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Vulnerability and Resilience in Course Adaptations for Online Modality: Anytime, Anywhere, Any Climate

Giancarlo De Agostini[1, *], Xavier Arcentales[1], Patricio González[1], Marco Yamba[1], Frank Viteri[2]

[1]Online Education Department, Catholic University of Cuenca, Cuenca, Ecuador

[2]Psychology Department, Salesian Polytechnic University, Quito, Ecuador

Email address:

giancarlo.deagostini@ucacue.edu.ec (G. De Agostini), gdeagostini@gmail.com (G. De Agostini)

[*]Corresponding author

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Abstract: It has been found that university professors in the global south, working in online courses, have a great "dilemma" to transfer and extrapolate the different curriculum, syllabus, teaching ideas, messages, cooperative activities and concepts from a face-to-face teaching-learning environment to an on line or virtual modality. The big problem is the lack of resilience of teachers to adapt the education of the past, to a future one, that is already present and needed, especially today with drastic climate changes and pandemic events. Thus, a critical and transcendental question to answer is how, in an online classroom, teachers are prepared to deal with vulnerable students, regardless of its ability or any environmental conditions, including climate management. This question refers to an equal treatment to all alumni, respecting their differences in cultural lives, social, economic and weather conditions, beliefs, and special capacities. Every student, regardless of its ability and geographical residence, should have equal opportunity to contribute with their ideas in an online or virtual class or event; this is a crucial question to be answered and treated for an online environment. Usually, university professors use a course management system for their classes as a repository (deposit) of documents and isolated activities, instead of a series of connected participatory activities, gradually developing from simple to more difficult tasks in order to really help learners with their academics under any type of conditions.

Keywords: Online, Courses, Omnipresent, Adaptable, Climate, Rural

1. Introduction

Study anywhere, anytime and under any climate condition is the "motto" of today´s online active learning [1].

A series of international documents from United Nations Organization [2], Intergovernmental Group of Experts on Climate Change, World Meteorological Organization, Summit on the Climate Action, Kyoto Protocol, Paris Agreement and other resolutions in climate change have been consulted and vulnerability and resilience have been covered in climate change and curriculum.

With pandemic, tornados, earthquakes or any other catastrophes, somehow, an online learning model, by itself, could anywhere survive and be a real solution towards an active education, today and in the near future. Communication should not be a real problem today due to satellite support and communication facilities.

It has been found that for university professors, designing and working in online courses, the great "dilemma" has been to transfer and extrapolate the different curriculum, syllabus, teaching ideas, messages and concepts from a face-to-face teaching-learning environment to an on line modality.

1.1. Methodology

From a methodological point of view, it is healthy to start from a heuristics approach [3] to identify specific variables relating to climate change and educational solutions to the problem. Here, the variables are drawn from the experience of the team of researchers, as well as knowledge in pedagogy and educational practice, all directed towards a common

purpose. This approach also relies on internationally collected data, establishing criteria to propose strategies and mechanisms to apply and contextualize virtual education in the framework of drastic climate changes [4].

Data relating to this environmental phenomenon is available worldwide, having been presented by a wide range of global initiatives: The United Nations [5] - Environment, Intergovernmental Group of Experts on Climate Change, the World Meteorological Organization (WMO), the Climate Action Summit, Kyoto Protocol, and the Paris Accords. In these and other sources, the consequences of climate change are constantly being updated worldwide, as climate change affects education and gradually but consistently causes harm to the poorest countries and developing nations.

This paper seeks to implicitly generate mechanisms to allow for democratization of education among the most vulnerable sectors of society and reflects on how these proposed mechanisms serve to broaden educational opportunities while minimizing the effects of climate change, also by providing a contextual analysis that evidences the difficulties teachers confront when transitioning from a traditional face-to-face education to an online education.

In general, schools have been implementing online educational learning processes throughout the world to serve a large population with obstacles due to a wide range of causes that include poverty, school dropouts, migration, drug rehabilitation, etc. Each of these causes is subject to a specific analysis, which would provide a better understanding and adaptation of a better and more efficient methodology and learning didactic techniques to be implemented to an online modality.

Experiences such as virtual high school in Ecuador implemented 20 years ago and worldwide have been reviewed, along with transition mechanisms implemented by Ecuadorian universities from face to face (f-t-f) to online education, have allowed them to serve remote populations and students who do not have access to schools or universities.

While distance education still represents a minority of study options today, it is the most important factor for increasing educational coverage in poorest regions with public and private support. In the near past and specially recently, it has experienced more growth than face-to-face educational programs.

Latin America has been slowly immersed in the transition from face-to-face to virtual education since about two decades; definitely, this change to virtual education has provided more alternatives for the most disadvantaged population groups. The cases studied reflect a series of conflicts, but also opportunities that are analyzed herein.

Understanding that online educational platforms allow to work with participants living in different contextual environments is important since it permits to adapt the curriculum to specific community needs. One fundamental source for understanding the contextualization of these platforms is the Iberoamerican Virtual High School [6] one that, amidst the geographical and cultural richness of Ecuador, has achieved a nationally and internationally recognized educational program [7].

In addition to the real case mentioned above, the Iberoamerican High School project has been supported through a theoretical and methodological basis, which is based on official UNESCO documents, which join forces with different governments in order to generate awareness in issues such as climate change an online education, “the need to create a world citizenship, a workforce and government officials aware of their role in mitigating climate change and adapting to it is pressing” (UNESCO, 2011).

But it is not only a call for attention to the world governments but a joint work in cooperation with them to be able to comply with the UNESCO Action Strategy on climate change (2018-2021), which aims to:

1. Enable Member States to take urgent action to combat climate change and its impacts through education, science, culture, and information and communication, in accordance with their respective determined contributions at the national level (CDN) in the framework of the Paris Agreement (COP 21), and in the global context of the 2030 Agenda for Sustainable Development and its SDG 13. (UNESCO, Action Strategy on Climate Change 2018 - 2021, 2017).
2. Generate a process of coalition to solve climate and social problems together with other Nations, in fact, in such a society as globalized as ours, actions must be established from the community of states and also from the daily practice: “It is important to provide education and training and to be aware as wide a public as possible” (UNESCO, Climate Change Education for Sustainable Development., 2011, p. 2).

Since the governments work at the political middle and high level decisions, education is required for society at large, thus, schools and colleges play an essential role in helping learners understand the causes of climate change so that can make informed and effective decisions to act appropriately in implementing solutions to help agro-family farmers to acquire the abilities needed to participate in the transition toward more sustainable lifestyles, green economies, and climate-resilient societies. (UNESCO, not just hot air: putting climate change education into practice, 2015). In Ecuador, the Ministry of Agriculture is implementing an online program consisting of a sequence on virtual courses to help families with small farms to be able to work with climate adversity.

This makes it necessary to rethink educational processes to envision a transition from formal classroom education to a virtual e-learning education [8], allowing access to learning and above all guaranteeing the right to an education for all, especially in contexts affected by global climate changes.

It is important to remember that pedagogical, methodological, and didactic considerations are not detached from the normative, legal, and institutional processes of countries worldwide, since the applications of proposals like those mentioned so far also require changes and flexibility in public policies that govern national educational programs.

The commitment here is required not only from academia, but also from the "public establishment" to seek out alternatives.

1.2. The Big Question

It is generally agreed that every student, regardless of its ability, geographical and living conditions, should have equal opportunity to contribute their ideas and participate actively in the classroom? On this document let's change the word classroom for the term online or virtual class or event.

Why this question has been chosen? simply because it has not been simple to treat it in an online environment; usually university professors use a course management system for their courses as a repository (deposit) of isolated activities, instead of a series of connected activities, gradually developing from simple to more difficult tasks [9].

Normally in such environments as LMS or MOOC, both students and tutor are working asynchronously, thousands of miles apart from each other, at different times and under diverse changing climate conditions, very frequently with work and family pressure. Besides these factors, usually, professors use a limited amount of resources, although there exists access to a large number of online tools (see list at the end of document).

1.3. Awareness

In an online mode of teaching-learning process, besides considering the student discipline on the side of the pupil and the motivation that should be generated by the online tutor [10], the three-way relationship *Teacher-Curriculum-Student* (T-C-S) and the three different types of curricula: Formal, Informal and Hidden, besides planning, it is important to be aware of the difference between traditional digital contents like DVD, Word, Excel, PPT, etc., and real "online contents" like images, interactive activities and evaluation, comprehensive assessment, audio, videos, infographics, simulations, and games, among others.

Also, it is important to have in mind the concept of multiple intelligences brought about by Howard Gardner, at the time professor of Harvard University, in his book "*Frames of Mind: The Theory of Multiple Intelligences*" (1983).

According to Dr. Gardner "*students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways*", thus, people usually work, solve problems, perform different tasks with diverse competences.

Gardner´s intelligences are catalogued as: logical, linguistic, visual, musical, kinesthetic, interpersonal and intrapersonal, besides naturalist and existentialist. These relate to mathematical problems, written text, animated resources, hearing media, manual and outdoor activities, relation with others and auto self-evaluation processes.

Now comes the crucial question: how to treat students in online courses, through a digital platform or so called "course management system", equally with so many differences, especially nowadays, with drastic changing climate conditions?

1.4. Climate Conditions and Climate Change

Climate change is the global alteration of the Earth's climate, today influencing, more than ever, schooling. This variation may be due to natural causes, such as heavy rain, volcanic eruptions, earthquakes or to human activities, such as the use of fossil fuels, toxic industrial activities, the burning of large areas of trees and forests as in the Brazilian Amazon, pollution, large plastic waste to rivers and sea, among other causes of human responsibility.

Changes in climate can manifest themselves with frequency and with different effects, such as, temperature, rainfall, cloudiness, etc. Additionally, human activities carry out toxic emissions of gases in high concentrations that have altered the natural greenhouse effect necessary for life, generating global warming. Those gases are carbon dioxide (CO_2), oxide nitrous (NO_2) and methane (CH_4). Before, nature was in charge of balancing these emissions and today, it can no longer do it. The proportion of CO_2 in the Earth's atmosphere should be very small: about 270 parts per million; the proportion of CO_2 is now 416 parts per million as May 2021 measurement [11] and increasing.

Figure 1. *Catastrophe.*

Being specific, the causes associated with human activities are:

a. The combustion of coal, oil and gas: for transportation, for heating, for industry, to generate electricity, to cook, etc. This combustion produces CO_2 and nitrous oxide (N_2O), enhancing the greenhouse effect.
b. Cutting down of forests and rainforests (deforestation): the trees absorb CO_2 from the atmosphere and thereby help regulate the weather. If the trees are cut down, the beneficial effect is lost and the carbon stored in trees is released into the atmosphere and increases the greenhouse effect.
c. The development of livestock: cows and sheep produce great amount of methane in their dregs, another greenhouse effect.
d. Agriculture: the use of nitrogen fertilizers produces emissions of nitrous oxide, also responsible for the increase in greenhouse effect.

e. Fluorinated gases used as refrigerants, extinguishing fire agents, solvent and foam manufacturing insulators cause a powerful heating effect, up to 23 thousand times higher than that produced by CO_2. Scientific analysis shows that human activities are the cause of the alteration call climate change. In a sense, all humans are responsible, some countries and also several companies, more than others.

Now, it is necessary to point out some of the consequences:

Melting of poles and glacier shrinkage with the increase in extreme weather events. There will be more fires and higher climate temperatures. There will also be more hurricanes, tornadoes, heavy and longer rains, floods and storms produced by changes in temperature and evaporation of water and droughts on the other side. Loss of biodiversity (ecosystems, species, genes) with soil degradation, deforestation and desertification because of extensive fires, implying scarcity of water resources and significant reduction in agricultural production with the consequent food shortage and increase in diseases, and of course, the impossibility to go physically to school or university, thus, the necessity of an online education with qualified professors and quality resources and excellent planned activities.

1.5. The Course Management System (CMS)

Which CMS to select? Usually, almost any online "course management system" (CMS) or digital platform to deliver courses has hundreds of resources to create interesting activities. Personally, my experience has been in facilitating and designing online courses and working in several of them; MOOC type like edX (free) or LMS type such as MOODLE (free), CANVAS, and Blackboard, among others. Which one is the best to work with? The majority are excellent to work with having plenty of resources, thus select and work with the one feeling at your ease and your pocket.

As to Ecuadorian experiences, since sixteen (16) years ago there exists an Ecuadorian foundation to advise on the theme of e-Learning to educational institutions and also it devised a complete totally online Ecuadorian high school approved by the government with approximately one hundred courses, to attend the whole country students, from the highlands to the amazon jungles, and Ecuadorians living in other nations, with all types of weathers.

The online high school [12] with international prizes and funding support [13] (UNESCO, IDB, and other local institutions) is based on five Moodle platforms, originally devised to deliver the last six years of High School courses, prepared to manage diverse climate conditions with the support of public and private online service stations.

2. Design

Let´s try to describe how an online course designer has to tackle the content´s organization and dosage of an online educational event, ready to all participants, geographically disperse, through all type of climates.

If possible, try to be sequential in any learning module to be prepare, starting with an evaluation of the profile and alumni needs. Also use justifiable and efficient tools and resources asking questions such as, why do a teacher needs to use a chat or a forum or a video or an evaluation tool or any other resource?

Organize and divide units in complete and self-contained interrelated learning blocks so that the participant will not be distracted. Simple content at the beginning and then, progressively, increasing in difficulty.

There are several methodologies (ADDIE & SAM, s.f.) to use in planning an online class, but never start, as many beginners do, with a technology orientation; start with an end in mind but plan the online lesson carefully and don´t forget to apply a sound methodology and techniques. Be aware since online teachers are not working with physical available students in a brick classroom, the students are located anyware and may work at any time, with different climate conditions and varied needs related to independence since many of them work or are nursing mothers, or live far away from institutional centers in different and diverse climates, among other situations.

Jared Stein, Vice President of Research and Development at Canvas, said during an interview with Online Education (On line Education, s.f.), "*You will want to choose the tools that provide the best opportunities to learn, practice, and socialize with the least amount of technical overhead"* and under any type of environmental conditions.

To start with a good practice and well design modules, the online course designer has to read the complete original author´s document, then adapt to it an adequate instructional systemic design so that the multimedia designers have a clear idea of what resources and tools may incorporate into the construction of the virtual class.

Online education in an educational organization is a participatory scholastic meeting, among students and tutors mediated by technology, that builds new knowledge. The characteristics of a virtual e-learning education is: adaptable, active, cognitive, using multimedia resources, prompt feedback, collaborative, constructive, omnipresent, equal, inclusive and diverse.

It has to be a totally online program including scholarships to in need students, permitting an autonomous modality of studies adaptable to time and place, but totally monitored and guided by online trained teachers, through the online virtual classroom, along all the educational process.

3. Techniques

There is a number of teaching-learning techniques to be aware of and use profusely in an online educational environment, such as: planning of a class, precise activities at the beginning and at the end of a class, concept development and problem solving techniques, ability in asking and answering questions, efficient use of examples and cases, assessment and evaluation themes, among others.

Never fill your course module with excessive pictures,

videos and other resources; it does not have to look like a circus, only use the justifiable necessary didactic elements. Be balanced, adjust your tools according to the needs of the lesson and your participants, and remember to justify all media in use to communicate the course contents, related always to the course learning objectives.

Have at hand and know well your online digital tools kit, especially those belonging to the platform effectively in use and with positive results, which definitely promotes and motivates the acquisition and production of students´ knowledge.

Additionally, the resources of a Moodle platform are actually many; one may create forums, wiki, data bases, chats, interactive content, questionnaires, regular and pre-defined polls, glossaries, lessons, evaluations, workshops, homeworks, quizzes, external resources and many more. Moodle was one of the first existing course management systems. Besides being able to activate several additional tools from the CMS, it is possible to use and adapt several external resources to the platform.

4. Systemic Instructional Design

Don´t forget this crucial step. Being the Instructional Design a pedagogical planning methodology, which serves as a reference for the production of various educational materials, according to the learning needs that seek to ensure online educational quality, therefore, the online course designer should propose a sound instructional design, in which the general principles and aspects of online learning will be inserted, in a dynamic and flexible way, so that the students can assimilate their training in the most effective possible way, used as a guide for the planning of learning units as well as for the definition of pedagogical approaches to fulfil the mission of guiding online learning, and to introduce flexible characteristics to readjust the online events according to the realities of each group culture.

Constructivism as a Pedagogical Model will become the transversal axis of all scientific or technological content in the proposed instructional design, so that the student is driven by the components of Freire´s "critical pedagogy", a teleological axis of substantial importance, and by the principles of Morin´s "complex pedagogy", to thereby tend to acquire the skills of free, proactive and critical thinking future professionals, thus having the individual to participate in cooperative activities.

Additionally, the evaluative components will directly affect the neuronal activity through the activation of various intellectual operations to produce deductions, inferences, arguments, counter-arguments, proposals and conceptualizations, within a reading frame and, decoding of images, videos, graphemes, phonemes, whose design proposals have an impact, in addition to logic, on the perception of the recipients with messages that corroborate the institutional identity and universal values. It is therefore convenient to point out two important axes in this instructional design - content and method:

a) The content axis will specify:
   1. Learning objectives.
   2. Course Organization (credit determination), the learning units and scheduled execution times (timing).
   3. The Strategic Contents: specificity with a purpose and define each of them: the number of chats, forums, wikis, videos, animations, simulations, evaluations, banners, subtitles, etc.
   4. The suitable strategies and pedagogical resources (synchronous or asynchronous) within a constructivist model and specifically of a critical and complex pedagogy.
   5. Determination of the platform's adaptability in terms of "function and format".
   6. Use of digital open repositories (OER)

b) The methodology axis will specify:
   1. The construction of knowledge directed to the student as the main actor in any educational activity, in a context of synchronous and asynchronous interactivity.
   2. The inclusion of critical and complex thinking as a transversal axis of cognitive processes, where intellectual development will be enhanced by the range of activities that induce the student to develop their abilities through the activation of intellectual operations.
   3. The learning tools or resources that include the aforementioned elements in reference to the construction of knowledge without neglecting conceptions of image management and messages that influence perceptions, regarding universal values and humanism.

5. Solution

Since there is not physical contact or presence between student-teacher in a totally online digital platform, it is crucial to use a considerable number of online ready tools to work with a curriculum [14] in mind, for a virtual course environment, since, at least, over a 99% of the class has to be installed, ready, evaluated and proven before it starts, with texts, forums, infographics, interactive activities, videos, audios, tools, resources, articles, documents, bibliography, references, links, etc.

Besides a sound and solid content delivered from experts, also use learning base problem (LBP) activities, the promotion and participation in forums and debates, discussions, group activities, varied case studies, simulations, participation of augmented reality laboratories, multiple scenarios through videos, valid sources of information, online office hours through video or chat synchronous conferences, evaluation strategies, among others. Remember, it is mainly a read-write model.

With all these resources in mind and a sound methodology and techniques, should be in capacity to attend with quality and equality, students with differences in disperse

geographically and climate scenarios, working efficiently with the support of Gardner´s multiple intelligences.

Use a myriad of resources but do not exaggerate; if using too many unnecessary effects and transitions it may distract, annoy or bore the participant; always think in the spectator and remember that the importance is the learning message and active activities. Finally, eliminate any superfluous design or information and always foster motivation and discipline throughout the online course.

Remember, your online lesson should never be a repository of long documents to read, but instead, it must be a purposeful conglomerate of diverse functional participatory activities.

6. The Most Difficult Task

Diversity, Inclusion and Equity,

These three concepts of Equity, Inclusion and attention to Diversity often generate confusion or are considered similar or misunderstood and are really different but interrelated. Then let´s clarify them to course designers on digital platforms, from our point of view, considering the online teaching-learning processes (virtual, as some call it) effective for these purposes, using all the appropriate resources of the course management system (CMS) in use and the Internet network.

These three concepts, very necessary in traditional or face-to-face education, are indispensable in mixed, blended or online learning in order to achieve greater social justice.

To accept *Diversity* is to be aware that *existence* is diversely beautiful, everything has its *raison d'être* (purpose), nothing is useless, ugly or unnecessary. Without going too far, let's observe what surrounds us, all nature, flowers, trees, dogs, cats among other animals such as insects, fish, birds, etc.

All is diverse and in diversity people find beauty; then, let´s not forget our own diversity: babies, girls, boys, teenagers, women, men, adults, elderly, old, blacks, whites, any beautiful mix, people with disabilities, some fast and others slow... humans are awesome beautiful [15].

Strengthening *Inclusion* means creating complementary learning teaching processes that satisfy Diversity. It leads us to take advantage of the resources of the Internet network and especially the integrated online course management systems such as MOODLE (custom) or edX (massive), among others, to implement a pedagogical and andragogic methodology that includes, through Diversity, the differences of the participants.

And finally, what is it understood by Equity? Accepting equal respect for people, attention, consideration, treatment, dedication and support to all participants without distinction, respecting differences, extrapolating the concept to “everyone around us”.

LIFE is an image of our actions, but each individual interprets it with admiration although in a different way, with a vision of their own, different from the rest, so the question arises: why treat everyone equally disregarding differences? Why demand and want everyone to think under the same patterns, rules and behaviors?

It is necessary to live in community, treating everyone with respect, accepting the diverse and including everyone in a participatory and not politically exclusive project, especially in an educational environment.

7. Four Principles of Vulnerability

The following principles, *Affordability, Accessibility, Adaptability and Acceptability,* should determine and guide the activities of any online course in order to guarantee its non-vulnerability and adaptability to the multiple climate changes of our Time.

Affordability, refers to the existence and availability of the educational online service to guarantee teaching programs, in a range of active educational possibilities offered to an entire community, through a sound educational program, with the use of up to date technologies, as well as the principle of inclusion towards a quality eLearning proposal “for all”; of importance is “quality” which cannot be exempted in the specification of the courses, since without it a proposal could failed.

Additionally, it is imperative to allow digital natives to adapt to their educational process efficiently and effectively through electronic devices, being it important to take into account that the levels of poverty in the world are very high, then it is worth emphasizing the need for investment by governments to provide to the population with technological tools that allow them to cope with any phenomena including climate varied conditions that will appear, thus acting first from a preventive rather than a late reactive perspective.

The lack of planning of the pedagogical, methodological and technological components in distance education can lead to errors in the design, production and distribution of study materials, failures in coordinating the interaction between the different personal and material resources, as well as inconsistencies in the evaluation learning processes, with respect to the objectives planned.

Therefore, it is important to bear in mind that this principle will always be achieved when the respective governments invest in processes of provision and equipping not only of schools but also as a center for integration of the community so that students continue with well-designed educational-learning processes.

The principle of *Accessibility* expressed in the philosophical framework of recognizing all areas of social participation as equal, provides facilities so that everyone can access ubiquitous educational services under any climate conditions and with equal opportunities, specifying the following indicators: economic reference in relation to financing plans, scholarships and tuition; the educational system formulated for "other forms of study", different from the traditional, by its nature avoids the costs generated by transfer and permanence due to geographical location, with open schedules and special educational needs, through digital media and virtual environments, also converging with the principle of non-

discrimination. Finally, the subject of curricular and pedagogical accessibility is evident, not only in the access to educational possibilities, but also with an educational model that entails a situational understanding of non-homogeneous groups, without neglecting educational quality.

In the context of climate change and any phenomena that can be triggered by these processes, it is important to be certain that virtual education will allow students, in the midst of the changes produced by any climate phenomenon, to continue with their academic continuous training process without generating abrupt rupture in their learning.

Regarding the principle of *Adaptability*, which is the capacity of being flexible, responsive and adaptable to the needs of societies and communities in transformation and its corresponding development of various aspects of diversity: cultural, geographic, varied climate drastic changes, age, gender, educational level, among others.

Then, it can be inferred that the flexibility that distance education fosters, regarding individual differences, is feasible, since the student becomes the actor of his own training, adapting his learning to his own rhythm and study frequency, choosing the schedules according to their context reality, where not only the concept of "equal opportunities" is important, but also the access to education under different climate situations, since for this purpose, the pedagogical online model considers the target group and its cognitive characteristics. Thus, higher online education must maintain its quality and propensity for "continuous improvement", always responding to contextual, social, cultural, climate changes and geographical needs, as mentioned earlier.

Also, it is important to take into account that education, being the heritage of humanity, implies that has to adapt to contextual historical situations, in other words, it should not be interrupted by external processes, but must advance with history, and History requires adaptation and variability to establish mechanisms for institutional survival. In fact, education is the human foundation of societies in overcoming any natural phenomenon and political circumstances.

As far as the principle of *Acceptability*, which refers to the contextualization, diversification, relevance, cultural adaptation and maintenance of the quality of the curriculum, it is important to mention that because Ecuador is a multi-ethnic and multicultural country, it needs to have university online programs responding effectively to contextual participant needs, and to the reactivation of a productive matrix; for this reason, the educational proposal is expressed as an alternative according to the specific needs of the person, region, climate, social situation, conditions and living context. The online "modality" as well as the pedagogical methodology, should converge to the aforementioned needs.

In today's world, it is especially important to understand that the situations to which nature has led the world require to open our eyes towards a feasible educational transformation, which also implies that students, parents and teachers accept this new type of online study to guarantee not only the transmission of knowledge but also to favor a holistic learning in the actual new circumstances that must face as humanity, in fact, for these models to be accepted, substantial changes have to be made in the life of people and its communities.

8. Conclusion

To start an online program in any institution it would be needed, in general, to start preparing the online designers, usually teachers, not with one or two online courses, but with a catenation of a minimum of five educational events up to preferably eight including an understanding of environmental possible drastic changes, not forgetting a complete professional instruction in Andragogy to all online teachers.

It is suggested as courses´ themes at least the following [16]:

1. Introduction to Online Education
2. Group Online Communication Processes
3. Students´ Distance Services
4. Systemic Instructional Design
5. Online evaluation strategies
6. Technologies for Distance Learning
7. Online Learning Techniques
8. Applied Project

Also be aware of [17] [18]:

1) Define how an online model course should be constructed: typology of study, materials, resources and activities, especially to tackle climate changes.
2) Make a proposal of how these contents are presented and organized in the virtual classroom: instructional and interface design.
3) Define and write a teaching guide describing the teaching-learning methodology and guidelines for the study, which will serve to guide teachers and students, and thus show them how to study and how it is taught in the virtual classroom.
4) Update the e-Learning online course management system and its contents, frequently.
5) Set up special parameters according to possible changes that our environment will have in coming years and decades in which future generations are going to educate themselves, thus, answering an important question: what will education and learning be like between 2021 and 2030 or even 2050?
6) Be aware that an Online Education is the result of the deliberate integration of theories and methodologies from Pedagogy, Psychology, Sociology, Communication, Engineering and Technology with the purpose of improving the conditions for students´ every day learning under any climate condition.
7) Acknowledge that our educational system is under constant pressure in order to focus on new ideas, new learning strategies, new technologies and especially today and into the future with environmental and climate drastic variations, ultimately enabling to develop innovative means to inspire the next generation.
8) Be certain that in this decade, advances in educational curricula and policies will allow us to address

educational reforms oriented to individuals in a way it was unattainable in earlier times. As such, the new paradigms for teaching-learning processes in online modes of education present as crucial challenges for both the teacher and the student in their new participatory roles.

9) Let us be certain that our actual social educational model will end, and consequently, in the future humans will never stop learning under any conditions, including climate.

List of Tools

Bank of Images

1) Pixabay: https://pixabay.com/es/
2) Flickr: https://www.flickr.com/
3) EveryStockphoto: http://www.everystockphoto.com/
4) Google images (tools > non-commercial use)

Infographics

1) Piktochart: infographics for the web (vertical format)
2) Datawrapper: interactive graphics
3) Ease. lyinfografías & interactives contents • Genial.ly
4) PowToon Editors img/ html
5) EXeLearning
6) Photoshop CC
7) Sublime TEXT
8) Dreamweaver CC

Templates

1) A good place for inspiration: https://themeforest.net
2) Slide Carnival (free templates): https://www.slidescarnival.com /category/free-templates

Screen Casters

1) PPT recorder
2) Open Board: electronic blackboard.
3) Active Presenter: Video recording and editor.
4) Screencastify, Chrome extension. Permits screen recording + webcam
5) Spark Adobe.

Multimedia Editor

1) Mpeg Stream clip: video editor to export to web formats
2) Video Editor Windows 10
3) Light box, advanced video editor
4) Audacity, audio editor
5) Transcoder (compression):
6) Handbrake
7) Google hangouts& YouTube
8) Big Blue Button
9) Opencast

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