

## Article

# Proposal for a Flipped Classroom Program with Massive Open Online Courses to Improve Access to Information and Information Literacy in Primary School Teachers

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**Abstract:** The objective of this study was to propose a teacher training program based on the flipped classroom model with MOOCs to strengthen access to information and information literacy among primary education teachers in the Lambayeque region of Peru. The non-experimental design was assumed with a quantitative approach and a propositional, descriptive type. A diagnosis was made using a questionnaire given to 917 primary school teachers. It was discovered that nearly all of the items in the questionnaire revealed a deficiency in the ability to navigate, search, and filter information, data, and digital content; the highest percentages were at the Basic level, with the exception of the item expressing information needs in an organized manner, which was at the Advanced C2 level. The lowest percentage was at the Advanced C1 level, and the majority of the lower percentages were at the Advanced level. In addition, there are competency deficiencies in the evaluation of information, data, and digital content of nearly all the items: the highest percentages were at the Basic level, with the exception of the item involving the processing of information, data, and digital content, where 26.4% were at the Intermediate B1 level and just 2.8% managed to be at the highest level, which is Advanced C2. Furthermore, when it came to storage and retrieval of information, data, and digital content competency, all the high percentages were at the Basic level, and all the low percentages were at the highest level, that is, Advanced. These findings helped us to understand that teachers have only a basic knowledge of information literacy and information competency. As a result, it is necessary to advocate for a teacher training program based on the flipped classroom model with MOOCs. This idea was supported by the opinions of five experts, who stated that its implementation would enable primary teachers of Regular Basic Education in the region of Lambayeque (Peru) to develop their access to information and information literacy competency area.

**Keywords:** flipped classroom; MOOC; information; information literacy



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## 1. Introduction

The pandemic triggered by COVID-19 affected every aspect of human life [1,2], prompting remarkable advances in the educational system, originally based on traditional, in-person education [3–5] and changed to an education mediated by Information and Communication Technologies (ICTs) [6] where teachers quickly became self-sufficient in handling the necessary tools to deliver online education. Teachers now possess better digital competencies, that is, attitudes, knowledge, and abilities to effectively teach in this context [7,8].

However, a large number of primary school teachers, including those from the Lambayeque region, were either not properly and quickly trained for the management of ICTs or, as a result of the abrupt change experienced, had to train themselves as best they could,

presenting gaps that have not yet been addressed in the five competency areas of teaching digital competence (Instituto Nacional de Tecnologías Educativas y Formación del Profesorado [9]). These gaps are primarily in the area of information competency and information literacy, which consist of accessing, finding, evaluating, and using information available on the Internet in a critical, safe, ethical, and effective manner, as well as expressing reasoned opinions. Put simply, primary teachers struggle with the first competency area of digital competences called information and informational literacy. This becomes a problem that urgently needs to be addressed in a knowledge society [10].

In order to address the growing demands of a globalized and hyperconnected world, one of the most important aspects of education is the development of the five competency areas of teaching digital competence; however, only the first competency area is covered in this study, as primary teachers of Regular Basic Education in the Lambayeque region feel that it needs to be strengthened. An alternative solution would be to implement a flipped classroom model supported by Massive Open Online Courses (MOOCs). This would allow educators to be trained by solving problems, engaging in stimulating debates, applying newly learned concepts to real-world situations, and other interactive activities [11].

Based on our review of the recent scientific literature [12–14], the development of digital competencies has become crucial in the modern educational field. Especially in the face of a challenging and constantly evolving curriculum [15], it is appropriate to use the flipped classroom strategy with MOOCs [11,16–19] as this approach represents a change from the dynamics of traditional teaching to a more active and participatory one by offering study material, whether in the form of videos, readings, or interactive resources, prior to class [20,21].

In light of the aforementioned imperative, a question of research was put forth in this study: how could the proposal of a training program for educators based on the flipped classroom method with MOOCs contribute to strengthening access to information and information literacy in elementary Basic Education teachers of the Lambayeque region (Peru)?

As follow-up questions, how can a MOOC-based flipped classroom training program improve the digital competencies of Peruvian primary school teachers in the Lambayeque region, especially with respect to access to information and information literacy, considering the diagnosis's identified areas of deficits and challenges and how can a training program that integrates MOOCs with a flipped classroom methodology improve the digital competencies of primary school teachers in the Lambayeque region (Peru)?

In order to address these issues, the research proposes a flipped classroom-based MOOC training program that will facilitate primary teachers of Regular Basic Education in the Lambayeque region of Peru to strengthen their information and literacy skills.

### **State of the Art**

#### *1.1. Digital Skills in Teachers*

Society needs teachers with digital skills; at the very least, the fundamental ones to study, live, and work (United Nations Educational, Scientific, and Cultural Organization [22]). These skills must enable educators to search for information, transform it into knowledge, and share, communicate, and distribute it in digital environments [23]. Digital competence turns out to be key for people to integrate into this ever-changing society and to learn continuously. To obtain it, teachers need to be competent in ICT and incorporate it into their teaching methods, as well as create appropriate spaces where students can acquire meaningful knowledge [6].

Since teachers are responsible for preparing the next generation of citizens [22], believes that building their digital competency is essential to worldwide progress; however, 64% of primary school teachers worldwide lack necessary instruction; this suggests a global shortage of trained teachers. Deficiency in ICT training is an issue that needs to be addressed by educational institutions, governments, businesses, and society at large. This

will require creative policies and investments to remove these barriers so that, by 2030, there will be teachers who are adequately qualified to teach [24].

### *1.2. Use of the Flipped Classroom and MOOC Methodology to Develop the Area of Access to Information and Information Literacy*

According to [25], the flipped classroom methodology is a cutting-edge pedagogical approach that flips the traditional instruction time by providing students with advance access to study materials. This enables more interactive and collaborative activities in the classroom. This approach makes teaching and learning more differentiated, in addition to encouraging more in-depth and independent learning [26].

However, ref. [27] assert that Massive Open Online Courses (MOOCs) have been acknowledged as a valuable tool for teachers' professional development. According to [28], these courses provide teachers with low-cost or free access to a variety of excellent educational resources, enabling them to improve their expertise in particular areas, such as information literacy. Additionally, MOOCs encourage flexible and self-directed learning, which, when supported by ICT, significantly contributes to the democratization and updating of knowledge. As a result, each participant's needs are met, and they are free to learn at their own pace [29].

Consequently, the combination of MOOCs and a flipped classroom model [30] offers an integrated strategy to improve information literacy and digital competencies among primary teachers in the Lambayeque region [31]. With the help of this approach, they will be able to adapt to a constantly evolving educational environment and be prepared to face the growing demands of the 21st-century globalized and hyperconnected world, where proficient use of technology and information is essential for both teachers and students [32].

In short, the integration of strategies such as a flipped classroom supported by MOOCs can be especially beneficial for primary teachers in the Lambayeque region [33]. According to [34], these methodologies not only help them improve their information literacy, that is, the capacity to identify, access, assess, and use data from a variety of sources to solve problems, reach conclusions, and communicate effectively in both digital and analog settings, but they also teach them how to adapt to a changing educational landscape and get their students ready for the 21st-century digital world.

### *1.3. Challenges and Barriers to Implementing a Teacher Training Program Based on the Flipped Classroom Model with MOOCs*

Implementing a teacher training program based on the flipped classroom model with MOOCs will present a number of challenges and obstacles, including resistance to change, as many teachers are used to traditional methods of teaching and are hesitant to adopt new ones that will significantly alter the dynamics of teaching and learning. A flipped classroom program using MOOCs may require certain technological tools, such as managing online platforms, creating multimedia content, and facilitating online interactions; therefore, insufficient technological skills refers to the fact that some teachers may not yet have the technical expertise needed to use these tools effectively. It can be challenging for teachers to get access to technology and connectivity, especially when they work in rural areas; some teachers may not have the motivation or commitment to fully participate in an online training program, especially if they do not see the benefits or connections between the training and their daily work. It goes without saying that conquering these challenges will involve an integrated approach that takes into account pedagogical and technological concerns, institutional support, and cooperation from everyone involved [26].

## **2. Materials and Methods**

### *2.1. Design*

In this research, a quantitative methodology was used, with a non-experimental design of a basic and propositional, descriptive type. The design called for a diagnosis of the levels of information competency and information literacy to be carried out. Based on the results

obtained in the diagnosis, a program was proposed that addresses the needs identified in primary level teachers.

## 2.2. Sample

The sample consisted of 917 teachers ( $n = 917$ ) at the primary level from the Local Management Units (Unidades de Gestión Local—UGEL) of Chiclayo, Ferreñafe, and Lambayeque, all located in the Lambayeque region. According to the sociodemographic profile, the majority of respondents (44%) ranged between the ages of 46 and 55 years, followed by those who were 56 years or older (30.4%), continuing with the ages of 36 to 45 years (21.2%), and a small group of respondents (4.4%) aged 35 or younger. Similarly, women made up the majority of teachers (80.9%), and very few were men (19.1%). In addition, regarding the level of study, 37.2% of respondents reported having a master's degree, 35.8% were post-secondary graduates, 17.7% were high school graduates, and 9.2% declared having pursued doctoral studies. Regarding work location, three out of four respondents were urban workers, primarily at the UGEL of Chiclayo. Non-parametric tests, Mann–Witney ( $k = 2$ ) and Kruskal–Wallis ( $k > 2$ ), were performed for the discriminant analysis. The gender and work area variables were analyzed using the Mann–Witney U, while the Kruskal–Wallis H was used to analyze age in intervals, educational level, and the UGEL.

## 2.3. Instrument

The survey method and the scale instrument on information and information literacy, developed by [9] and integrated into the Common Framework of Digital Teaching Competence, was carried out. The instrument was written in Spanish and consisted of 30 items in total, of which 16 questions had Likert scale answers ranging from 1 to 6 where 1 denotes very basic; 2, basic; 3, almost intermediate; 4, intermediate; 5, almost advanced; and 6, advanced. The instrument was validated by expert criteria. Cronbach's alpha coefficient was used to assess the scale's reliability; its value of 0.963 indicated high consistency. The original scale that was used was further validated by the fact that no variables needed to be excluded, proving its exceptional validity and reliability. Furthermore, discriminant analysis was conducted using the Mann–Whitney and Kruskal–Wallis tests. Also, the variables whose total-corrected element was less than 0.30 were eliminated.

The instrument was applied virtually through a form to 917 primary school teachers in the Lambayeque region of Peru over the course of two weeks. Teachers had the opportunity to decide for themselves whether or not to participate in this study by providing informed consent prior to the application of the instrument. Based on the results obtained, the proposal for a teacher training program based on flipped classroom model with MOOCs was designed to improve access to information and information literacy among primary teachers of Regular Basic Education in the Lambayeque region of Peru.

## 2.4. Data Processing and Analysis

The statistical analysis was conducted using IBM SPSS Statistics 25, with a focus on measures such as mean, standard deviation, degree of skewness, and kurtosis. After confirming the psychometric properties of the instruments used, the normality of the data were evaluated using the Kolmogorov–Smirnov test to discern between parametric and non-parametric variables and determine whether the variables displayed a normal distribution [35].

## 3. Results

The results regarding accessing information and information literacy, that is, the capacity to recognize, locate, acquire, store, organize, and analyze digital information, data, and content, as well as assess its applicability and purpose for educational tasks, are presented, taking into consideration the three competencies that comprise the competency area of strengthening information and information literacy.

### 3.1. Browsing, Searching, and Filtering Information, Data, and Digital Content

Table 1 display the results of teachers' perceptions of their proficiency in browsing, searching, and filtering data, information, and digital content. Showing a deficiency in nearly all the items, the highest percentages were at the Basic level, with the exception of the organized expression of information needs item, with the highest percentage (26.0%) at the Advanced C2 level and the lowest percentage (1.6%) at the Advanced C1 level. Additionally, 47.3% of the total research population reached the Basic A2 level in search of information, data, and digital content on the network and access to them, while 2.8% reached the Advanced C2 level. Also, regarding information found that was pertinent to teaching tasks, 28.8%, the highest percentage, were at the Basic A1 level, while the lowest percentage, 9.5%, were at the Intermediate B1 level. When it comes to effectively choosing educational resources, 32.9% of teachers were found to be at the Basic A2 level, while a low percentage—3.1%—were at the Intermediate B2 level. Furthermore, in managing different sources of information and developing personal information strategies, 44.4% of the teachers were at the Basic A1 level and only 6.3% had attained the highest level, the Advanced C2 level.

**Table 1.** Browsing, searching, and filtering information, data, and digital content.

	Basic				Intermediate				Advanced			
	A1		A2		B1		B2		C1		C2	
	n	%	n	%	n	%	n	%	n	%	n	%
Search for information, data, and digital content via the network and access to it	94	10.3	434	47.3	94	10.3	175	19.1	94	10.3	26	2.8
Expression of information needs in an organized manner	203	22.1	29	3.2	29	3.2	182	19.8	15	1.6	238	26.0
Location of relevant information for teaching duties	264	28.8	235	25.6	87	9.5	90	9.8	92	10.0	149	16.2
Selecting educational resources effectively	204	22.2	302	32.9	258	28.1	28	3.1	52	5.7	73	8.0
Management of different information sources and developing personal information strategies	407	44.4	117	12.8	195	21.3	61	6.7	79	8.6	58	6.3

### 3.2. Evaluation of Information, Data, and Digital Content

Table 2 reveals that there were competency deficiencies in the area of evaluating information, data, and digital content. The competence in this area was lacking; in nearly every item, the majority of respondents were at the Basic level, with the exception of the item regarding processing of information, data, and digital content, where 26.4% were at an Intermediate B1 level, compared to just 2.8% who were at the highest level, that is, Advanced C2. In this regard, the majority of teachers—25%—were at the Basic A2 level in regards to the item investigating knowledge of information, data, and digital content, compared to 2.4% at the Advanced C2 level. Similarly, in the item regarding collection of information, data, and digital content, the highest percentage—34.6%—attained the Basic A1 level, while the lowest percentage (3.6%) attained the Advanced C2 level. In reference to the item regarding understanding of information, data, and digital content, 39.9% of the total were found to be at the Basic A2 level, while just 3.1% could be assessed at the Advanced C2 level. Comparably, the item investigating the critical evaluation of information, data, and digital content revealed that only 4.7% of the teachers could be assessed at the Advanced C2 level, whereas 37.2% of the teachers were at the Basic A2 level.



**Table 2.** Evaluation of information, data, and digital content.

	Basic		Intermediate				Advanced					
	A1		A2		B1		B2		C1		C2	
	n	%	n	%	n	%	n	%	n	%	n	%
Knowledge of information, data, and digital content	212	23.1	229	25.0	216	23.6	185	20.2	53	5.8	22	2.4
Collection of information, data, and digital content	317	34.6	58	6.3	307	33.5	154	16.8	48	5.2	33	3.6
Processing of information, data, and digital content	176	19.2	238	26.0	242	26.4	151	16.5	84	9.2	26	2.8
Understanding information, data, and digital content	157	17.1	366	39.9	244	26.6	42	4.6	80	8.7	28	3.1
Critical evaluation of information, data, and digital content	172	18.8	341	37.2	169	18.4	119	13.0	73	8.0	43	4.7

### 3.3. Storage and Retrieval of Information, Data, and Digital Content

Table 3 illustrates the deficiencies of the teaching staff in the storage and retrieval of information, data, and digital content, showing that all the high percentages were at the lowest level, Basic, and all the low percentages were at the highest level, Advanced. Accordingly, regarding the item investigating the knowledge of services to store information, data, and digital content, 29.7% of the teachers were at the Basic A1 level, compared to 4.3% at the Advanced C2 level. For the item regarding the management of information, data, and digital content to facilitate its recovery, the highest percentage, 35.1%, were at the Basic A2 level, while the lowest percentage, that is, 3.9%, were able to reach the highest level, that is, Advanced C2. Regarding the item investigating the storage of information, data, and digital content to facilitate its recovery, its highest percentage of 40.5% were found at the Basic A1 level, while the lowest percentage (2.4%) were found at the highest level, Advanced C2. Similarly, for the item assessing the organization of information, data, and digital content, 43.1% were at the Basic A2 level, while the lowest percentage, 3.9%, were at the highest level, which is Advanced C2. Finally, in the item investigating the transfer of compressed files and resources, 25.7% were assessed at the Basic A2 level, while 9.2% were at the Advanced C2 level.

**Table 3.** Storage and retrieval of information, data, and digital content.

	Basic		Intermediate				Advanced					
	A1		A2		B1		B2		C1		C2	
	n	%	n	%	n	%	n	%	n	%	n	%
Knowledge of services to store information, data, and digital content	272	29.7	267	29.1	163	17.8	90	9.8	86	9.4	39	4.3
Management of information, data, and digital content to facilitate its recovery	202	22.0	322	35.1	174	19.0	115	12.5	68	7.4	36	3.9
Storage of information, data, and digital content to facilitate its recovery	193	21.0	371	40.5	128	14.0	144	15.7	59	6.4	22	2.4
Organization of information, data, and digital content	395	43.1	98	10.7	197	21.5	91	9.9	96	10.5	40	4.4
Transfer of compressed files and resources	234	25.5	236	25.7	130	14.2	110	12.0	123	13.4	84	9.2

### 3.4. Design of a Teacher Training Program Based on a Flipped Classroom with MOOCs

Figure 1 depicts the design of a training program based on a flipped classroom model with MOOCs, which emerged as a result of the needs detected after the application of the instrument. This program was made up of 26 training workshops that seek to strengthen

the competency area of information and information literacy in primary teachers of Regular Basic Education in the Lambayeque region (Peru) through the use of digital tools related to the skills of surfing, searching, and filtering of information, data, and digital content; storage and retrieval of information, data, and digital content; and evaluation of information, data, and digital content. For every content area, it is required that the planning and design of the material be presented to the study participants. This material must be shared via the Moodle platform prior to each session so that participants can examine and analyze it to discover if they have any questions or concerns. These concerns ought to be addressed in a face-to-face class, which would serve to start the debate.

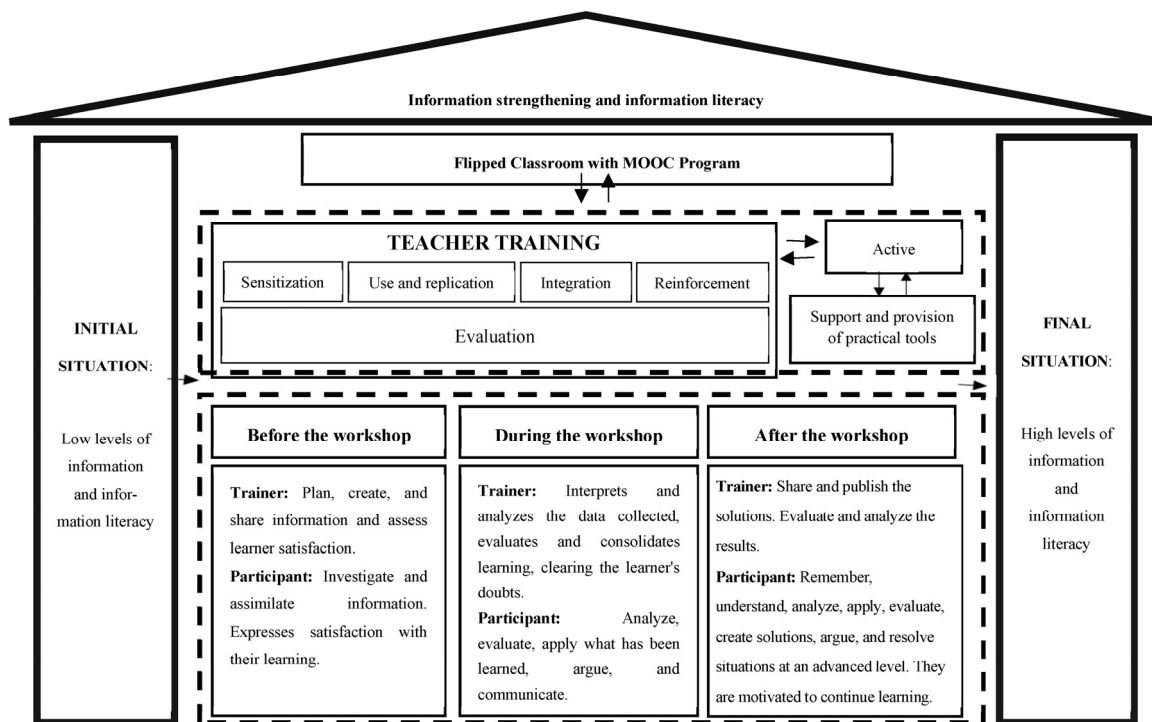


Figure 1. Teacher training program based on a flipped classroom with MOOCs.

#### 4. Discussion

An analysis of the results revealed deficiencies in access to information and information literacy among primary school teachers in the Lambayeque region of Peru. Specifically, they are insufficiently prepared to identify, locate, retrieve, store, organize, and analyze digital information, assessing its relevance and purpose. For example, according to the results in Table 1, the majority of the teachers who participated in this study know that the Internet can be an invaluable source for teaching and that they can use it to search for information, data, and digital content. They also know that search results vary depending on the search engines. Comparably, few teachers are proficient in using the Internet to find information and digital educational resources in different formats, that are from dynamic information sources, and of interest for their teaching goals. They also lack the organizational skills necessary to express their information needs and are unable to select the best available information from the resources they come across, as well as resources that they could adapt for educational use. Moreover, few are able to use advanced search tools and filters to find information and resources relevant to their teaching needs. Additionally, very few are able to create a customized strategy for searching and filtering data, digital resources, and information for the continuous updating of resources, best practices, and educational trends.

According to Table 2's results, the majority of teachers reached the Basic level: they are aware that the Internet has an extensive amount of information and resources for

teaching and that not all of it is trustworthy and can be reused. As a result, before utilizing websites or resources in the classroom, they perform a basic assessment of them by looking at information like the author, provenance, or origin. Nevertheless, very few teachers are aware of the use licenses that permit the distribution or repurposing of online resources or assess the quality of educational materials found online by looking for accuracy and curriculum alignment. In addition, very few teachers criticize the information sources, personal profiles they follow, and communities they are a part of, or follow a clear, efficient, and effective procedure for evaluating the material.

The majority of teachers, as indicated by the results in Table 3, feel competent in organizing teaching resources and possess the skills necessary to store digital information for their work, even though they are aware that they do not have control over all the devices or options available to them. Similarly, few teachers have their own storage strategy, know how to save and label files, content, and information, or know how to retrieve and manage the information and content they have saved.

The importance of training teachers to integrate online teaching methods and master emerging technologies, the primary focus of this research, is highlighted by the results. The body of scientific research that is currently available [17,36] highlights the advantages of teacher training when it comes to the efficient application of these innovative technologies, compared to conventional methods of teaching [37]. As a result, it is critical to ensure that all teachers take responsibility for the many technological resources that they utilize to optimize pedagogical work. This is because, in an increasingly globalized world where social networks are created through ICT, teachers can use these tools to simplify administrative, methodological, and didactic tasks.

Regarding this, ref. [38] pointed out that the flipped classroom method offers significant insights into the impact of fully online teaching methods on academic performance that are relevant to educational institutions, policymakers, and educators. Likewise, ref. [8] noted that the use of flipped classrooms in online learning environments has a positive impact on students' levels of motivation, satisfaction, and autonomy as well as cognitive learning results. Similarly, findings showed that the most remarkable feature of the FC is the motivation that the learner presents with this tool in the process of knowledge construction, emphasizing the role of the teacher in fostering the learner's autonomy. The FC is recognized as a strategic content tool that fosters peer interaction and teacher feedback, supporting learners' motivational needs that are crucial for learning.

Likewise, ref. [39] emphasizes in their research the necessity of rethinking the learning process in highly reflective subjects in teacher training. This allows for the adoption of a reverse training strategy, wherein the readings and videos prepare the students for their initial encounter with the relevant concepts and then engage them in dialogical problem solving during face-to-face class. However, the study by [40], focused on vocabulary instruction and teacher reflection, discovered that the use of technology and flipped classrooms were beneficial for urban areas but unfavorable for the rural ones because, in addition to creating learning problems, they also created other issues that prevented students from learning, such as access to technology. Consequently, this study suggests using it in urban settings.

Thus, the flipped classroom strategy presents a valuable opportunity to transform teaching. The teacher becomes a facilitator of learning, guiding the entire process by providing personalized guidance [41] for the development of problem-solving skills [42] and critical, reflective, and creative thinking [43] since the students acquire fundamental knowledge outside of class hours [44]. The flipped classroom model changes the role of the classroom by incorporating digital technologies into subject education. The teacher abandons a master class-based methodology and instead becomes a facilitator of resources for viewing or reading outside the classroom and utilizing the latter as a fluid and interactive learning environment where students take an active role [45].

Students, by receiving the material previously, have the opportunity to independently explore, investigate, and evaluate various sources of information on their own [38]. This helps them not only to acquire knowledge while also honing the ability to discern between



reliable and unreliable sources of information, which improves critical thinking. Furthermore, the flipped approach can be adapted to accommodate various learning styles and individual paces. More autonomous and personalized learning is encouraged by allowing students to review content according to their needs. This flexibility may also pave the way for creating more collaborative projects in the classroom where students apply newly learned information in original ways to solve problems and engage in critical thinking.

Developing the flipped classroom strategy means integrating MOOCs, which are online courses that provide a flexible and accessible platform for learning how to design, implement, and assess this teaching methodology [46]. All of this is carried out to create the best possible platform for promoting technological proficiency.

Teacher training in the flipped classroom model with the support of MOOCs can catalyze a major transformation in teaching [47]. Rearranging classroom time is just one aspect of this; another is enabling students to become active, critical, and autonomous learners in the information era [48,49]. This means having dependable devices and connectivity to take part in online courses and access digital resources.

Furthermore, teacher training should be promoted through policies that enable teachers to produce digital content adapted to local needs, with a particular emphasis on the flipped classroom and information literacy. These policies should provide easily accessible resources and provide teachers with the necessary abilities to evaluate the reliability of the information found [50].

As [51] points out, in order to achieve high-quality instruction that is relevant for today's classrooms, teacher education and training are crucial. In a similar vein, authors such as [52] emphasize the importance of providing continuous support to teachers, which includes monitoring mechanisms as well as technical and pedagogical support, such as follow-up sessions, online advice, or communities of practice, in order to ensure that the lessons learned are successfully applied in daily instructional practice.

Due to these reasons, it is crucial to address the successful integration of technology and the adoption of the flipped classroom model in classrooms through initiatives led by central governments or continuous educational programs. These programs may be offered in association with educational institutions or through specialized online platforms. In light of this, it is essential that information literacy be included in the curriculum of schools. There should be clear guidelines on how to address this topic in the classroom, as it ought to be considered as a transversal component in various subjects and educational levels [53]. Moreover, it is imperative to establish evaluation systems that recognize and value the effective implementation of the flipped classroom and information literacy within the educational environment [36].

Authors such as [54] propose the establishment of incentives for teachers who exhibit a positive influence on students' learning. Furthermore, fostering collaboration among diverse stakeholders—including the educational sector, academic institutions, non-governmental organizations, and technology companies—is recommended. Simultaneously, studies such as that of [55] suggest that it is critical to strengthen teacher training initiatives, provide them with access to digital educational resources for their teaching role, and help them adapt to the new methodologies required by today's world. The application of this study's recommendations is subsequently proposed, acknowledging the fact that teachers' use of ICT is crucial for contemporary educational practices.

## 5. Conclusions

To improve the level of access to information and information literacy of primary teachers of Regular Basic Education in the Lambayeque region (Peru), it is recommended to introduce a teacher training program centered on a flipped classroom model and supported by MOOCs as the primary school teachers surveyed in the Lambayeque region demonstrate deficiencies in their comprehension of information competency and information literacy, with the majority of them being at the Basic level in its three dimensions and the lowest percentage being at the Advanced level. The MOOC's flipped classroom program consisted

of 26 practical workshops that raised awareness about the importance of the proposal, the use and replication of the tools taught, as well as their integration into pedagogical practice, process reinforcement, and evaluation. All of this was conducted under an active methodology with ongoing support from the trainers prior to, during, and after the workshops. In addition, the proposal of a teacher training program based on the flipped classroom model, supported by MOOCs, has the potential to significantly transform the way that education is delivered. This involves not only reorganizing the structure of classroom time but also providing workshop participants with the resources they need to become engaged, critical, and independent learners in the information age.

It is advised to conduct a mixed-methods investigation employing questionnaires and group interviews to acquire a deeper comprehension of how the flipped classroom's characteristics affect students' learning experiences. Additionally, training programs that adapt to the unique requirements of educators and raise educational achievement should be created. Moreover, it would be valuable to put interviews into consideration to further understand why some rural or urban areas might show a more favorable or unfavorable reception toward these educational technologies.

In order to strengthen the level of access to information and information literacy of primary school teachers of Regular Basic Education in the Lambayeque region (Peru), a teacher training program based on a flipped classroom method with MOOCs was proposed. The primary teachers surveyed in the Lambayeque region showed deficiencies in the levels of the information and information literacy competency area of digital competence, with the majority of them being at the Basic level in its three dimensions and the lowest percentage being at the Advanced level.

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