# Web 3.0 Resources in the Development of Autonomous Work of Higher Education Students in Times of Covid-19 Pandemic

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**Abstract.** This research on web 3.0 tools and autonomous work analyzes new and interactive possibilities for the generation of educational content in web environments. The research aims to determine the use of web 3.0 tools and the autonomous work of higher education students in times of pandemic. The research methodology was of an experimental type through a quantitative approach, with a documentary bibliographic modality for the understanding of the variables and field where direct contact was maintained with the study population. For the collection of information, the survey technique was used based on a questionnaire on a Likert scale. The study population was 68 students of the Tourism major, a population to which the experimentation was applied based on the ADDIE methodology for the development of digital tools and the application of the TAM model survey. The statistic used to test the hypothesis is Kolmogorov-Smirnov with a value less than 0.05. The results of this research were that the students favorably accepted the technology, that is, the web 3.0 tools in autonomous work since they contribute to generating self-learning skills, motivation, and commitment to the construction of knowledge in a playful way.

**Keywords:** TAC · Web 3.0 tools · Author resources · Virtual education · Autonomous work

## 1 Introduction

[1] author of the study "Pedagogical use of web 3.0 to dynamize teaching practice" seeks to point out the didactic alternatives of web 3.0 in the curriculum of the Faculty of Communication (Medellín, Colombia) through a mixed research approach. He reflects that there must be a balance between the technological possibility, the role of the student, the role of the teacher and the pedagogical model to initiate a bidirectional sketch of a virtual learning environment adapted to a variety of situations inside and outside the educational field. Within the results, two main limits are exhibited for the pedagogical management of web 3.0 in the development of classes:


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1. Lack of tangible resources (computers, mobiles, etc.)
2. Digital illiteracy of teachers

For this reason, the researcher concludes and identifies the need for teaching literacy in pedagogical digital media that allows it to guide, share and transfer viable and reliable information to students as a key source of construction of significant knowledge in a critical, recursive, autonomous, and collaborative way.

[2] considers in his study that "M-Learning in the autonomous learning process" is a multimedia learning method that allows the individual to learn anywhere, at any time through mobile devices (tablets, mobile phones)., handheld devices, etc.) if you have wireless connectivity. The author concludes with four significant advantages when carrying out educational practices of M-Learning such as:

- Stimulates the use of ICT (Information and Communication Technologies).
- Provides flexibility in content and interaction between student and teacher.
- Promotes the interest, motivation, and concentration of students in-class sessions.
- Strengthens group and individual experiences in virtual environments.

Therefore, mobile devices facilitate individual learning, since each learner is a unique being with their own abilities, skills, needs, and interests in terms of their learning process, thus offering students great flexibility to follow their own pace and learning style which could enhance their motivation to learn.

[3] reflect that facing a new digital generation, the educational system must be focused on investigating new ways of conceiving a more personalized, flexible education and the use of mobile devices as an added value. Much of our daily life requires the use of the Internet in different fields, especially in the educational field [4]. These mobile resources provide an ideal framework and/or environment for the teacher and the student to interact through devices, giving way to increasing autonomy, competitiveness, and critical - constructive vision besides having immediate and continuous progress of the students during the teaching and learning process.

With the appearance of the (TEP) Technologies for Empowerment and Participation, [5] defines them as the set of digital tools that facilitate communication, social cohesion, commitment, and participation, sharing ideas in a virtual environment. Thus, collaboration is encouraged within the framework of reflection, interaction, and the joint construction of knowledge to contextualize and locate them according to the learning needs of each student in the educational community [6].

In a pedagogical sense, if we learn to use ICT, TAC, and TEP to motivate students, develop their creativity, and take advantage of synergies between teachers and students, we will create extended learning in which students work proactively, and independently, guided by their curiosity for lifelong learning. They learn to use the extraordinary potential of technology as a source of information, teaching methodology and constant educational stimulus [7].

## 2 State of the Art

Web tools are the set of programs or applications that are hosted directly on a page and/or website to facilitate access to information regardless of the site of origin [8]. Over time, the web continues to evolve, offering improved network connectivity, new network access points, and endless changes to meet needs, particularly access to information and communication.

For the evolution of the web over time, there are three different stages known as the "web" and then the numbers 1.0, 2.0, 3.0 (Fig. 1).

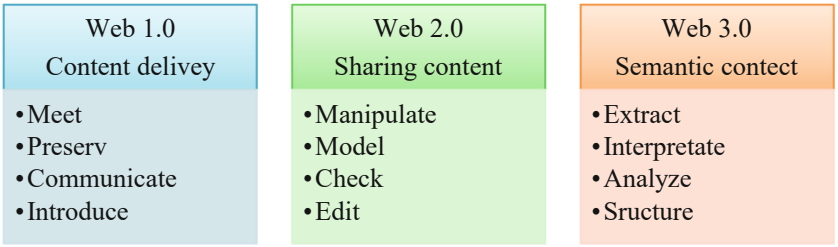


**Fig. 1.** Evolution of web

However, this evolution of the WEB depends on its content and the possibility of accessing, maintaining, and optimizing the information that users have, giving rise to three generations of the web. Thus, Web 1.0 provides information, Web 2.0 overloads the data network, and Web 3.0 offers information control [3].

### 2.1 Web Tools Used in Education

In this digital universe, there are innumerable tools that are framed within the WEB, including a variety of applications that can be used from any device, or location and are focused on educational purposes, while most stand out for being free [9] (Fig. 2).


**Fig. 2.** Education web tools

### 2.2 Web 3.0 Tools

The web 3.0 concept first emerged in 2006 in an article by Zeldman. Web 3.0, also known as the "Semantic Web" which, in general, refers to a variety of tools (google, mobile devices, augmented reality, etc.) with procedures and languages that can interpret certain styles of users, allowing them to access a variety of images, content, videos, documents, files and multimedia content through hyperlinks and/or hyperlinks [9]. So, it is linked to the term personalization, since it aims to offer a range of content and information adapted to our preferences based on a framework of flexibility and versatility that allows us to overcome barriers of structure and format [10].

In this sense, the generalities of web 3.0 tools were exposed to understand their origin and conceptualization. The immersion of this type of tools in the educational field has shown that it can contribute to a new concept of teaching where the motivation and creativity of teachers, students and parents in the educational process are encouraged [11].

### 2.3 Web 3.0 Tools in Education

The Semantic Web in education would then focus on the design and development of meta programs such as logical, attachable information systems, with a complete and individually executable computational structure aimed at both students and teachers. Given this scenario, there is an unavoidable need to involve all members of the educational community (students, teachers, parents, directors, among others) in the production of innovative pedagogical proposals to address the great benefits offered by technological advances, considering that there must be constant training and monitoring of changes that are taking place in this context [12].

[13] mentions that there are advantages to the application of web 3.0 tools in the educational field such as:

1. Environment simulators (laboratories, classrooms, class sessions).
2. Hypertext, which allows the user to create content within the address that he imagines interesting.
3. Multimedia capabilities, which allow exchanging content internally in different ways.
4. Tools that facilitate communication through emails, chat, and forums.
5. Ability to form working groups. 6. Student motivation and interest in learning.

### 2.4 Characteristics of Web 3.0 in Education

Web 3.0 tools are facilitators of the process of transformation and innovation of educational praxis, so they have important characteristics. [14] mentions the following (Fig. 3):

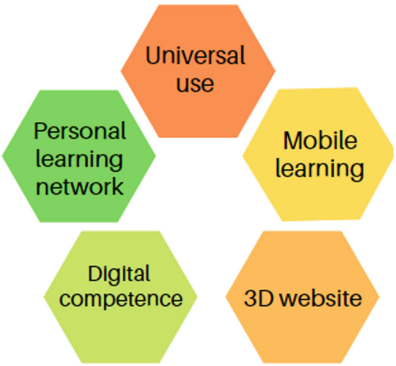


**Fig. 3.** Web 3.0 characteristics in education

### 2.5 Autonomous Work

Autonomous work is the faculty of self-interest that the student must systematically manage, plan, control, and evaluate their cognitive and socio-affective processes based on the use of their own strategies, that is, go beyond what is seen in the class session. to develop their skills, and abilities in a conscious, autonomous way to achieve specific goals. In this process, aspects such as self-regulation (control and awareness of one's own learning), the role played by the teacher (counselor), and the development of the student's autonomous thinking and learning are present [15].

In this case, the pedagogical effort is aimed at training students focused on solving specific aspects of their own learning activities, and not only solving a specific task, in other words, guiding the student and learning to plan, monitor, and self-assess their own pace of learning consciously [16] defines the three precise aspects (Fig. 4):

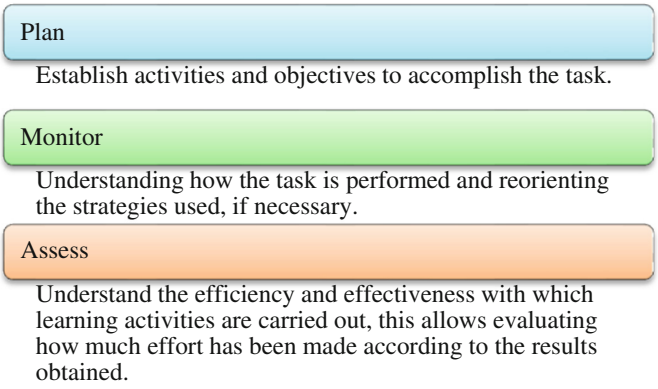


**Fig. 4.** Autonomous work

In contrast, the teaching process aimed at autonomous work and therefore autonomous learning has the purpose of expanding behaviors that promote a high degree of understanding and control of learning in and by students adapted to individual characteristics, needs and interests for taking timely decisions and problem-solving.

The world cannot fail to recognize the current technological reality, even more from the emergence of virtual education also understood as an interactive and dynamic learning method based on collaborative work. Teachers and students will continue accomplishing objectives set forth in the national curriculum, which is comprehensive and holistic training, even if there is a certain distance that prevents physical contact between educational actors [17].

From this perspective, web 3.0 tools have modified the educational process, as they are known as the web of time and space that allows organizing the search for content and information through connections between the web and the real world [18]. Then, the teacher must innovate their pedagogical plans rich in virtual environments that simulate laboratories, classrooms, etc. In addition to providing interactive games, virtual reality, one-way graphics, webcams, and more components where the student is motivated to learn and interact with the teacher and classmates to share knowledge, encouraging the management and development of creativity and imagination [19].

## 3 Methodology

The research is experimental because it applied author resources based on web 3.0 tools. First, a diagnosis was made that consisted of two parts. The first consisted of a test on the use of web 3.0 tools in self-employment for university students; Finally, the TAM Model was applied, with the intention of knowing and measuring the degree of satisfaction that students present in the use of this technological tool intended for learning. In the same way, it is considered exploratory because this study allowed to have an approximation on the use of Web 3.0 resources in self-employment, which allowed obtaining preliminary information as an approach to have an overview of the research.

The hypothesis that was proposed for this research is: web 3.0 resources improve the development of autonomous learning.

It has a mixed approach in seeking both quantitative and qualitative data. By applying the web 3.0 resources test and the TAM Model with their respective instruments, the aim was to measure the level of development of students' autonomous work and thus obtain quantitative data; to then obtain the qualitative part on the perceptions and acceptance of the use of technology in the population under study.

Based on an analysis prior to the development of web 3.0 tools aimed at autonomous work in students, the various types of appropriate and adaptable tools to the contents of the subject were examined, which promote motivation, responsibility, critical thinking, and learning. Significant on the various topics, for that, the selected tools focus on the acquisition of abilities, skills, and an autonomous learning process in playful and interactive virtual environments. So, it is important to emphasize the difficulty that lies in this whole process. It is the navigation and manipulation of many platforms, tools, or virtual environments, which generates in students a certain degree of demotivation or moments of distraction due to the great demand for information, and therefore the

lack of interest in examining and acquiring academic content focused on technological knowledge.

Currently, most students rely on the use and management of Microsoft Teams as a unique communication platform for the development of their classes, as well as the presentation of information or academic activities. They are addressed with tools that do not show greater interaction in their presentation such as Word, PowerPoint, educational platforms or in the same books or notebooks. This generates monotonous classes and boredom in students. Therefore, it is necessary for educators to integrate digital tools that streamline the teaching and learning process, in which the teacher-student binomial must be willing to face the challenge of producing significant knowledge in a playful, digital, and interactive way.

## 4 Results

Among the results obtained, three web 3.0 tools were taken into consideration, focused on autonomous learning in students of the Tourism career, which were used in virtual classes against the Covid-19 pandemic, which are detailed below (Table 1):

**Table 1.** Web 3.0 for autonomous work

| | Why to use them? | Benefits |
|---|---|---|
| Educaplay | • Preparation of multimedia academic activities<br>• Various educational scenarios: word search, crossword puzzles, riddles, etc<br>• You can add audio files, images<br>• Easy and attractive tool to handle | • Promotes creativity, imagination in the flow of ideas<br>• Promotes motivation to fulfill the tasks suggested by the teacher<br>• Self-management of actions and procedures<br>• Activates imagination and critical thinking |
| Canva | • Interactive teaching and learning<br>• Online design tool<br>• Content creation: videos, presentations, infographics, etc<br>• Presentation of concise, playful, and attractive information | • Helps them express themselves more confidently and learn from feedback (recordings)<br>• Visibility of creative processes<br>• Way to stimulate creativity, collaboration and optimize work<br>• Adaptable to all types of users |
| Kahoot | • Tool to gamify the teaching and learning process<br>• Activities personalized to the needs and interests of the student<br>• Allows you to create quiz games with multiple answers<br>• Objective: learn by playing | • Link between fun and learning<br>• Broadens the level of participation<br>• Dynamic and enjoyable learning different from conventional learning<br>• Renewing, dynamic vision |

**Table 2.** Useful tools in virtual classes

| Options | Frequency | Percentage |
|---|---|---|
| Strongly disagree | 5 | 7,4 |
| Disagree | 7 | 10,3 |
| Agree | 24 | 35,3 |
| Strongly agree | 32 | 47,1 |
| **Total** | **68** | **100,0** |

*Question 5. In general, I find that these tools are useful in my work in virtual classes.*

Of a total of 68 surveyed students that correspond to 100%, 47.1% strongly agree that technological tools are useful in their work in virtual classes, 35.3% agree, 10.3% disagree and 7.4% strongly disagree. The results indicate that, for the most part, the students strongly agree that technological tools are useful in their work in virtual classes since they provide learners with autonomy, flexibility adapted to their learning rhythms and content based on the quick navigation in diverse digital spaces (Table 2).

*Question 2. In general, I find that web 3.0 and gamification tools improve autonomous work in virtual classes.*

**Table 3.** Use of 3.0 Web tools and gamification

| Options | Frequency | Percentage |
|---|---|---|
| Strongly disagree | 3 | 4,4 |
| Disagree | 10 | 14,7 |
| Neither agree nor disagree | 10 | 14,7 |
| Agree | 29 | 42,6 |
| Strongly agree | 16 | 23,5 |
| **Total** | **68** | **100,0** |

Of a total of 68 students surveyed that corresponds to 100%, 42.6% agree that web 3.0 and gamification tools improve autonomous work in virtual classes, 23.5% totally agree, 14.7% are undecided and disagree and 4.4% totally disagree. The results indicate that, for the most part, the students agree that web 3.0 tools are easy to use due to the existence of multiple interactive, innovative, and playful tools with easy access that generate curiosity in students about their manipulation and activity development (Table 3).

*Question 12. The use of web 3.0 and gamification tools allows for friendlier communication with my environment, both synchronously and asynchronously (classmates and teacher).*

**Table 4.** Web 3.0 and gamification for communication

| Options | Frequency | Percentage |
|---|---|---|
| Strongly disagree | 6 | 8,8 |
| Disagree | 8 | 11,8 |
| Neither agree nor disagree | 10 | 14,7 |
| Agree | 24 | 35,3 |
| Strongly agree | 20 | 29,4 |
| **Total** | **68** | **100,0** |

Of the 68 students surveyed that corresponds to 100%, 35.3% agree that the use of 3.0 and gamification tools supports more friendly communication, 29.4% totally agree, 14.7% are undecided, 11.8% disagree and 8.8% totally disagree. The results indicate that, for the most part, the students agree that the use of 3.0 and gamification tools supports friendlier communication through games, playful activities, and real-time interaction between teachers and students provided by technology (Table 4).

*Question 15. I would like to use this type of tool more frequently outside the virtual classroom.*

**Table 5.** Tools used outside virtual classes

| Options | Frequency | Percentage |
|---|---|---|
| Strongly disagree | 6 | 8,8 |
| Disagree | 7 | 10,3 |
| Neither agree nor disagree | 9 | 13,2 |
| Agree | 22 | 32,4 |
| Strongly agree | 24 | 35,3 |
| **Total** | **68** | **100,0** |

35.3% totally agree they would like to use tools outside the virtual class more frequently, 32.4% agree, 13.2% are undecided, 10.3% disagree and 8.8% totally disagree. The results indicate that, for the most part, the students fully agree that they would like to use tools outside the virtual class more frequently because they could self-manage their procedures and academic activities, that is, self-educate based on the implementation of playful digital tools, needs and pace of learning (Table 5).

For the Wilcoxon test statistic, the two representative questions were considered: question number 5: In general, I find that these tools are useful in my work in virtual classes and question number 11: Technological tools help me to work efficiently in an autonomous way. It can be determined that, according to the application of the

TAM model (Technology Acceptance Models), technological tools help students to work autonomously. Then, having a P value (.000) less than the value of 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted, therefore, the web 3.0 tools applied to the autonomous work of children are acceptable, because they allow them to work autonomously and are useful for their virtual classes (Table 6).

**Table 6.** Wilcoxon test

| | Technological tools help me work autonomously more often. In general, I find that these tools are useful in my work in virtual classes |
|---|---|
| Z | 3,531[b] |
| Asymptotic Sig. (bilateral) | ,000 |
| a. Wilcoxon test of signed ranks | |
| b. It is based on positive ranges | |

## 5 Conclusions

Web 3.0 resources for the development of autonomous work provide various dynamic scenarios that, due to their singularities, catch the attention of students and this contributes to the teaching-learning process. In this way, students are not passive receivers of information, but also have the possibility of searching and sharing, as well as creating content in a creative way that can be used at any time during the class or specifically to work on reading comprehension, but in a fun way.

This is how new web 3.0 resources are constantly generated with various characteristics regarding their use, communication, and collaboration according to their purpose.

The digital author resources presented a great acceptance by the students since they are encouraged to improve their communication, creativity when carrying out autonomous work, both synchronous and asynchronous, in a fun way.

It is not intended to carry out a summative evaluation only for a quantitative grade, but in this case a formative assessment, in which students can play and learn at the same time. This is how these types of resources are essential for the teacher because they are attractive, modifiable and can be used inside and outside the class so that the student exercises their reading comprehension.

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