

## Article

# Determinants of the Intention to Use MOOCs as a Complementary Tool: An Observational Study of Ecuadorian Teachers

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**Abstract:** New technological advances and globalization have undoubtedly given rise to new forms of learning. Massive Open Online Courses (MOOCs), which are a kind of evolution on e-learning, have the endorsement of prestigious universities around the world, and are transforming the traditional teaching–learning process. In Ecuador, these online courses are based on the Basic General Education system and are neither popular among students nor widely used by teachers in their teaching method, thus, this teaching system is not considered as an official qualification. The inclusion of this tool in the Ecuadorian educational system as a learning resource would expand access to equal opportunities to students and teachers from all over the country. Therefore, our proposal is to use the MOOCs as a source with all the instructional contents of the subject and as classwork based on the flipped-classroom method. In this way, such resources can be an aid to traditional high school classes, and the average grade achieved by students through this platform, as well as the student’s participation, may be part of the formal evaluation system in any institution. With the purpose of measuring the level of confidence in online education and the usage of MOOCs as a tool for teachers’ work, a descriptive and analytical approach has been taken in this study. A quantitative survey was administered to 696 Basic General Education teachers who took used this type of course. The results of this investigation show that 93.9% of the teachers trust the online education; 89% are ready to use MOOCs as a teaching–learning resource and 79% would use MOOCs as part of the final grade. These data prove that MOOCs could be a complementary tool for Basic General Education in Ecuador, so they could contribute to improve learning outcomes and the development of traditional education.



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## 1. Introduction

Massive Open Online Courses (MOOCs) have constituted a new experience for university education in recent years [1]. Undoubtedly, this is a new way of teaching that allows participants to be trained without schedule restrictions, and which is free or economically priced. Currently, very few universities are averse to offering MOOCs [2], with academic backing, as can be seen on the main platforms such as Coursera, edX and Udemy, among others. MOOCs are a new way of studying and may become a complement to the traditional teaching–learning process. Additionally, these courses represent an alternative to lifelong learning [3], and have been widely accepted by many higher education institutions [4].

In Basic General Education, several secondary teachers do indeed use MOOCs [4]. However, there are very few studies that report on the use of MOOCs in secondary education [5]. The University of Wisconsin and MIT offer preparatory MOOCs for secondary school students. Nonetheless, the research on the impact and implications of such initiatives

is still in its infancy [6]. Meanwhile, for computer science education, some German schools conducted a Python MOOC targeted at high schools. The results were successful, which showed that it is possible to employ MOOCs in classrooms with slight modifications within the given time frame. Teachers have successfully used these courses in class as well as in in-school and extracurricular settings [7]. Likewise, in the Republic of Kenya, in order to lessen the impact of the COVID-19 pandemic on education, MOOCs were implemented, so the area of education should focus on the use of MOOCs in institutions of basic education [8].

Currently, Ecuadorian teachers in Basic General Education are required to carry out numerous activities such as planning, testing, uploading grades to the platform, preparing lesson plans and preparing teaching material, among other tasks. These tasks are not done at school, but to a great extent, represent work taken home, which leaves little time for personal activities [9]. A MOOC, “as a complement to face-to-face courses”, could go some way towards addressing the fact that secondary school teachers have little time to dedicate to daily tasks. In addition to integrating new teaching and learning methods such as the flipped classroom through a MOOC, this combination can increase the effectiveness of teaching MOOCs [10], as they allow teachers to develop new skills which can benefit students. Other benefits include that students can become more involved in their own learning and thereby become active participants and actors in their own learning process, which fosters success in individual and group work. In addition to the perceived usefulness, stands out as the most important factor influencing the behavior of the intention to use e-learning systems by the Ecuadorian teachers [11].

The purpose of this research is to determine the acceptability of MOOCs as a complement to formal instruction in Basic General Education. This research is based on the analysis of the results obtained through the survey administered to teachers of Basic General Education that have taken part in this type of courses. The results of this investigation have shown that 93.9% of the teachers trust online education; that 89% are ready to use MOOCs as a teaching-learning resource and that 79% would use MOOCs as part of the final grade. These data prove that MOOCs could be a complementary tool for Basic General Education in Ecuador and contribute to learning outcomes and the development of traditional education.

The article has been organized in several sections. In Section 2, we explain our theoretical framework and make a brief description of the state of the art in relation to the MOOCs; in Section 3, we specify the material and methods that were used to make the present study; in Section 4, we present the results gathered through the survey applied to the teachers, in Section 5, we present a discussion, in Section 6, we include the conclusions and implications, and finally, we expose the limitations and future research.

## 2. Theoretical Framework

The first online course which was known as a MOOCs was “Connectivism and Connective Knowledge”, organized by George Siemens and Stephen Downes, of the University of Manitoba, Canada, in August 2008. Approximately 2300 students enrolled on this free course [12].

MOOCs in higher education have generated great interest recently [13]. Due to the fact that they are free courses with a flexible schedule, they fulfill the expectations of students around the world.

MOOCs arose from the desire of higher education institutions to disseminate content on a very large scale [14], thus providing free access to information and knowledge, not only to formal students, but to any individual with an interest in the subject. For this reason, numerous universities around the world have joined the movement and launched their own platforms to host their own MOOCs.

For all modalities of MOOCs or other personalized online courses, content tends to be organized sequentially in line with classical techniques, in which a central role is given to how to organize learning or represent the students’ knowledge, students’ preferences, personal goals and beliefs, among other things [15].

Currently, there are differing interpretations regarding the MOOC phenomenon. There are those who believe these courses represent a technological tool, and those who consider that MOOCs represent a way of learning: a new version of e-learning which facilitates the democratization of knowledge, since anyone can have access to these courses regardless of their location or social class [16]. Thus, countless MOOC platforms such as Coursera, edX and Udemy, which offer this type of course have appeared. Generally, the structure of these courses is defined depending, among other things, on their presentation, the description of the course, their objectives, content, and methodology, duration and assessment methods.

The aims of MOOCs are the ability to bring together many of students (which can easily sum up to thousands) and course material and as a means of transferring information [17]. MOOCs allow people to choose courses which may be delivered by professors and experts from universities and organizations anywhere in the world [18]. To participate, learners require a computer or mobile device with an internet connection. Nowadays, the majority of MOOCs provide a certificate to participants, sometimes at no cost or at a low cost. For some participants, the certificate is of utmost importance, since it formalizes their effort and gives their learning backing from a prestigious institution.

Likewise, there are different distinctive features of MOOCs, which we list below [19]:

- It is an educational resource which is similar to a classroom course with start and end dates.
- It has assessment mechanisms.
- It is online.
- It is free of charge.
- It is open via the web and has no admission requirements.
- It allows interactive participation on a large scale with hundreds of students.

Based on these characteristics of MOOCs, the authors [16] summarize and propose that MOOCs are an evolution, another aspect or dimension of distance learning, because they can appropriate characteristics which are ascribed to educational programs delivered in this way [19]. Similarly, the implementation of MOOCs at prestigious universities and educational institutions allows the continuous training of those who participate, and it also represents an option for life-long learning [20,21].

Without a doubt, MOOCs can be considered as tools that offer students the opportunity to train and increase knowledge [22,23] very economically. MOOCs can complement face-to-face classes as an additional resource to some subjects [24,25], simplifying vital theoretical and practical content, and offering quality content [26] for teachers and students.

The mass and open nature of MOOCs attracts a wide range of students, each of whom has different motivation [27], goals, intentions, beliefs and learning styles. This diversity in learner base complicates the creation of learning experiences adapted to heterogeneous profiles [28]. However, nowadays many MOOCs do not conform to the characteristic of being open, since there are several courses which charge or in which the participants are required to pay to obtain a certificate.

Furthermore, the disruptive nature of MOOCs can be only verified if they are taken as an experiment to test new methodologies, new technology and new ways to organize education [29]. These courses are hosted on diverse platforms, with a range of pedagogical origins and approaches such as constructivism, behaviorism and connectivism theory.

### 3. Materials and Methods

One of the fundamental tools used in this investigation was questionnaires, the aim of which was to collect information from a precise sample. The survey was administered with the purpose of finding out the acceptability of MOOCs as a complementary tool in Basic General Education, by the teachers who took part in the MOOC “Basic General Education”. Five thousand Ecuadorian teachers participated in the MOOC, “Basic General Education”.

The survey contained several closed questions, a “why” question, and multiple-choice questions, which allowed us to gather demographic data from the participants, as well as their level of knowledge about online education, MOOCs and flip classes, among other

things. For the survey design, we used a tool called Typeform (an online form builder), in order to automatically obtain the result report.

The survey was sent to the MOOC participants' emails, through the tool Mailrelay (create, send and analyze email campaigns), in an anonymous way, with the purpose of obtaining clear, concise and no-harm answers for the participants.

The main questions used in the diagnostic study were the following:

1. Gender
2. Age
3. Highest level of studies accomplished
4. Number of years of teaching experience
5. Nationality
6. How often do you take online courses?
7. Do you trust online education?
8. Do you think that it is necessary to have an online platform to complement face-to-face classes?
9. Would you accept the grade obtained in a MOOC as part of the official grade for a student?
10. What concerns you most about online learning?
11. What most fills you with enthusiasm about online education?
12. Tick the relevant box according to the importance to you of each of the statements related to Internet use.
13. Tick the relevant box according to how important to you these resources for blended-learning (b-learning) courses are.
14. Tick the relevant box according to how important the statements related to user-computer interaction in a b-learning course are to you.
15. Bearing in mind the features of the flipped class, rate the statement according to your views.
16. Which learning style do you most identify with?
17. Which style of learning would you associate with your learners?
18. Which learning style do you think would be the most suitable to use in the flipped-classroom method through a MOOC?

#### 4. Results

The questionnaire was sent by email to 5000 Basic General Education teachers in Ecuador who had previously taken a massive course, using the Mailrelay tool, with the following results: 1856 users opened the email, 1332 clicked on the link to the survey and 696 users completed the questionnaire, which represents almost 14% of the target teachers. This is a representative sample from which the following findings were obtained:

Question 1: Gender

In the survey, 67.3% of those who completed the questionnaires were women and 32.6% were men. The remaining 0.1% corresponds to 10 respondents who did not answer this question.

Question 2: Age

In answer to this question, 80.4% of the teachers were over 35 years old, while 19.6% were between 20 and 35 years old.

Question 3: Highest level of studies attained

The definitions of study levels were in line with Resolution RPC-SO-27-No.289-2014 of the Ecuadorian Higher Education Council (post-graduate level, graduate level, higher technical or technological and basic) [30]. The following data were collected: 20.6% of respondents are at the post-graduate level, 61.4% are at the graduate level, 16.2% responded higher technical or technological and 1.8% responded "other".

#### Question 4: Years teaching experience

The most marked finding here is that the majority, 95%, have over 3 years of teaching experience, and that 4.9% have between one and three years of teaching experience in Basic General Education.

#### Question 5: Nationality

In the question related to teachers' nationality, 99.6% answered that they are Ecuadorian nationals, whereas those of other nationalities account for only 0.4%.

#### Question 6: How often do you take online courses?

From the survey it can be seen that 48.7% of respondents take a course every 12 months, while 30.2% take a course every 3 months; 16.5% answered "other" and finally, 4.6% stated that they take an online course every month.

#### Question 7: Do you trust online education?

Following the same line of enquiry, and based on the results of the survey, it can be seen that 93.9% of respondents consider online education to be trustworthy. On the other hand, 6.1% state that they do not trust online education.

Question 8: Do you think that it is necessary to have an online platform to complement face-to-face classes?

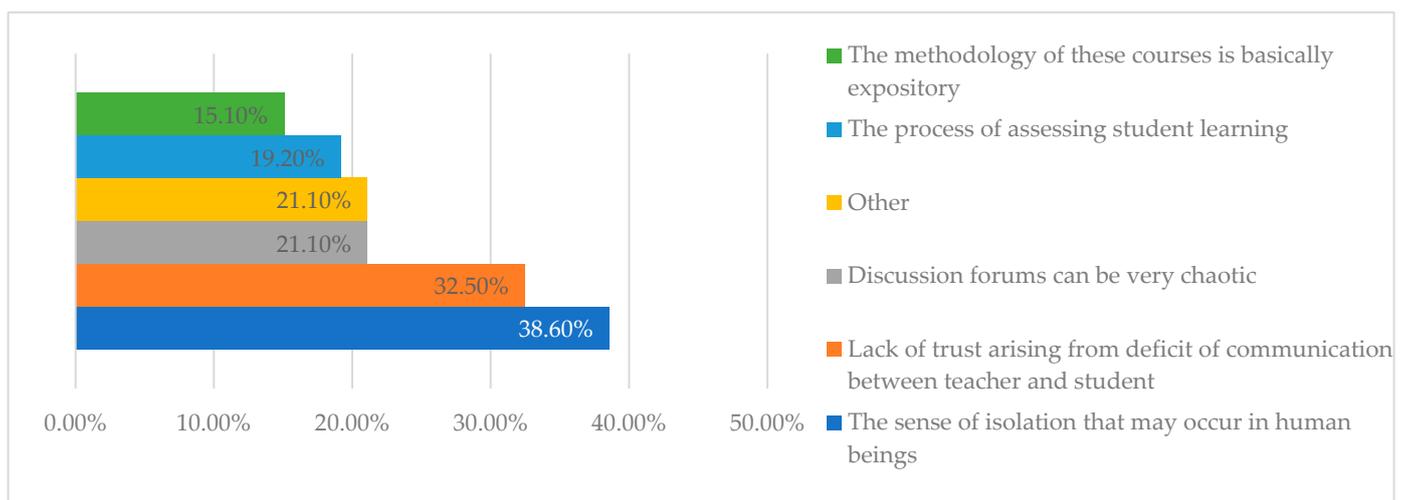
The findings show strong support for the idea, with 89% of respondents agreeing that it is necessary to use online resources to complement face-to-face classes, while only 11% expressed an opinion to the contrary.

Question 9: Would you accept the grade obtained in a MOOC as part of the official grade for a student?

In answer to this question, 79.1% of respondents stated that they would indeed accept the grade obtained in a MOOC as valid. On the other hand, 20.9% responded that they would not.

#### Question 10: What concerns you most about online learning?

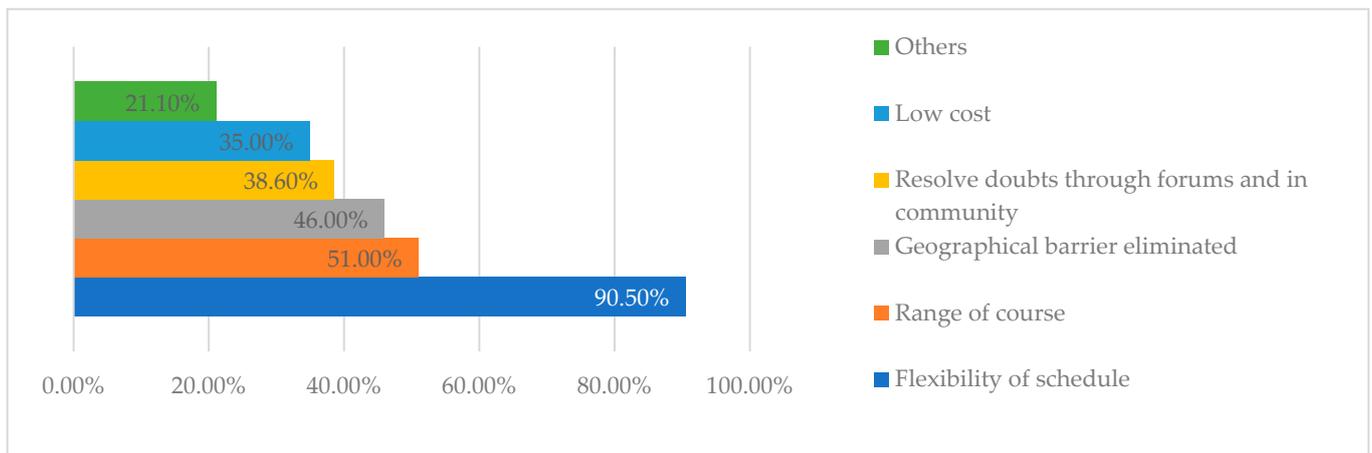
From Figure 1, we can identify some features that are of concern to teachers in relation to online education. The most important concern is "the sense of isolation that may occur in human beings" and the least important concern is that "The methodology of these courses is basically expository".



**Figure 1.** Top concerns of Basic General Education teachers in relation to online education.

#### Question 11: What most fills you with enthusiasm about online education?

The data in Figure 2 indicates that flexibility as regards schedule is the most motivating aspect of taking online courses, followed by other aspects such as the variety of courses available, low cost, resolving doubts through forums, and others.



**Figure 2.** Key features that motivate Basic Education teachers to take online courses.

Question 12: Tick the relevant box according to the importance for you of each of the statements related to Internet use.

Table 1 provides an overview of each of the statements according to a five-level Likert Scale from “not important at all”, “not very important”, “of average importance”, to “important” and “very important”. The table shows that there is a preference for quality videos.

**Table 1.** Relative importance of uses of the internet for Basic General Education Teachers.

	Not Important at All	Not Very Important	Of Average Importance	Important	Very Important
Finding online resources to use in my classes		2%	6%	34%	58%
Finding out about news related to the subjects I teach		2%	8%	32%	58%
Finding quality videos related to my subject		1%	4%	28%	67%
Communicating with students via social media	1%	4%	19%	41%	35%
Optimizing web searches		3%	16%	42%	39%
Academic search engines	1%	3%	11%	38%	47%

Question 13: Tick the relevant box according to how important for you these resources for blended-learning (b-learning) courses are.

The results of Table 2 show opinions regarding which resources should be considered in b-learning courses and indicate once again a preference for video resources.

**Table 2.** Relative importance of resources for a b-learning course.

	Not Important at All	Not Very Important	Of Average Importance	Important	Very Important
They must have theoretical material	1%	4%	20%	42%	33%
They must have videos		2%	9%	34%	55%
They must have self-assessment questionnaires		2%	10%	40%	48%
They must have questionnaires with open questions	1%	6%	15%	37%	41%
They must have discussion forums	1%	4%	15%	37%	43%
They must have tasks	1%	7%	22%	39%	31%
Integrate platforms with external resources	1%	3%	22%	41%	33%
Share class content on social networks	3%	7%	22%	34%	34%
Formal assessment	1%	2%	13%	40%	44%
Formal accreditation	1%	2%	11%	36%	50%

Question 14: Tick the relevant box according to how important the statements related to user–computer interaction in a b-learning course are for you.

From the results, we can obtain a better picture of b-learning courses with regard to practice and interaction with tutors, as set out in Table 3 below.

**Table 3.** Importance of User–Computer interaction in a b-learning course.

	Not Important at All	Not Very Important	Of Average Importance	Important	Very Important
Explore		2%	11%	42%	45%
Understand		2%	6%	30%	62%
Practice		2%	5%	27%	66%
Transfer		2%	9%	34%	55%
Self-regulation		2%	15%	45%	38%
Interact with resources		2%	9%	39%	50%
Interact with tutors		2%	11%	33%	54%
Interact with peers	1%	4%	13%	37%	45%

Question 15: Bearing in mind the features of the flipped class, rate the statement according to your views.

The findings set out in Table 4 below show that most of the features of the flipped classroom described in the statements were rated by the majority as “important” or “very important”.

**Table 4.** Importance of the characteristics of the flipped classroom to teachers.

	Not Important at All	Not Very Important	Of Average Importance	Important	Very Important
Involve student in their own learning		2%	9%	30%	59%
The student as an active participant and protagonist of their own learning		2%	6%	23%	69%
Promote individual and group work		2%	9%	26%	63%
Learn how to learn		2%	7%	22%	69%
Motivate the student		2%	7%	20%	71%
Personalized attention to students	2%	4%	13%	30%	51%
Digital resources		2%	11%	29%	58%
Independent student learning	2%	2%	9%	33%	54%

Question 16: Which learning style do you most identify with?

The findings set out below are based on four fundamental characteristics that clearly show learning style relating to each of the respondents. Each column represents the percentages, and the data indicate that one teacher identifies with all the learning styles, as shown in Table 5.

**Table 5.** Teachers’ self-identified learning styles.

	I Do not Identify	I Identify a Little	Neither a Little nor a Lot	I Identify Quite a Bit	I Fully Identify
Visual and verbal learners	2%	6%	20%	42%	30%
Sensing and intuitive learners	1%	8%	22%	46%	23%
Active and reflective learners		3%	9%	44%	44%
Sequential and global learners	1%	7%	22%	45%	25%

Question 17: Which style of learning would you associate with your learners?

As a complement to the previous question, the same question is asked but this time regarding the learners. Findings suggest that students have a range of learning styles, amongst which the most favored is “Active and reflective learners,” as shown in Table 6, below.

**Table 6.** Student learning styles in Basic General Education.

	I Do not Identify	I Identify a Little	Neither a Little nor a Lot	I Identify Quite a Bit	I Fully Identify
Visual and verbal learners	2%	7%	18%	42%	31%
Sensing and intuitive learners	1%	7%	25%	45%	22%
Active and reflective learners		5%	14%	43%	38%
Sequential and global learners	1%	8%	25%	45%	21%

Question 18: Which learning style do you think would be the most suitable to use in the flipped-classroom method through a MOOC?

Continuing with the theme of learning styles, a question was asked on the matter of which style would be most suitable to use in the flipped-class technique via a MOOC. It can be seen in the findings that no preference was identified, and it was pointed out it can be used with students with any learning style, in particular for “Active and reflective learners”, as illustrated in Table 7 below.

**Table 7.** Learning style suitable for applying the flipped-classroom technique.

	I Do not Identify	I Identify a Little	Neither a Little nor a Lot	I Identify Quite a Bit	I Fully Identify
Visual and verbal learners	3%	6%	15%	33%	43%
Sensing and intuitive learners		4%	15%	44%	37%
Active and reflective learners		4%	9%	39%	48%
Sequential and global learners		4%	18%	45%	33%

## 5. Discussion

With regard to the age of individuals surveyed, it can be seen that those aged over 35 account for the greatest number of users enrolled. From this finding, it can be deduced that chronological age does not exert much influence in the development of online courses. It is worth pointing out that each age group has characteristics or behaviors which set them apart from the other groups.

Teaching experience and experience as participants in online courses in the surveys is important. This study showed that the majority of those surveyed have 3 or more years teaching experience, and almost all of them take online courses at least once a year. This implies greater credibility in the findings obtained with respect to the possible use of MOOCs as a complementary tool to traditional education. In addition, MOOCs significantly reduce the impact of COVID-19 on education by 34.5 percent [8].

Contrary to what was expected (since the majority of teachers are over 35 years old), most of the teachers trust online learning and similarly, they trust the support of an online complement to face-to-face classes. This could have important implications for the future of traditional education. Therefore, it would be advisable to consider these results when thinking about other educational innovations that may arise, as well as the transformation of instructional delivery that comes with the logistical challenges of implementing MOOCs, and the attitudinal modifications that will be necessary for their widespread adoption [31].

Thus, 93% of the teachers trust online education, and 79% of the teachers consider that the grades obtained by taking part in a MOOC could be used as part of an official grade. The narrow gap between these percentages is somewhat contradictory and is essentially the result of the teachers’ lack of trust in the students.

It can be clearly seen that 90.5% of the teachers are motivated to participate in online courses, as the schedules of these courses are flexible. Judging by the reaction of respondents to this question, it would appear to confirm that online courses offer the opportunity for continuous academic and professional growth [32]. These courses can adapt to the timetable needs of users and thus, participants can work and study at the same time, without having to neglect either of their activities.

These days, the internet has become an essential support tool for teachers. Many of them use it, among other things, as a source of academic data, as a means of communication, and as a resource to find out about the latest news related to their subject. Thus, it is important to take full advantage of the benefits offered by this tool, and more so nowadays, since most of the population has access to this resource and due to the demand for inclusive education.

The three principal elements required by an online course are videos, questionnaires and discussion forums, though this should be interpreted with caution since it may vary depending on the participants whom the course is aimed at and on the topic.

With regard to the flipped classroom, it is interesting to note that most of those surveyed are not familiar with this way of learning. Thus, it could be concluded that the flipped-classroom methodology has not been widely disseminated among General Education teachers in the teacher training process. However, once a teacher has become aware of the features of the flipped classroom (for example, that it fosters creativity and critical thinking, and allows for greater efficiency), they realize its importance and rate it highly. This high rating also reflects that this methodology allows students to participate more actively in class [33], so they can prepare for in-class discussions by reviewing relevant material before class at their own pace [6]. This finding indicates that the flipped classroom is a valuable technique which can be implemented by Basic General Education teachers.

However, learning styles refer to the fact that every individual uses different methods and techniques to assimilate, reason and process new information [34]. Based on the findings of the study, it would appear that both teachers and students share similar learning styles, namely that they are “active and reflective” learners, reasons that must be considered when designing an online course.

## 6. Conclusions and Implications

In this research, interesting findings have emerged, such as the acceptability of MOOCs as a complementary tool in Basic General Education by teachers. The results reveal that the majority of educators (93.9%) believe that students can learn well via online courses, and as many as (89%) are willing to use MOOCs as teaching–learning resources. This evidence suggests that MOOCs might become a supplementary resource in Ecuador’s primary and secondary education systems. Some results of applying this type of course on the system will be: curriculum changes, new policies that will rule the teaching–learning process, MOOCs as an evolution of electronic learning and digital alphabetization for teachers and students.

## 7. Limitations and Future Research

The potential limitations that may arise on this type of research are: low precision on the measurement instruments, the random sample will not be representative, and the lack of digital competences of the people taking the survey. Based on these findings and aware of potential limitations we can encounter while implementing these courses, we have planned to create a MOOC and test it with teachers from several institutions.

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