologies are integrated and new uses are established to relate to each other, producing a massive expansion [4]. Post-digital is concerned with our changing and rapidly changing relationships with digital technologies. Similar to the computer age, post-digital is also a paradigm. The understanding of the post-digital does not seek to describe a life after digital, but rather attempts to describe the current opportunity to explore the consequences of the digital age. In relation to all this, in 2008, MOOCs (Massive Open Online Courses) appeared in a disruptive way as a new learning modality within distance education [5]. This phenomenon, revolutionizing the traditional e-learning evolved in parallel to the post-digital society, opened innovative training and research lines, in order to raise its re-conceptualization as well as its new functions and challenges for sustainable training future [6]. This distance education model, similar to MOOCs, is the object of our study, where an investigation was designed from a mixed research methodology. Quantitative and qualitative data analyzes have been combined [7,8]. The objectives and hypotheses raised are considered. The variety of instruments used has allowed us to develop a triangulation process enriched with quantitative techniques such as the questionnaire, aimed at people with training experience in MOOCs. In the qualitative aspect, interviews and focus groups [9] have been carried out with the creators of these proposals, but with the massive social approach of an open online course [10]. It should be noted that when we refer to MOOCs in this research, four different typologies have been considered: conventional open mass online course (xMOOC), the connectivist open mass online course (cMOOC) [11], the sMOOC [12], and the transfer course, the massive open online course (tMOOC) [13], which all present different methodological approaches. In xMOOC the approach is a more traditional teaching and in the cMOOC model a connectivist and social learning approach is proposed, which is projected through social networks. There is a history of studies on social sMOOCs or MOOCs, which evolve into tMOOC, whose main characteristics focus on the transfer of post-digital learning and pedagogical transformation, by generating interest in action and professional interaction. As a clarification of the sMOOC and tMOOC, it should be noted that social MOOCs or sMOOCs whose main characteristic is the use of social networks and virtual communities to disseminate and project content to society, evolving towards tMOOC in the following way: On the platform Ecolearning, a sMOOC was held to train e-teachers. In addition, an analysis of the scientific production of MOOCs and their typologies was carried out in the Web of Science, and the pertinent data obtained from both cases will give rise to the taxonomy of the 10 t's or premises of the tMOOC: authentic tasks, transfer from learning to the profession, pedagogical transfer, the TRIC, (technologies of relationship, information, and communication), transmediality, open temporality, collaborative, transnational work, intercreative talent, and finally, tolerance. The tMOOC have similar objectives where the participants, through collaborative work with a commons dimension, acquire the necessary skills to put into practice all the tools, learning methods, peer co-evaluation system, etc. Both one and the others are generated in the European platform and project Ecolearning as of 2014. To highlight the educational innovation of the sMOOC and tMOOC approaches, typical of the post-digital society, it encourages the concept of empowerment of students who become e-teachers. From the empowerment of citizenship that is projecting the Internet of the Future, and through the Eco Digital Learning platform, teachers are trained for the creation and implementation of sMOOC/tMOOC training proposals and for their correct projection through social networks in order to create communities of practice. These MOOC typologies have a social character since its contents and knowledge are projected through social networks. They provide a creative and collaborative methodological model for the collective construction of knowledge between teachers and students. They offer tools and resources that enhance interactivity among participants and are designed from

inclusive models that offer and guarantee accessibility for all. The social character of education and MOOCs should be part of it. The highlighted competencies and social activities were obtained with participation in the communities created for the performance of the course, and the conception of learning as a construction process. The construction of sMOOC and tMOOC encourage creativity, since they have the ability to generate new ideas or concepts between their contents and the association between them. The sMOOC and tMOOC promote collaboration among participants as a very useful resource, to increase their motivation and bonding in the completion and completion of the course. The role of teachers is essential to enhance interactivity and student participation, projecting content and disseminating it on a social level, to generate citizen participation in the collective construction of knowledge. The sMOOC and tMOOC promote inclusive education, understanding these as an opportunity for the development of people with disabilities or social marginalization. Strategies and content are used to achieve the inclusion of all people with the purpose of educating everyone, responding to different educational needs. The novelty of this research with respect to other studies is the development of a statistically validated instrument or questionnaire on the experiences in massive open online course, to be used in future research. The results obtained in the research and their corresponding analysis indicate that the data collected in the study are concentrated in the sMOOC and tMOOC typologies. However, the information collected from the sample and the testimonies about experiences with these and other e-learning training models have been analyzed regardless of whether they occurred in a particular typology or another [14]. Research has shown the existence and current consolidation of the post-digital society and, as a result, this research is carried out to relate it to sMOOCs and tMOOCs, as the most relevant and disruptive phenomena and methods of social learning in the emerging distance education [15] massive, open, and on-line.

2. Methodology

This research has as main objective of providing a new vision on the social learning processes centered on sMOOCs. It is based on the following specific objectives:

- (1) To understand this reality from the participants' own learning experience.
- (2) To analyze how the creation of sMOOCs increases sustainability and enhances the culture of participation, establishing new forms of relationship with digital education.
- (3) To present the influence of social learning in relation to sMOOCs, since it is not possible to separate the digital from the so-called real, physical and/or analog world.

The hypotheses considered for the research are the following, in relation to the proposed objectives, and with the scientific review related to sMOOC and tMOOC.

- The sMOOCs are used mainly by people linked to the professional and/or academic field of digital education. Users have studies on educational disciplines. In addition, their professional performance is related to education (H1).
- The most used virtual platforms are those that do not offer universal and inclusive design models typical of sMOOCs. The most widely used MOOC platforms do not conform to the sMOOC (H2) models.
- The evaluation proposals that are applied do not conform to the collaborative patterns established for sMOOCs. Traditional (H3) assessments continue to be offered.
- The resulting interaction in the social learning generated in these virtual learning communities is greater or less depending on the typical activities of the sMOOC and the use of social networks. The interaction in learning is related to the proposed activities (H4).
- In the post-digital era, the sMOOC and tMOOC models of sustainable distance education are positively valued for their projection and transfer of learning to the world of work. The sMOOC and tMOOC models influence learning towards the world of work (H5).

This study was based on a mixed research methodology conceptualized in general terms by the collection of quantitative and qualitative data [7] framed within a triangulation of data. This type of methodology has been considered because the objectives, study variables and hypotheses cannot be answered with a single paradigm or individual method. The methodology has simultaneously answered confirmatory and explanatory questions, allowing on the one hand to confirm the effects on the sMOOC phenomenon in the post-digital era through statistical analysis of quantitative data and, on the other hand, to explore the reasons behind the observed effect, using qualitative techniques [16].

2.1. Instruments and Sample

The mixed methodology chosen for this study is based on information and data collection instruments: questionnaire, semi-structured interviews, and focus groups.

Its design fulfilled the key function of serving as a link between the objectives and the results based on the reality of the participants [17]. Mixed methodology is a research design in which researchers collect, analyze, and combine (integrating or connecting) quantitative and qualitative data. For this research, the mixed methodology is a very complete way of obtaining information. By combining the advantages of both methods, it allows this to be extensive and in turn detailed. The methodological process allows us to complement the use of the quantitative, as a form of approximation, and the qualitative, as a form of in-depth analysis. With this method, we can make statistical inference, although we do not intend to extrapolate the results obtained from the studied sample to the population under study. The use of this mixed methodology has allowed us to carry out much more efficient questionnaires: on the one hand, with responses based on scales such as Likert or dichotomous; on the other, with open approaches that investigate the opinions of the interviewee.

The designed questionnaire was disseminated in social networks, virtual spaces, and communities [18], or using greater scope and sample projection, for example Twitter, Facebook, LinkedIn, with replies collected through Google forms, answered by a total of 203 people who participated in this training model. In relation to the data collection instrument of the seven semi-structured interviews and the focus group, a random sample of 17.25% (11 persons) of the students of the Master in Communication and Education in the Network of the Universidad Nacional de Educación a Distancia (UNED), specifically in the subject Virtual Scenarios for Participation, was used, with a student profile from the fields of education, communication, and social sciences. The priority topics of this master's degree were to critically analyze the prevailing communicative and educational models, still largely based on functionalist and industrial theories initiated in the 19th century and reinforced during the 20th century. It was the task of this Master student to offer an innovative and overcoming view of such educational and communicative models and the commitment to appropriate methodologies for the sociotechnical context of the 21st century in the fields of education and communication. The instrument for qualitative analysis (interviews and focus groups) is as follows:

ASSESSMENT OF THE MOOC CREATION EXPERIENCE

1. How do you assess the experience of carrying out the sMOOC in the subject of Virtual Scenarios for participation?
2. Once the proposal to create a sMOOC was made, your group thought about a specific topic to transfer your knowledge. Based on what main factors is this topic selected?
3. What process does the group go through to decide on a specific virtual platform to develop its sMOOC? For what reason/s have you selected this platform?
4. What aspects do you consider innovative and creative in the design and implementation of the sMOOC that you have developed?
5. What resources of your sMOOC would you highlight in relation to interaction, collaborative work, and participation? Has the group used various tools/software, annexed to those of the platform to develop the MOOC? Which ones and why? Have you used social networks?

6. What evaluation format have you developed in your sMOOC and for what reason(s)?
7. What main difficulties have you had in the planning process of the MOOC until its completion? How do you think it could be improved?
8. The contents worked on in the subject and the communicative and pedagogical model developed in it, have they helped you in this work?
9. Do you think this experience can be beneficial for your professional life? And for the betterment of society?

The reason for this choice is the experience that the students had to carry out in groups, having to design and implement a sMOOC as an evaluation test with a total of 13 sMOOCs being organized [19]. With respect to the interviews and focus groups, the instrument presents 10 questions related to the experience in the internship, platform used, theme chosen, resources included, creative aspects, evaluation format, difficulties encountered and relationship with the contents of the subject. For the focus group, a total of 4 people who have also carried out the internship were brought together to present their personal points of view on their experiences as creators of sMOOCs, in line with the questions raised in the interviews. The questionnaire presented a series of identification questions allowing to describe the study sample relating it to a series of personal, social, academic, and professional characteristics, 28.57% (8 items); the remaining questions were directly related to the research through multiple choice questions 10.71% (3 items), grouped on a Likert scale 57.14% (16 items), and open questions 3.57% (1 item). It is worth mentioning that the questions with ordinal variables were grouped based on the Likert method [20], defining a standard psychometric scale commonly used to measure responses [21] and establishing a five-point scale, in which each point was labeled according to its level of preference, increasing the following categories by one unit each. 1 = Strongly Disagree, 2 = Disagree, 3 = Indifferent/Undecided, 4 = Agree, and 5 = Strongly Agree. The options presented were odd-numbered, so as not to force the individual to make a positive or negative choice in relation to the item presented. The sample selected for the interviews and focus groups, as well as the results obtained in the questionnaire, are not intended to be extrapolated or generalizable to a larger population. The data obtained were coded and tabulated in the specialized computer programs SPSS v.22 and Atlas.ti v.8. All the instruments have been validated by specialists who were part of the SMEMIU (Universidad Nacional de Educación a Distancia) and GICID (Universidad de Zaragoza) research groups, bearing in mind the method of adequacy and relevance of the questions posed from an educational and communicative perspective.

2.2. Reliability Check

An empirical criterion was defined in relation to the questions grouped in the Likert scale to ensure that this dimension was common to all the items and was effectively recognizable to the people participating in the study. To verify that the items of the scale were coherent with the rest, and that they were not semantically related to other different concepts, item analysis and reliability calculation were carried out to shape the final instrument. The procedure applied in this item analysis phase was the study of the correlations between the individual score and the total score ("item-total" correlation). Null or very low correlations would inform us about whether or not to dispense with the item, while high correlations provided information relevant to the behavior studied. Consequently, we would identify the items of the scale that were not consistent with the others and they would be eliminated. In this process, the item analysis data were obtained with a logical order and, subsequently, the calculation of reliability (internal consistency), with formula 1 for the calculation of Cronbach's α coefficient [22]. This formula was interpreted as α (Cronbach's alpha coefficient), k (number of items), S_i^2 (sum of item variances) and S_T^2 (variance of the sum of the items).

Formula (1): calculation of Cronbach's α coefficient:

$$\alpha = \left(\frac{k}{k-1} \right) \times \left(1 - \frac{\sum_{i=1}^k s_i^2}{s_t^2} \right) \quad (1)$$

The internal consistency of a questionnaire considers that the minimum satisfactory value for this coefficient is 0.7, this value indicates that the questionnaire presents acceptable reliability [23]. Since an α value of 0.897 is obtained as a result, we can affirm that the instrument has a high degree of reliability, validating its use for data collection. With the data obtained, in the "item-total" correlations, it is not necessary to eliminate any item to increase the coefficient and the reliability of the instrument, since the resulting values are lower than Cronbach's α coefficient. We performed factor analysis as a method of verification and validity, to establish the meaning of what the instrument measures. Once the 16 items that make up the scale have been selected, and through the SPSS v.22 software, we will use the factor extraction method, the most common being that of principal components, with a variance equal to or greater than one. We observe that the three factors that are retained in the factor analysis explain 58.58% of the total variance. If we analyze the percentage of variance that each component explains, we verify how effectively the first factor explains a significantly higher proportion than the rest of the factors with 40.58%. Component 1 (40.58% of the variance), Component 2 (10.27% of the variance), and Component 3 (7.73% of the variance). Total accumulated variance of the three factors extracted 58.58%. We carry out the analysis of rotated components to identify the items that have the highest weights in each factor, to clarify the structure of the instrument and therefore the construct to be measured. The scheme of the internal structure of the variables offered by the analysis could be the following:

Factor 1: IT13, IT12, IT10, IT19, IT11, IT18, IT16

Factor 2: IT24, IT23, IT22, IT21, IT15, IT20

Factor 3: IT26, IT25, IT17

Considering the distribution of items in the factors, an attempt would be made to carry out a conceptual analysis in order to determine what the formulations of the items that define them have in common, mainly paying attention to those with the highest weights. It is often useful, as a result of the above, to give them a name: Factor 1 includes the items related to "learning through interaction", factor 2 groups items related to "perception of the general environment in the MOOC", and factor 3 groups those items related to "assessments adjusted to learning methodologies".

In relation to the reliability that in qualitative research identifies with concepts such as fidelity or auditability (internal constancy or consistency), we understand that the findings of this research in terms of its qualitative aspect, are auditable since there is an absence of bias—that is, there is neutrality and objectivity. In relation to all this, the qualitative instrument has been subjected to double blind control, comparing the results to independent analyzes by two or more researchers who have not participated in its collection. The instrument is subjected to a temporal triangulation since the information obtained at different times is contrasted. This occurred because the informants of the interviews participated in the focus group that was carried out later and confirmed their information. We understand that the instrument is reliable and valid and can be used in research and studies that show similarities in the findings and information to be obtained.

2.3. Sample Profile

The research presents two participant profiles depending on the data collection instrument applied. On the one hand, in the interviews and focus group, it is about the students of the subject Virtual Scenarios for Participation, in which a total of $N = 203$ people participated, being 54.5% ($n = 6$) male and 45.5% ($n = 5$) female. All people coming from

disciplines related to education and pedagogy, with an academic level of university degrees and with ages between 26 and 35 years old. On the other hand, and in relation to the questionnaire with a total of $N = 203$ respondents, the following profile was obtained; Sex: female $n = 118$ (58.13%), male $n = 84$ (41.38%), undefined $n = 1$ (0.49%). Figure 1 shows more details about the profile of the people surveyed.

The country of residence with the highest percentage of the people surveyed is Spain with 89.66%.

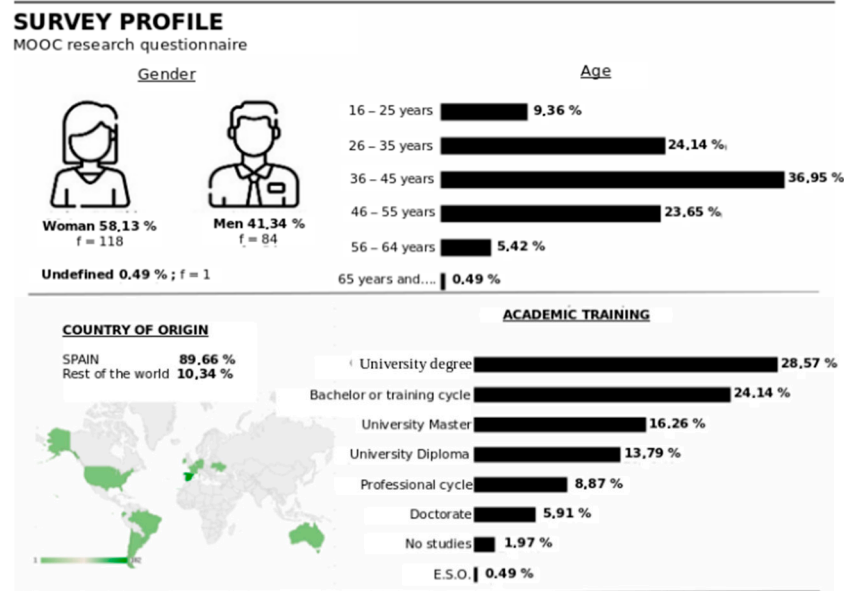


Figure 1. Respondent profile. Identification questions.

3. Results

3.1. Probability and Estimation of Overall Percentages

The results of the questionnaire recorded a final score obtained by each subject, this being the sum of the scores achieved in each of the items of the Likert scale. The variable for this research, which sums the scores for each of the items, is called total_items and is represented by a histogram in Figure 2.

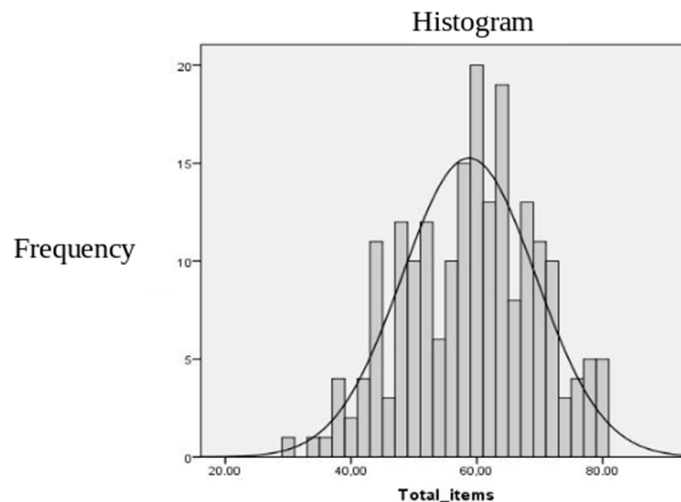


Figure 2. Frequency distribution of the variable total_items.

According to the statistics obtained (mean = 58.75; median = 60; mode = 64; standard deviation = 10.61), we found that the distribution has a slight negative skewness (−0.178), obtaining less data to the left of the graph, and a negative kurtosis coefficient (−0.476), so the distribution is platykurtic, offering a lower concentration of data around the mean. The Kolmogorov-Smirnov normality test [24], was performed for samples larger than 50 subjects (see Table 1), considering the following hypotheses to be tested:

H0 = The data analyzed follow a normal distribution.

H1 = The data analyzed do not follow a normal distribution.

Table 1. Kolmogorov-Smirnov normality test for samples with N > 50.

Kolmogorov-Smirnov Normality Test			
Variable	Statistic	gL	Sig.
Total_items	0.56	203	0.200

Since the significance level of the test was 0.200 and was greater than 0.05 [25] the null hypothesis (H0) was accepted, so that the distribution of the data of the total_items variable was normal, and we rejected the alternative hypothesis (H1). Since it was a normal distribution, the successive standard deviations with respect to the mean established reference values for estimating the percentage of observations of the data and probability calculations. From the results obtained in the interviews and focus groups, the following total number of citations were obtained for assignment to the established variables: interview no. 1 (ENT-E16-DB)—54 citations; interview no. 2 (ENT-E10-CR2)—45 citations; interview no. 3 (ENT-E31-JA)—45 citations; interview no. 3 (ENT-E31-JA)—45 citations; and interview no. 4 (ENT-E31-JA)—45 citations. No. 3 (ENT-E31-JA)—40 quotes; interview No. 4 (ENT-E7-BU)—38 quotes; interview No. 5 (ENT-E40-NM)—43 quotes; interview No. 6 (ENT-E4-AM)—32 quotes; interview No. 7 (ENT-E49-RV)—27 quotes; focus group (FG-E10-CR2/FG-E31-JA/FG-E4-AM/Moderator)—41 quotes. The data treatment for the qualitative analysis of the interviews and focus group is carried out through the software atlas.ti v.8. The process is as follows: The main topic is the creation and experience in the sMOOC/tMOOC. Based on the information collected, it is encoded in the following variables to group the information: Experience, difficulties, resources, platform, theme, innovative/creative aspects, evaluation, and content. In relation to all this, we obtained the number of citations associated with each code/variable and each interview and focus group.

With more concreteness of the results, it can be seen in Table 2 and by means of the calculation of probabilities in the normal distribution curve, and by typing the “normal” X variables, (ranges of the scale) N (μ,σ), in Z variables, N(0,1), the percentages obtained, in each of the response ranges, by all the persons surveyed.

Table 2. Typification of variables X and calculation of probability according to the normal distribution. (Source: self made).

Scale	Rank	Z = (X−μ)/σ	Calculation of P	P	P (%)
1 Strongly disagree	16.0–28.8	$-4.029 \leq Z \leq -2.823$	$P(Z \leq -2.823)$	0.0024	0.2%
2 In disagreement	28.8–41.6	$-2.823 \leq Z \leq -1.616$	$P(-2.823 \leq Z \leq -1.616)$ $P(Z \leq -1.616) - P(Z \leq -2.823)$	0.2506	5.1%
3 Indifferent indecisive	41.6–54.4	$-1.616 \leq Z \leq -0.410$	$P(-1.616 \leq Z \leq -0.410)$ $P(Z \leq -0.410) - P(Z \leq -1.616)$	0.2879	28.8%
4 In agreement	54.4–67.2	$-0.410 \leq Z \leq 0.796$	$P(-0.410 \leq Z \leq 0.796)$ $P(Z \leq 0.796) - P(Z \leq -0.410)$	0.4462	44.6%
5 Strongly agree	67.2–80.80	$0.796 \leq Z \leq 2.003$	$P(Z \leq 0.796)$ $1 - P(Z \leq 0.796)$	0.2129	21.3%
				1	100%

Table 2 shows the questions of the questionnaire that obtained the highest score on the Likert scale. In this way, we obtain the most powerful variables in relation to what the respondents thought about sMOOC and tMOOC. Respondents answered the questionnaire with the highest percentage of responses to option 4 “Agree” with 44.6%. If to this evaluation we added the responses to option 5 “Strongly agree”, we obtain a total of 65.9% as positive evaluations. The percentage of people who “Strongly disagree” and “Disagree” reached 5.3% of the total, and “indifferent/undecided” reached 28.8%. Going into more detail, the perception of a tolerant environment of respect, understanding and compromise, as well as objectives in accordance with the methodology used and contents, with resources in the desired language, were the highest rated and best valued issues. On the other hand, aspects related to accessibility were the worst rated and/or scored, such as interaction and social learning with people from other cultures, and the challenge of universal and inclusive design, as can be seen in Table 3.

Table 3. Scale and percentage obtained per item.

Item	Study	Σ	%	Range	Response
26	Perception of a tolerant environment of respect, understanding and compromise.	878	7.4	5	Strongly agree
10	Objectives in line with the sMOOC and sMOOC methodology	828	6.9	4	In agreement
25	Contents and resources in the desired language	808	6.8	4	In agreement
12	Evaluation to identify the achievement of objectives	801	6.7	4	In agreement
18	Variety in sMOOC and tMOOC training resources	797	6.7	4	In agreement
19	Tutors and counselors in the sMOOC and tMOOC	789	6.6	4	In agreement
13	Evaluation adjusted to the learning methodology	785	6.6	4	In agreement
17	Adequate sMOOC and tMOOC workload	756	6.3	4	In agreement
20	Leveraging sMOOC activities	756	6.3	4	In agreement
11	sMOOC and tMOOC learning methodology	743	6.2	4	In agreement
16	Open temporality and interaction formulas	731	6.1	4	In agreement
21	Properties of the activities	706	5.9	4	In agreement
15	Methodology and/or learning model offered	685	5.7	3	Indifferent/indecisive
23	Learning occurs through interaction	684	5.7	3	Indifferent/indecisive
24	Disability-friendly sMOOC and tMOOC design	616	5.2	3	Indifferent/indecisive
22	Interaction with people from other cultures	563	4.7	3	Indifferent/indecisive
Total		11,926	100		

3.2. sMOOC/tMOOC Training: Social, Inclusive, and Interactive Learning

In relation to item no. 15, we saw that its response category was different from the rest, since it asked about the methodology and learning model offered in the MOOCs they have taken, having to answer on a scale of 1 to 5, with 1 = “Behaviorist” to 5 = “Connectivist”, obtaining a general range of 3 for the question. Therefore, the experience of the people surveyed placed the learning methodology in a medium range, in which, although with closed structures, there were certain open and flexible aspects in their experiences with MOOCs, identifying these with sMOOCs and/or tMOOCs. The correlation indicated the strength and direction of a linear relationship and proportionality between two statistical variables.

To determine the degree of relationships between the variables established for the Likert scale, with ordinal and nominal measurements, the Spearman correlation coefficient (r_s) was calculated (Formula (2)) as a non-parametric test. The calculations were corroborated

and compared with Kendall’s correlation coefficient tau b, Formula (3), which adjusts for ties in the results [26].

Equations (2) and (3): Correlation of Spearman (r_s), Correlation of Kendall tau b.

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{r(r^2 - 1)} \tag{2}$$

$$\tau_B = \frac{n_c - n_d}{\sqrt{(n_0 - n_1)(n_0 - n_2)}} \tag{3}$$

The results obtained are detailed in Table 4, and include those correlations with a range of moderate 0.51 to strong 0.75.

Table 4. Spearman’s Rho correlations with moderate to strong range 0.51 to 0.75 and comparison to Kendall’s Tau b correlation model.

Correlations Spearman’s Rho and Kendall’s Tau B				
	Item no. 23 Learning occurs through interaction	Item no. 20 Leveraging MOOC activities	Item no. 26 Perception of the general environment of the MOOC	Item no. 13 Evaluation adjusted to the learning methodology
Item no. 12 Evaluation to identify the achievement of objectives				Rho Spearman: 0.563 Tau b Kendall: 0.510
Item no. 17 Adequate workload of the MOOC		Rho Spearman: 0.594 Tau b Kendall: 0.519		
Item no. 18 Variety in MOOC training resources of the MOOC	Rho Spearman: 0.519 Tau b Kendall: 0.452	Rho Spearman: 0.600 Tau b Kendall: 0.538		
Item no. 20 Exploitation of the activities en el MOOC	Rho Spearman: 0.586 Tau b Kendall: 0.506			
Item no. 21 Propierties of the activites in the MOOC	Rho Spearman: 0.670 Tau b Kendall: 0.584			
Item no. 22 Interaction with the people others cultures	Rho Spearman: 0.596 Tau b Kendall: 0.510			
Item no. 24 Disability-friendly MOOC design MOOC design	Rho Spearman: 0.602 Tau b Kendall: 0.515			
Item no. 25 Contents and resources in the language desired			Rho Spearman: 0.547 Tau b Kendall: 0.503	

The strongest correlation was between item no. 23, referring to social learning, “Learning occurs through interaction” and item no. 21 “Properties of the activities in the MOOC” (Spearman 0.670; Kendall 0.584). We would like to highlight the correlation between items 23 and item 24 “MOOC design suitable for people with disabilities” (Spearman 0.602; Kendall 0.515). What is also noteworthy was the correlation between item no. 20, “Making the most of the activities in the MOOC” with two items of the questionnaire, item no. 18 “Variety in the MOOC training resources”, (Spearman 0.600; Kendall 0.538), and item no. 17 “Adequate MOOC workload”, (Spearman 0.594; Kendall 0.519). With these data, we were able to affirm that hypothesis no. 4 of the research, which stated that there was more or less interaction in social learning, depending on the activities created with attributes of the sMOOCs and the use of social networks, was fulfilled. The answers obtained, from both quantitative and qualitative techniques, indicated the importance of group work,

the use of communicative tools that enhance interaction in digital education, and the use of external resources, virtual learning communities and communities of practice in social networks; all this around the design and implementation of activities. Interaction in learning was also strongly related to a universal and inclusive design. This showed that the facilitation tools that give way to interaction and interrelation of social dynamics, from a participatory agenda, from this perspective, had a favorable impact on the democratization of information, thus combining people's lifestyles and culture, regardless of geographic location or borders [27].

3.3. sMOOC/tMOOC Collaborative Learning Roles

With regard to the role played by the people who were interviewed and carried out the focus group, 100% of them were creators and designers of a sMOOC, with topics related to gamification, cyberbullying, digital competencies, learning difficulties and multiple intelligences. With respect to the questionnaire, the most frequent role is that of Student (61.35%) followed by Teacher (12.06%), Creator (8.51%), Facilitator (5.67%), Collaborator (6.38%), and Others (6.03%), as shown in Table 5, which are roles characteristic of social networks. Since there were people who exercised various roles, a total of 282 responses were obtained from 203 respondents, with the most frequent chain being that of Alumnado-Docente-Creador/a ($f = 15$; 7.39%).

Table 5. Roles played in sMOOC/tMOOC.

Role	To Survey		Interviews and Focusgroup	
	Σf	%	Σf	%
Student	173	61.35%	0	0.00%
Teacher	34	12.06%	0	0.00%
Creator	24	8.51%	11	100.00%
Invigorating	16	5.67%	0	0.00%
Collaborator	18	6.38%	0	0.00%
Others	17	6.03%	0	0.00%
	282	100%	11	100%

The general profile obtained for this research considers that certain improvements are needed in the methodology of MOOCs as a model of digital distance education. In many cases, the participation of the teaching teams and/or guides and their knowledge of certain topics should be increased, which results in an ineffective final evaluation. The study shows that it is necessary to improve the quality of resources and materials, offering very limited content, and with deficiencies in the methods of interaction. Different disciplines and professional fields are not included in the MOOC training offer. There is a specific demand for training proposals related to the field of defense, pharmacy, cooking and hospitality, animal esthetics, etc. MOOCs, although they advocate massiveness, are designed with contents aimed at a profile of people with higher education, so there is a demand for greater customization and offer of this type of courses for other educational and professional levels. Despite this, the sample shows that MOOCs are very positive because of their accessibility to all citizens, their ubiquity, their free nature, and their individualized and personalized learning, allowing the acquisition of specific professional competencies and skills. Social learning and the collective creation of knowledge are highly valued, fostering the empowerment of students, offering the possibility of establishing professional relationships in the future. These questions confirm that hypothesis 5 of the research is true, as sMOOCs and tMOOCs are valued very positively, due to their projection and transfer of learning, mainly to the world of work. They generally understand that these are improving with experience and over the years, being in continuous evolution, and offering an increasingly solid model based on the culture of participation and acquisition of professional skills, as a distinguishing feature of the post-digital concept.

3.4. Creation of sMOOCs/tMOOCs and Projection in the Professional Field

The platforms used by the people interviewed and focus group to create and develop their sMOOC are two in particular: Canvas 53.85% ($n = 6$), and Moodle 46.15% ($n = 7$). The questionnaire resulted in 10 platforms comprised 79.61% of the total, the results being as follows: UNED Abierta ($f = 84$; 18.42%); Ecolearning ($f = 45$; 9.87%); Edx ($f = 44$; 9.65%); Miriada X ($f = 41$; 8.99%); Google Activate ($f = 37$; 8.11%); Coursera ($f = 30$; 6.58%); Red Educa ($f = 27$; 5.92%); Canvas Network ($f = 24$; 5.26%); UniMOOC ($f = 16$; 3.51%); Udacity ($f = 15$; 3.29%) (see Figure 3).

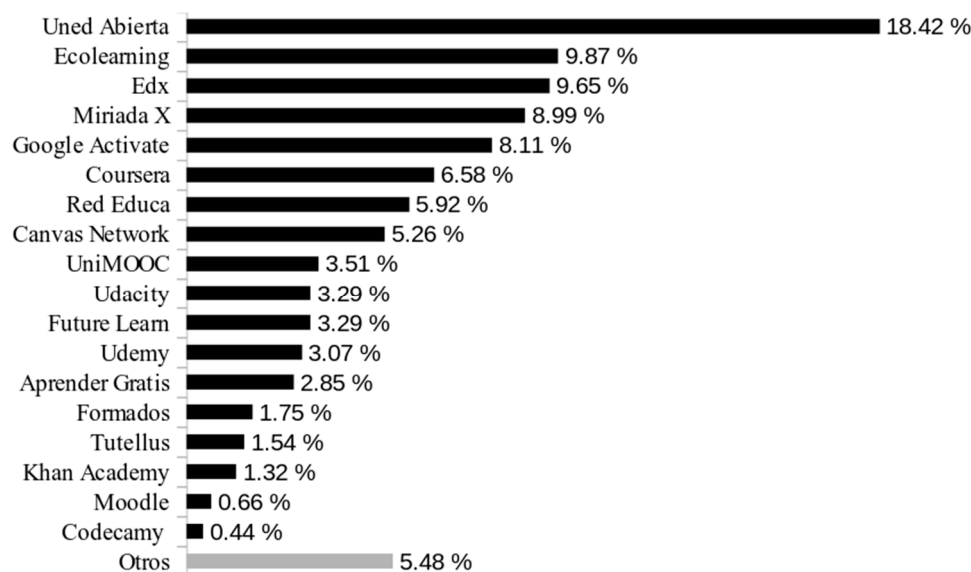


Figure 3. Most used platforms in the experiences with MOOC typologies.

Based on the results obtained and in relation to hypothesis 2, the most used platforms were those that do not offer a universal and inclusive design based on the sMOOC model. Among the top 10 most frequently used by respondents, only EcoLearning offered sMOOC and tMOOC typologies, ranked second below UNED Abierta. Respondents and focus group participants used two platforms to create their sMOOCs: Canvas Network and Moodle, which did not offer courses with methodologies based on sMOOC and tMOOC attributes. We confirmed that hypothesis no. 2 was true, having generally used and experienced platforms that did not present or host open and flexible models. However, the students considered that they acquired a collaborative and social learning model through the creation of the sMOOC, developing activities and practical cases of application to social reality, and creating content with dissemination in social networks. They valued the platforms on which they had worked with a friendly interface, offering no difficulty in terms of navigation and interactivity, and thus enabling greater and better accessibility and usability. The students understood and put into practice in these virtual learning communities, pedagogical models and tools of universal and inclusive design very close to the premises of sMOOCs and tMOOCs. On the one hand, we noted that regardless of the platform used, students managed to develop sMOOC and tMOOC models by creating content and interaction tools that were more open, flexible, participatory, collaborative and with social projection using social networks, in addition to P2P evaluation models, self-evaluation, participation in forums, social networks, etc. On the other hand, we noted that the data obtained confirmed that the more commercial and for-profit platforms were establishing more and more models with attributes of sMOOCs and tMOOCs, thus adapting to the current models of this post-digital era, although they were launching themselves into the future of the Internet from a market perspective. The sMOOCs and tMOOCs were mainly hosted on the Eco Digital Learning Project platform, used by 9.87% of the people surveyed, of which 53.33% were people linked to the professional and/or

academic field of digital education, thus confirming hypothesis no. 1 of this research. In the interviews and focus groups, the students developed a sMOOC project and the disciplines and academic background of the working groups were also linked in their entirety to the educational field. The people interviewed and the results of the focus group coincided in their assessments in considering that the creation of the sMOOC offered great possibilities of transferring this knowledge to the professional and labor level. It was an experience with a very innovative proposal as they have to develop their own resources, contents and communicative tools. They underline the importance of the social learning that took place in the work group, and the freedom to develop it, adopting new roles, making decisions, and having to work as a team.

3.5. Proposals for sMOOC/tMOOC Collaborative Assessment

The evaluation models presented by the sMOOCs, elaborated by the people interviewed and focus group, were centered on open methodologies such as P2P, self-evaluation, creation, and development of didactic content to be presented by the people who carried out the sMOOC. However, there were also evaluation proposals that required objective tests and quizzes, although in a percentage close to 15% ($n = 2$) of all the sMOOCs created and designed by the students of the subject and interviewed.

Figure 4 shows the results obtained in the survey on the evaluation proposals that respondents have had in their experiences with MOOCs. The option that continues to prevail as an evaluation methodology in MOOCs is multiple-choice tests in first place ($f = 118$; 25.99%), followed by the survey and/or questionnaire ($f = 84$; 18.50%), self-evaluation ($f = 68$; 14.98%), and peer evaluation ($f = 48$; 10.57%). The data presented in Figure 3 shows that the evaluation models, which the respondents have experienced in their practices with MOOCs, do not conform to patterns established in the evaluation of sMOOCs and tMOOCs, so that hypothesis no. 3 of the research can be considered valid. That is to say, closed evaluation models prevail; they are not very flexible and are centered on traditional methodologies (test, questionnaire, written exam, etc.). The study highlights the need to continue encouraging an alternative model of assessment in digital distance education that focuses on collaboration, participation, and student empowerment.

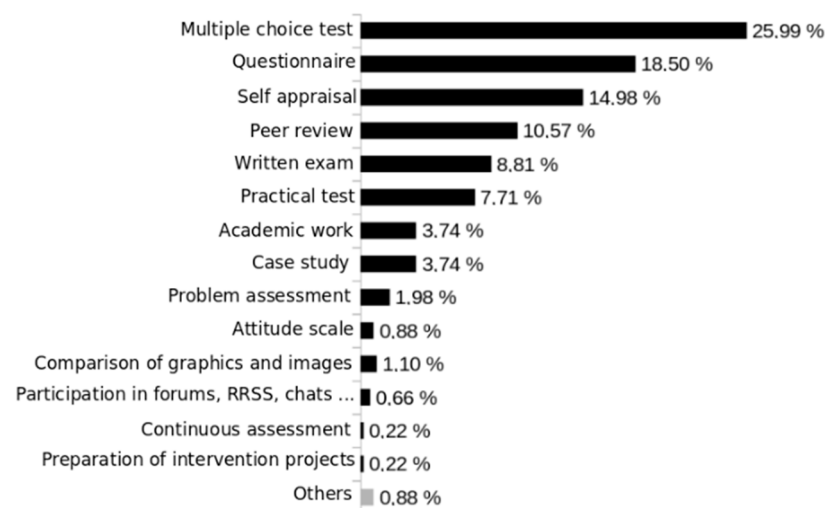


Figure 4. Mode of evaluation in MOOC experiences.

4. Conclusions

The novelty of this research with respect to other studies is the development of a statistically validated instrument or questionnaire on the experiences in massive open online courses, to be used in future research. This research has provided a current view on learning experiences developed in digital distance education, specifically in sMOOCs/tMOOCs. These data corroborate the achievement of the main objective of the research, since the

study provides a new vision on social learning processes, focused on the sMOOC and tMOOC modalities. The analysis has been carried out based on issues such as the profile of the users of this training model, its didactic design, resources and inclusive collaborative activities and universal design [28]. The study confirmed that these training proposals are still being taken by people with university studies and a background related to digital education. The massiveness of MOOCs, the universal design of content, resources and activities remain a challenge for the post-digital society.

The perception of a tolerant environment of respect, understanding and compromise, as well as objectives in line with the methodology used and content with resources in the desired language were aspects positively valued in MOOCs. However, those related to accessibility, social learning, and interaction with people from other cultures, and universal design, where inclusive access for people with functional diversity is possible, still require greater effort. Although MOOCs are projected in a tolerant and respectful environment, there may be shortcomings in terms of universal design, creation of resources and accessible activities [29]. The properties of the activities and the universal design of the MOOC suitable for all types of people have a strong correlation with learning through interaction. From these results, we can state that the variable defined by learning that occurs through interaction would be a dependent variable of the properties of the activities and the universal design of the MOOC, which would be independent variables [30]. Along with this area of inclusion, there is still a demand for an evaluation that fits the patterns established for sMOOCs and that, progressively, more open evaluation formats such as P2P, self-evaluation, etc., are introduced.

The social learning and interaction that occurs in the sMOOCs is greater or lesser depending on the design and properties of the activities, being also influential to design an inclusive sMOOC proposal. The most frequently used platform, regardless of the role they play in it, is UNED Abierta [31]. Platforms that do not present open and flexible models with sMOOC and tMOOC attributes are used. The ECOLearning project [32], which is in second place, is the only space that presents this typology. However, the students considered that they acquired a collaborative learning model through the creation of the sMOOC, developing an inclusive proposal, practical cases of application to social reality, and creating content with dissemination in social networks. Through the mixed work methodology for this research, we observed that the evaluation models applied do not conform to the patterns established for sMOOCs, although more open, inclusive, and participatory models are gaining importance [33], such as peer evaluations, self-evaluations, and even collaborative content creation activities and participation in social networks. Certain improvements are still needed in the methodology, in the quality of resources and materials, and the importance of the projection and extension of this training model to disciplines and professions that seem to be absent. These results are considered to confirm the specific objectives 1 and 2 of the research, since the analysis of the creation of sMOOCs and tMOOCs increases sustainability and enhances the culture of participation, establishing new forms of relationship with digital education. In addition, the data helps us understand the reality of the sMOOC and tMOOC phenomenon, based on the participants' own learning experience.

The general conception of sMOOCs and tMOOCs is that they are understood as a very positive phenomenon due to their characteristics such as all citizens inclusion, interaction, collaboration, and participation. They are also post-digital practices that are ubiquitous and free of charge, offering autonomous learning and the possibility of updating knowledge related to the work environment (professional transfer). All these dynamics include variables derived from Information, Relation and Communication Technologies, known as ICTs, and factors that link edu-communication as the central axis of its processes [34]. The results also show that the sMOOC/tMOOC model is being perfected with the experience and projection in different Spanish and European projects led by Eco Digital Learning (UNED). This institution continues to offer an increasingly solid model based on participation culture. The students responded in the interviews that the experiences in the creation of the

sMOOC by working groups within official postgraduate studies, have been a very positive and satisfactory practice, as well as a motivating challenge. We would like to underline the interaction developed in the work group, as well as the collaborative learning acquired and the knowledge of this resource as a learning method and evaluation process. We would also like to highlight the role of social networks, not only as a means of disseminating the life generated around the virtual learning community, but also as a community of practice. Therefore, the specific objective 3 of this research is confirmed, since there is an influence of social learning, in relation to sMOOC and tMOOC, in daily life and the real world, from a virtual plane. The students involved in the sMOOC/tMOOC creation process have discovered new ways of creative, collaborative, and inclusive work; they have been enriched by the exchange of experiences and collective construction of knowledge. As students, they believe that the task of having to create a sMOOC has provided them with certain digital and media competencies [35], new knowledge for professional transfer and performance of roles typical of social networks. Through this research, we have tried to demonstrate and understand the current reality of the sMOOC and tMOOC phenomenon, which is constantly developing and evolving, offering new functions and challenges for the future, and adapting to active methodologies, collaborative assessment models and horizontal and bidirectional communication [27,36].

5. Discussion

The culture of participation is enhanced and increased when turning students into e-teachers through the creation of their own MOOCs, being able to define a new model of inclusive digital education that is projected through social networks [37]. Personal experiences with MOOCs, regardless of their typology, are understood as an innovative learning methodology in constant renewal in the post-digital society. Finally, interdependence as a consequence and characteristic of the post-digital, is constantly in relation to sMOOCs, because it is not possible to separate the digital from the real and analog world [38]. This research can provide us with future implications, to get to know the different profiles of the sMOOC and tMOOC users, and their opinions on instructional designs, accessibility tools, interaction, etc., with the intention of improving the teaching and learning processes in the future online learning, and taking into account the limitations that this entails [39], due to the strong and rapid changes that occur in the forms and models of communication [40], and their relationship with technologies. In addition, we must bear in mind that MOOCs evolve and are being integrated as an application and support in other professional fields, such as journalism, thus offering new directions for future and possible investigations [41]. We must be attentive to the MOOC phenomenon since its learning models and methodologies change constantly and very quickly, and the literature and references that we have today may become obsolete. To date, the most current literature on MOOCs reveals that there is a large scientific production on this phenomenon, its typologies, and its evolution towards more open and flexible methodologies, leaving behind behavioral models of teaching-learning. The highlights of this study are the scientific and ethical values, the honesty, having communicated the results and possible applications in the research in a complete way, with respect to other researchers and ourselves. We also want to highlight objectivity because we have tried to go beyond our own preconceptions and possible deviations from the empirical evidence that justifies the conclusions. We consider that the research is objective because it corresponds to the reality studied, describing, and explaining it as it is. Rationality has been considered as an essential way to reach the results and the verifiable character of the investigation, since it allows greater reliability of the knowledge to be able to be verified by different people and varied circumstances. In short, a systematic study in which we have tried to determine an orderly, consistent, and coherent analysis in its elements.

Let this research serve as a basis for future studies that will help us understand MOOCs in general, as part and as method of learning in distance education, with the intention of

being able to offer citizens a more free, open, and fair education where everyone can one day have the same opportunities.

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