MOOC User Persistence

Lessons from French Educational Policy Adoption and Deployment of a Pilot Course[*]

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Abstract. This research explores user persistence in a massive open online course (MOOC) that was set up as an experiment before the French Ministry of Higher Education and Research launched in October 2013 the French Digital University initiative–a French platform for MOOCs. Persistence was looked into from the perspective of emotions. Digital trail data, demographic data and data from six scales were analysed. The scales were Positive Affect and Negative Affect Scales (PANAS) plus the Flow in Education scales (EduFlow). Results show that many registrants logged on, participated in activities and accessed resources seldom, while a few persisted and were active. Correlations between persistence and residence in Europe or Africa were found as well as patterns relating to negative affect and to well-being, again linked to geographic variables.

Keywords: Massive open online course, MOOC, Persistence, Well-being, Affect, Flow

1 Introduction

Massive open online courses (MOOCs) have become the trend in university education and have "taken universities in North America and elsewhere by storm"

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[12]. This trend is spreading to France too where central policy is pushing universities to endorse this form of e-learning. The French government adopted a road map for its digital development [7] that led to the launch of a plan for digital deployment in higher education, revealed on October 2, 2013, that includes a French Digital University (FDU). The FDU online courses are referred to as MOOCs which are delivered off a central platform by the French Ministry of Higher Education and Research (MHER). The first phase in deployment was a course on digital literacy, named MOOC iNum, that can be used to prepare level 1 of a national certificate, the *Certificat informatique et internet* (C2i). Accreditation for the certificate itself needs to be sought separately, by applying for it at a certifying institution.

A team of researchers took on the task of assessing the pilot course for the MHER. The report [5], which is a description of the project and its deployment, including statistical data, was mostly used by the MHER as a step to validate the FDU setup before its formal launch. The data collected on the application running the MOOC was supplemented by data collected through several questionnaires from scales to measure dimensions related to motivation, emotions and self-efficacy beliefs. Digital trail data, demographic data and the data collected through the questionnaires were later analysed in search of patterns to better understand persistence of usage or lack thereof. This paper reports the findings of these analyses.

2 Background

MOOC implementation, in terms of the learning paradigm that underpins the way services are organised for the learners and the associated instructional activities, have been classified under two general categories: "Connectivist" MOOCs (c-MOOCs) in which learning is the outcome of knowledge collectively constructed by peers, and more "traditional" MOOCs (x-MOOCs) in which the dominating paradigm is one of knowledge transmitted from instructor to student [3, 12, 16]. When a platform for MOOCs is set up, the learning paradigm adhered to should in principal lead to choosing a Learning Management System (LMS), to be served through the Web with its e-services (modules), that would support activities in accordance with the underpinning learning theory. An instructor who may be able to make certain services available to learners would then fine-tune the course design. For instance, a MOOCs LMS set up with a c-MOOC approach in mind would have at its core, services and end-user ergonomics that revolve around enabling learners to communicate among themselves, support each other, exchange ideas and co-create knowledge. This would not be the core of a system set up with an x-MOOC approach in mind. In the latter, static information that cannot be remodelled, such as videos of lectures, would likely be at the fore.

When an LMS in set up with a social constructivist epistemology and an open education initiative guiding choices, it is most likely that a c-MOOC implementation would be sought. Participating as a learner through the use of such a

platform requires of learners in addition to engaging in the activity individually, to be active in contributing to online discussions, creating the learning material as they go along and construct knowledge through peer supported and peer supporting activities. Participants need to be self-directed learners who interact in an open environment [16]. For peers to actively contribute to each other's knowledge formation, motivational and volitional characteristics of learners' engagement and persistence need to be enabled by environmental conditions that are favourable to agency. Research in these areas is needed to elucidate features and learner characteristics that could lead to improving the learning experience. Little empirical research to conceptualise and measure participation in open learning platforms has been done despite its importance [1].

Implementation of the iNum course followed a c-MOOC approach, at least in intention, referred to as following the principles of a "self-telic" [4] functioning system in which the driving force is produced by the interactions taking place, primarily through learners' contributions. Registrants in the pilot course were asked to respond to questions from scales to measure various learner characteristics in order to explore participation on the FDU platform. Limited participation in the iNum course led to picking out data regarding three scales and to analyse their correlations with digital trail data and demographic data. These scales are:

1. Positive Affect and Negative Affect Scales (PANAS) [18], transposed to French by Bouffard and Lapierre [2]. Positive and negative affect are two decisive dimensions of mood.
2. EduFlow [9] which bears on the state of flow in educational contexts. It is measured through four dimensions that constitute a sub-set of Csikszentmihalyi's [6] nine dimensions, refined for the purpose [9, 8]. The four dimensions are cognitive absorption i.e., feeling in control of the activity one is in as a result of knowing that the activity is doable and that one's skills are adequate, producing no anxiety nor boredom (D1); an altered perception of time i.e., feeling of timeliness which is the result of being intensely focused on one's present activity (D2); loss of self-consciousness i.e., not being concerned with oneself (D3); well-being i.e., being outside of daily reality to a degree that one feels ecstatic (D4). Flow is a subjective state of engagement in activity. It is a state of strong absorption in the activity that results from intrinsic motivation to engage in it for the pleasure that the activity affords. With such motivation, it is the state itself that is the reward for the activity.

2.1 iNum, the Pilot MOOC

Sakai (version CLE 2.9) was the platform used to manage the course. The course, named Digital Identity (*Identité Numérique*, abbreviated to iNum), lasted from may 6 to july 18, 2013. Activities in iNum revolved around four core tasks:

1. Creating one's digital identity
2. Starting one's e-portfolio
3. Creating an object through collaboration and setting out to communicate it

4. Writing a guide to using an online social network

According to the MOOC's designers, these activities are guided by a learning-by-doing approach. A fortnight separated each task deadline. In between, it was expected that learners would engage in developing their skills needed for successful completion of the task. Learning could involve individual activities which could last beyond the deadline for each task, but other activities were expected to be done collectively before the due date. Instant messaging, forums and document sharing areas served for discussion and sharing to accomplish these. Developing each competence involved three or four focused activities and a multiple-choice test for self-assessment. Students were encouraged to write up a summary of their activities in relation to the skills they were to develop. Documenting their learning would be helpful if they intended to seek certification once the course was completed.

Launching the iNum course was preceded by an information campaign. Information on MHER's website was relayed through Twitter and Facebook, the network of C2i contacts of French universities, the eLearning Africa network, French overseas embassies, the *Agence Universitaire de la Francophonie* (AUF), etc.

The campaign was effective to the degree that the FDU team decided to close enrolment sooner than planned, out of fear of being overwhelmed. Registration was open from April 10 to 24, 2013. Closing the course to further enrolments is somewhat paradoxical for a MOOC. Though this should not be of much concern under the circumstances of a pilot experiment, it nevertheless had its consequences. The population breakdown (see further along) may be a reflection of where the campaign to promote MOOC iNum hit first or strongest.

2.2 Linking Affect, Flow and User Persistence

Engaging in a MOOC is the result of a decision made by individual learners for whom motives are not the focus of this article. Persistence of learners in a MOOC however, which is central to this article, could be a concern. Accounting for both would help to better grasp reasons for dropping online course activities. Research has shown that large numbers of users drop out of MOOCs, sometimes very early after having registered. The numbers of those who persist and complete their course has sometimes been pointed to as a weakness. In a study conducted on HarvardX and MITx courses hosted on the edX platform [10], the authors insist on the fact that percentages are not numbers. Although 5% of typical registrants completed courses, the numbers of certified participants is high. 43,196 registrants were certified during the 2012–2013 academic year. The debate seems to miss the point. It is not a question of how many people access courses or end up with a certificate or credits for it; rather, the concern should be how adequate the MOOC environment is in satisfying participants' goals and conditions for learning. This is where improvement can take place.

Remaining an active participant in a course i.e., moving through stages of engagement until the point of course completion, is a matter of the adequateness

of the learning environment combined with the learner's dispositions. Both the learning environment, which includes media used, content, quality of interaction and so on, and learner dispositions, are interdependent. They are mutually forming. The environment will affect learner motivation and volition; in turn, these will affect learner participation and interaction. Interactions, as part of the environment, will in turn affect the dispositions of other participants which again will interact and contribute to reshaping the environment, and so on. A c-MOOC in principal should be more susceptible to changes and malleable as its design follows from the idea of participants co-creating through their interactions.

Our research strives to bring awareness to the need to explore facets of learners' dispositions as this could contribute to MOOC course designs that are favourable to the learning experience. The exploration of affect and flow can inform about the learning experience to help elucidate reasons for which registrants leave a course. Pekrun et al. [14, 13, 15] link emotions and cognition in learning contexts. PANAS in combination with EduFlow enable measuring the main components of well-being, those of affect and flow. The hypothesis for this research was that a relation exists between the emotional experiences of learners and their persistence in participating in the MOOC they enrolled in.

3 Methodology

Participants received an e-mail with a request to take part in a survey just before the end of the course. A link in each e-mail pointed to a webpage with the survey questions. Each link contained a unique token associated with that person's e-mail address. This enabled sending reminder requests only to registrants who had not yet responded. Commitment to confidentiality was given in the e-mail inviting participants to take part in the survey as well as on the LMS.

3.1 Analysis Procedures

Analyses were accomplished using SPSS (version 22). Analyses of data describing the population included: age, gender, country, student or professional status (ICT related profession, education related profession, retirement, leave for training, part-time), level of formal education, time the registrant expected to spend in the MOOC, and reasons for dropping the course. Digital trail data such as the number of visits to course areas, activity in each course area and content access were analysed as well as their relations to the demographic variables. These analyses were followed by the verification of internal consistency of responses to the PANAS and EduFlow scales. Analyses of correlations between data from the scales and digital trail data as well as with demographic data were followed up with an analysis of variance.

4 Findings

During the period open to registration (April 10–24, 2013), 1,189 persons registered out of whom 326 accepted to respond to the questionnaires. An analysis of frequencies enabled to determine a typical registrant profile. The typical registrant is a male (66.7%) who is not enrolled in a formal education programme (62.6%) nor any other course (77.0%), who owns a master's degree (42.5%) and who is between 31 and 39 years old. This profile fits 29 cases, representing 8.9% of respondents. This points to the variety of users and to the limited significance of a description of a typical user in iNum.

The country of residence of registrants was France for 17.9% and a similar percentage resided in Senegal. Following were Morocco (14.4%), Cameroon (13.3%) and Burkina Faso (12.3%). Apart for those registrants from France (a negligible number from Belgium, Canada and Switzerland; four in total), all others were residing in African countries. This may have been the result of the networks in Africa being quick in relaying the information about the opening of the course. Relaying networks in other parts of the world may have disseminated information later. By the time they did, registration may have no longer been possible (cf. Sect. 2.1).

Analysis of digital trail data reveals that of the 1,189 registrations, 272 never returned to the platform. There was less dropping out of registrants over 40 when testing for differences between age groups ($\chi^2(2) = 8.6, p < .05$). There was no effect of gender on the number of times users logged on to the platform ($\chi^2(3) = 2.16, ns$) or renounced participating in the course ($\chi^2(1) = 0.19, ns$). Of the 917 registrants who did return, 885 accessed the main course area (some had directly accessed task areas without passing through the main course area), 706 persons engaged in activities and 677 consulted resources in the main course area.
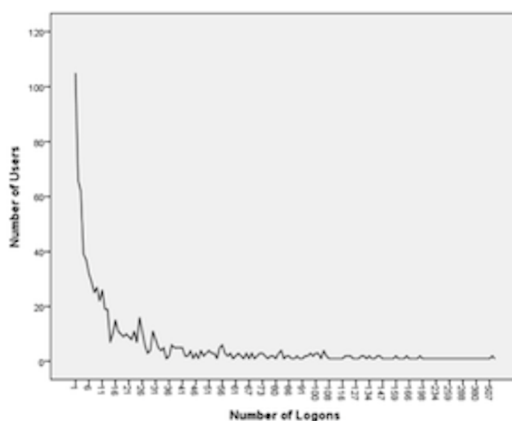

Fig. 1. Frequency of Users in Relation to the Number of Times They Logged On
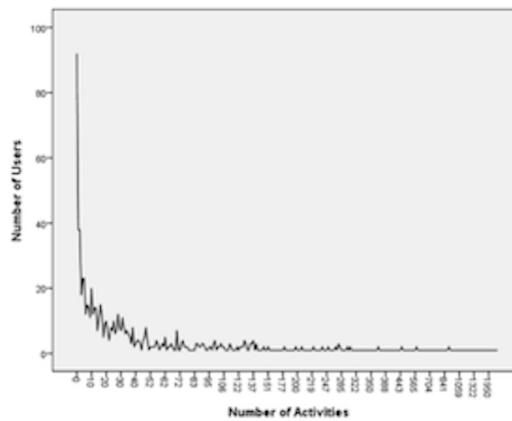
Fig. 2. Frequency of Users in Relation to the Number of Activities They Engaged In
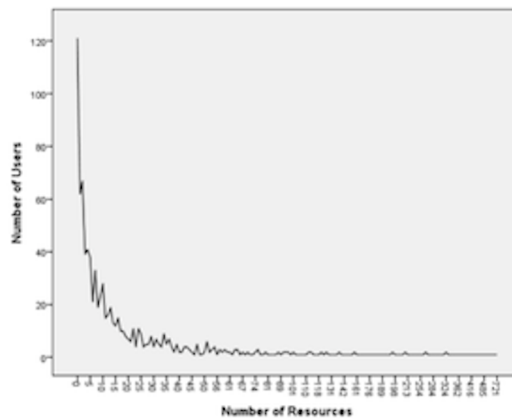

Fig. 3. Frequency of Users in Relation to the Number of Resources They Consulted

The frequency of users in relation to the frequency of times they logged on; in relation to the frequency of activities they engaged in; and in relation to the frequency of resources they consulted, are all similarly distributed. Many users logged on, engaged in activities and accessed resources a few times, while a few users who logged on, engaged in activities and accessed resources many times. 25.4% of registrants logged on 3 times or less while only 27.4% logged on more than 30 times (see Fig. 1). This same pattern is noted in Fig. 2 and Fig. 3, pointing to a general tendency in usage of the MOOC.

Analyses point to differences between the number of times registrants logged on and geographical variables. To explore these variables, three geographical zones were defined: one including the countries in sub-Saharan Africa, one including countries in the Maghreb, and one for those in Europe. The division into these zones was based on what could be considered as roughly correspond-

ing to cultural differences related to the history of French colonialism in these zones. Results point to statistically significant differences between the number of times registrants logged on to the MOOC and the geographical zones ($\chi^2(6) = 19.32, p < .01$). The frequency of European residents who logged on to the MOOC more than 30 times was higher than that of the African residents (sub-Saharan and Maghreb). There is also a statistically significant difference between abandonment numbers of users and the geographical zones ($\chi^2(2) = 6.95, p < .05$). European learners not only visited the MOOC more often as we saw earlier, they also dropped the course less often.

No relations were found between users who were also students in other institutions and the number of times that users logged on ($\chi^2(3) = 4.01, ns$), nor between these students and abandonment ($\chi^2(1) = 2.62, ns$). Concerning academic degrees held by users, there were no relations found between these and the number of times that users logged on ($\chi^2(9) = 8.41, ns$), nor in relation to abandonment ($\chi^2(3) = 1.28, ns$).

4.1 Analyses of Affect, Flow and User Persistence

Internal consistencies of the PANAS and EduFlow scales were verified, they are presented in Table 1.

Table 1. Internal Consistency of Scales

Scale	n	α
Positive Affect (PANAS)	47	.86
Negative Affect (PANAS)	43	.90
Cognitive Absorption (EduFlow D1)	63	.71
Altered Perception of Time (EduFlow D2)	63	.79
Loss of Self-Consciousness (EduFlow D3)	65	.88
Well-being (EduFlow D4)	64	.88

Descriptive statistics for scores obtained on the PANAS and EduFlow scales are presented in Table 2.

Before testing for correlation, logarithmic transformation was used to normalise the digital trail data after skewness and kurtosis were checked. A correlation exists between the number of times users logged on and the altered perception of time dimension (D2) of flow. Users who had an altered perception of time also logged on to the MOOC more often ($r = .25, p < .05$). Activity on the MOOC and the number of consulted resources are negatively correlated with loss of self-consciousness (D3 in EduFlow). This could perhaps be explained by the fact that the LMS design and setup were inadequate in providing a 'connected' experience. Users may have been more self-conscious, assessing how they appear to others as they sought ways to be seen and recognised as worthy interlocutors in an environment that was deficient in providing for connectedness

Table 2. Descriptive Statistics for Scale Scores

Scale	Min	Max	M	SD
Positive Affect (PANAS)	1.00	5.00	3.64	0.86
Negative Affect (PANAS)	1.00	5.00	2.07	0.97
Cognitive Absorption (EduFlow D1)	1.50	7.00	4.47	1.29
Altered Perception of Time (EduFlow D2)	1.00	7.00	4.51	1.50
Loss of Self-Consciousness (EduFlow D3)	1.00	7.00	4.12	1.67
Well-being (EduFlow D4)	1.00	7.00	4.46	1.52

[5]. The lack of possibilities to share and communicate among peers, qualifies the platform as an x-MOOC type [17], contrary to the declared intention of its planners.

Differences in patterns concerning the number of times users logged on and persistence, while accounting for users' residence, was the next step in the exploration of correlations. Correlations were sought between the sub-groups of users residing in Europe and African regions with affect and flow dimensions. Differences were noted and confirmed through analyses of variance (ANOVA). A statistically significant difference in emotions exists between European and African residents ($F[2, 61] = 3.55, p < .05$). European users had less negative affect when learning in the MOOC than Africans from the Maghreb and sub-Saharan Africa. While the African residents had more negative feelings, they also experienced enthusiasm, comfort and wanting to share feelings (see Table 3). As the ANOVA confirmed, this well-being dimension of flow (D4 in EduFlow) was stronger than that felt by their European counterparts ($F[2, 64] = 5.74, p < .01$).

Table 3. Means and Standard Deviations for Emotional Dimensions Differentiated According to User Residence

Scale	User Residence	M	SD
Negative Affect (PANAS)			
	Europe	1.68	.76
	Northern Africa (Maghreb)	2.62	1.13
	Sub-Saharan Africa	2.16	.98
Well-being (EduFlow D4)			
	Europe	3.57	1.42
	Northern Africa (Maghreb)	5.00	1.63
	Sub-Saharan Africa	4.81	1.38

5 Discussion

It may seem contradictory to have negative feelings while experiencing well-being. Taking a closer look at what is being explored in these dimensions, negative affect is conceived as stress, fluster, guilt, threat, hostility, irritation, shame and anxiety that may have been felt by the user, in this case when using iNum MOOC. Well-being in EduFlow is conceived as enthusiasm, comfort and wanting to share one's feelings with others, experienced while learning. It is plausible that users may have had momentarily felt negatively while still experiencing enthusiasm, comfort and eagerness to share the experience of learning in the MOOC. The Negative Affect scale in PANAS accounts for sporadic feelings, while Edu-Flow measures a continuous state. The eagerness felt by the residents in African regions may be understood as a feeling of being part of something innovative and exciting, to the extent that it links the user with an activity that has aura and value, perhaps even through connotations to prestigious institutions in countries looked up to. But this will require further exploration. Well-being could have been specked with frustration due to the absence of support to provide for connectedness [5]. This explanation also corroborates with the absence of loss of self-consciousness mentioned earlier.

While well-being was experienced by the African residents, it appears not to have been sufficient to sustain activity and to encourage persistence. African residents logged on less often and were more prone to drop out of the course. This may point to the inability for the learning environment, through its design, to provide for the needs of participants with different cultural references. As MOOCs are products of wealthy institutions in so-called Western countries, they are an expression of conceptualisations that are typical of them. People living in other cultural environments may not feel 'at home' in unfamiliar environments, even if they may be enthusiastic about being able to experience them, like one may feel when traveling to discover a new country for the first time.

It is also worth noting that as the MOOC was an experiment with a limited number of users, users were probably not representative of future course enrolees on FDU; not in terms of regional distribution nor in terms of numbers, as registration was closed earlier than expected, two weeks after registration was opened (cf. Sect. 2.1).

6 Conclusions

This research attempts to provide insight into learners' emotional experiences and the relation that such experiences have with persistence within an open online course. Though the experimental course was not massive in terms of the number of participants, it did offer an opportunity to explore facets of learners' experiences in an emerging e-learning environment and their relation to hanging in or dropping out of the course. Furthermore, linking emotions to cognitive activity is a step towards understanding the effects of opening up e-learning to massive enrolment and the reasons that enrolees leave a course before it ends.

There is a subtle difference between registering for a course and enrolling in it that can be made by distinguishing between those who just register and those who actually explore available resources and further move to become active learners plus interact with others in the process. This research highlights this subtle distinction by providing insight to the patterns of engagement with the online course. Few users engage in frequent access, activities and resources, while many engage only scarcely. To further understand user persistence, future research could explore well-being in conjunction with interest, motivation and strategies used to regulate one's learning [11], as these are crucial to active engagement and persistence, and to the effectiveness of the process.

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