# MENDIVE
## REVISTA DE EDUCACIÓN

**Original article**

# Development of TikTok content to strengthen environmental responsibility in Higher Education

## Elaboración de contenidos en TikTok para el fortalecimiento de la responsabilidad ambiental en Educación Superior

## Desenvolvimento de conteúdo no TikTok para fortalecer a responsabilidade ambiental no Ensino Superior

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**ABSTRACT**

Social networks are media that dynamize the development of content and its dissemination in various areas of knowledge. The proposed objective was to determine whether the development and dissemination of content in TikTok strengthens the environmental responsibility of higher education students. Methodologically, under a quantitative approach, explanatory level and quasi-experimental design, an intervention was carried out, which consisted in the elaboration and dissemination of environmental responsibility contents through TikTok. The sample consisted of engineering students, to whom a pre-test was applied before the intervention and after it, the post-test, the instrument was a questionnaire. The hypothesis test statistic chosen was Wilcoxon, which allowed corroborating the expected effects. The results showed to be significant, determining that the elaboration of content in TikTok strengthens the environmental responsibility of higher education students, and that the process of elaboration of the TikTok enabled a marked motivation, creativity and respect for the intellectual property of the authors of the sources consulted.

**Keywords:** competencies; contents; environmental responsibility; TikTok.

**RESUMEN**

Las redes sociales son medios que dinamizan la elaboración de contenidos y su difusión en diversas áreas del conocimiento. El objetivo propuesto fue, determinar si la elaboración y difusión de contenidos en TikTok fortalece la responsabilidad ambiental de los estudiantes de educación superior. Metodológicamente bajo el enfoque cuantitativo, nivel explicativo y diseño cuasiexperimental, se realizó una intervención, que consistió en la elaboración y difusión de contenidos de responsabilidad ambiental, mediante el TikTok. La muestra estuvo constituida por estudiantes de ingeniería, a quienes se les aplicó un pre test, antes de la intervención y luego de esta, el pos test, el

instrumento fue un cuestionario. El estadístico de prueba de hipótesis elegido fue Wilcoxon, que permitió corroborar los efectos esperados. Los resultados mostraron ser significativos determinando que, la elaboración de contenido en TikTok fortalece la responsabilidad ambiental de los estudiantes de educación superior, además el proceso de elaboración del TikTok posibilitó una marcada motivación, creatividad y respeto por la propiedad intelectual de los autores de las fuentes consultadas.

**Palabras clave:** competencias; contenidos; responsabilidad ambiental; TikTok.

### RESUMO

As redes sociais são mídias que dinamizam o desenvolvimento de conteúdo e sua disseminação em diversas áreas do conhecimento. O objetivo proposto foi determinar se o desenvolvimento e a disseminação de conteúdo no TikTok fortalecem a responsabilidade ambiental dos alunos do ensino superior. Metodologicamente, usando uma abordagem quantitativa, nível explicativo e projeto quase experimental, foi realizada uma intervenção que consistiu no desenvolvimento e na disseminação de conteúdo sobre responsabilidade ambiental por meio do TikTok. A amostra foi composta por estudantes de engenharia, que foram submetidos a um pré-teste antes da intervenção e a um pós-teste após a intervenção, sendo o instrumento um questionário. A estatística de teste de hipótese escolhida foi a de Wilcoxon, que permitiu a corroboração dos efeitos esperados. Os resultados se mostraram significativos, determinando que a elaboração de conteúdo no TikTok fortalece a responsabilidade ambiental dos alunos do ensino superior, e que o processo de elaboração do TikTok possibilitou uma acentuada motivação, criatividade e respeito à propriedade intelectual dos autores das fontes consultadas.

**Palavras-chave:** competências; conteúdo; responsabilidade ambiental; TikTok.

## INTRODUCTION

In recent years, social media has experimented with various contents and formats, with the purpose of reaching a greater number of people every day, making the transfer of information more effective and ensuring an attractive presentation of content in various fields such as politics, education, sports, communication, culture and others (Tejedor et al., 2022). The short video industry, characterized by real time, fragmentation and socialization, has become the main force in the digital economy, as is the case of the virtual platform TikTok (Jiang and Wen, 2024).

The impact of social media is especially felt among the youngest, current university students. They are the post-millennials, young people from Generation Z, born between 1995 and 2005, and have a special relationship with digital technology and the Internet; they demand a need for rapid communication. These characteristics constitute a great window of opportunity to communicate about various thematic content and reach the general public, given the large amount of time that young people spend on the virtual platform.

From an environmental perspective, the increase in the global temperature of the Earth and the oceans is worrying, generating collateral effects on socioeconomic development, health, migration, food security and impacts on terrestrial and marine ecosystems. For years, the scientific community has sought to make the problem of climate change visible and to raise awareness among the population and governments about its consequences. Specifically, at the university level, environmental awareness makes it possible to train future professionals with pro-environmental behaviors (Mejía, 2020).

## Social Networks and TikTok Platform

In a world where interconnection prevails, the use of social networks has transformed the traditional way of communicating. Social networks function as platforms for exchanging information or opinions. Each type of network has its own peculiarities; they vary in the functionalities and the communication created between users. In them, consumers can share images, sounds, videos, documents, opinions and information.

Social networks create virtual communities of users with similar interests on certain topics and spread across the planet, which can occur in real time. The evolution of social networks has been growing since the last five years of the last century. However, it intensified from 2017 onwards and the rapid rise of TikTok can be observed (Figure 1).
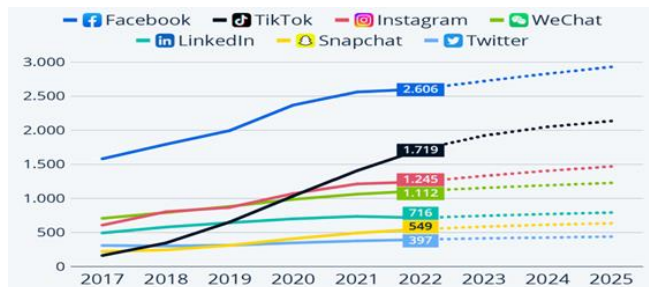


**Fig. 1-** Evolution of social media users in the world (in millions) June 2022

The TikTok platform was created in 2016 in China under the name Douyin. At the end of 2017, TikTok began to gain notoriety among the North American and European public, becoming today one of the preferred platforms worldwide. One of the keys to its success is the simplicity of its interface, which allows users to create their own videos with the editor and the consequent creation of content of various types, from everyday topics such as entertainment, academic, political, information and awareness on health, environmental, natural disasters and other issues.

In addition, this platform has an algorithm that personalizes the videos that appear in the personal feed according to the interests of each user. The videos are usually accompanied by hashtags, which allows for increased visibility and greater reach, even going viral (Nieto-Sandoval and Ferré-Pavia, 2023).

It also has an artificial intelligence system, thanks to which it is possible to use countless filters, special effects and background music, allowing any fan to create quality content in a very short time. In short, it meets all the expectations that a digital native in the era of immediacy can consume or develop on a social network (Hernández, 2021).

The social network TikTok is a trend on a global scale, where ephemeral, highly stimulating and visual communication prevails; information goes viral in seconds, thus contributing to the development of information, if it comes from reliable sources, or on the contrary, misinformation or fake news spreads (Sidorenko-Bautista et al., 2021). In short, TikTok in the educational field is established as a tool to promote communication and synthesis skills, enhancing autonomous and collaborative learning in an innovative way (Acevedo-Borrega et al., 2022). In addition, a high percentage of TikTok users claim to have learned new things through this medium.

## Environmental responsibility

The climate emergency can be defined as a state of environmental alert that demands actions leading to the reduction of atmospheric pollution caused by anthropogenic activities, which put humanity at risk due to the climatic disasters that are occurring and could increase (Romero et al., 2022). Within the framework of the United Nations Sustainable Development Goals 2030, the reduction of emissions of atmospheric pollutants and compliance with the commitment assumed in the Paris Agreement to improve resilience to climate change and promote zero carbon emissions are contemplated. Consequently, this mode of development raises

the objective of guaranteeing a balance between economic growth, environmental preservation and social well-being.

In 1972, one of the cross-cutting guiding principles of environmental policies was coined: "the polluter pays", giving rise to the visibility of environmental problems at a global level and generating periodic meetings of the United Nations, such as the Environmental Summits of the planet, like the one in Rio de Janeiro, and the Conferences of the Parties (COP), such as COP21 or the Paris Agreement of 2015. Environmental responsibility establishes an obligation for economic agents that cause negative ecological impacts to reverse such events. Conservation activities, promotion of "green" culture or energy saving, among others, emerge. Every effort that can be made to mitigate atmospheric pollution, the rational use of natural resources and opt for clean energy, among others, is of great importance. The means to achieve this are the various ways of disseminating environmental problems and the remediation and prevention alternatives.

The number of TikTok accounts that communicate sustainability is increasing all the time, and what was initially just for fun, today is a potential for learning for new generations, which involves research, creativity and motivation for content creators, who produce informative, educational or entertainment material intended to be shared through platforms in the digital environment (Martínez-Fresneda, 2024).

**Environmental education**

It is defined as the permanent educational action by which the educational community seeks to raise awareness of its global reality and the relationships that men establish with each other and with nature. In this regard, research has been carried out such as that of Escamilla-Fajardo et al. (2021), who in their article on: "Incorporating TikTok into higher education", mention that social networks have revolutionized the way people communicate and socialize.

Education has also changed, and in their article they present an educational innovation in which TikTok is used as a pedagogical tool. The most important results indicate that the use of TikTok promotes student motivation, creates an engaging learning environment, and encourages the development of skills such as creativity and curiosity; consequently, TikTok is recommended as a teaching-learning tool.

In this sense, Mendoza and Leyva (2020) consider that, in the development of competencies, creativity, motivation, communication and responsibility, among others, the linking of affective and cognitive processes is required, as well as the teacher's proposal of innovative activities that stimulate and enable a creative, motivating and responsible climate in the classroom. In this order of ideas, Conde et al. (2024) affirm that the dissemination of content through TikTok promotes quality learning through microlearning environments in higher education, considering that the adoption of tools that students already use in their daily lives facilitates the integration of new forms of learning.

Environmental responsibility concerns everyone, but especially future university professionals, who must strengthen their practices and those of others, to enable the balance of the planet and sustainable development. To this end, we ask ourselves: does the TikTok platform offer the opportunity to create content on climate change, with reliable information, in a creative and attractive way, so that consumers of this platform internalize the importance of the rational use of natural resources, the sustainable use of raw materials and responsibility towards future generations?

Currently, one of the most widely accepted virtual platforms is TikTok, which provides fast and attractive information through very short videos, whose consumers are people of all ages and especially young people. In this sense, it was proposed that university students produce TikToks with the theme of environmental responsibility, based on reliable sources and

respecting the intellectual property of the authors. In addition, it allowed them to exercise their creativity and synthesis capacity, which enables, firstly, the strengthening of their environmental responsibility; secondly, the TikTok produced and disseminated will have effects on the audience and followers, who are expected to be sensitized about the environmental problem and contribute to its mitigation.

In this context, new opportunities arise for discourse on Environmental Responsibility, given that the traditional critical and reflective discourse of experts is often difficult for the general population to understand, in addition to displaying sophisticated and paternalistic academicism.

The research aimed to determine whether the creation and dissemination of content on TikTok strengthens the environmental responsibility of higher education students and reinforces their learning skills.

## MATERIALS AND METHODS

The sample corresponded to the Professional Schools of Industrial and Agroindustrial Engineering, of a public university in Lima, Peru, totaling 165 students. Table 1 shows the proportions.

**Table 1-** Higher education students aged 20 to 23 who participated in the research

| Professional School | Cycle | Women | Men | Total |
|---|---|---|---|---|
| Industrial Engineer | 3rd | 24 | 28 | 52 |
| Industrial Engineer | 5th | 25 | 28 | 53 |
| Agroindustrial Engineer | 3rd | 28 | 32 | 60 |
| | | | | **165** |

The corresponding design was quasi-experimental with the application of the pretest and posttest around the intervention. The research had a quantitative approach and explanatory level in which the independent variable was the development and dissemination of TikTok and the dependent variable, the strengthening of motivation and creativity, environmental responsibility in its dimensions, rational use of natural resources, renewable energies and responsibility to future generations.

The instrument was the questionnaire and consisted of 20 items with a Likert scale, which included the dimensions, skills for the development of TikTok and the effects on the audience of the environmental content developed.

A pilot group of 20 students was administered the questionnaire to determine the reliability of the instrument, obtaining a Cronbach's Alpha = 0.778, which showed that the internal consistency was good. Regarding validity, the Expert Judgment of four teachers in the area was chosen, who made some suggestions for improving the instrument. The questionnaire was applied to the sample virtually, using Forms -Google.

### Procedure

The following guidelines were provided for the development of TikTok with environmental content:

a. Organization of groups of 2 or 3 students.
b. Choosing a topic to create content on: climate change, rational use of natural resources, air, water, soil pollution or similar.
c. Research in reliable databases and identification of a specific environmental problem.
d. Proposal of a possible solution or mitigation of said problem.
e. Creative development of a script to address the problem and its possible solution.
f. Presentation of TikTok with figure, photo, video, sound, text, etc.
g. Duration of 20 to 60 seconds maximum.

h. Take care in writing, elocution and spelling.
i. Presentation in the classroom for suggestions for improvement before dissemination.
j. Publication of TikTok on the Internet.
k. Recognition for the TikTok that achieved the highest number of " likes ".

The questionnaire was applied longitudinally, considering two contexts: before the development of TikTok and after its development and dissemination.

Regarding the selection of the hypothesis test statistic, the data normality statistic was applied, since there were more than 50 data, resulting in (p=0.000) for the difference between the data before and after, which led to the conclusion that the data did not comply with normality. Consequently, a non-parametric hypothesis test statistic was applied.

# RESULTS

The students were involved in the activity of creating a TikTok with environmental content, working collaboratively in teams of three. The topics they chose were about raising awareness about air, soil and water pollution mainly, from an engineering perspective, considering that they were students of Agroindustrial and Transport Engineering.

In preparing the script, they reviewed scientific articles, showing respect for the intellectual property of the authors. They managed the duration of one minute, for which they exercised their capacity for synthesis and communication. They were motivated and creative, presenting images, audios and videos with messages about the rational use of natural resources, renewable energy and responsibility towards future generations. Figure 2 shows the four items, out of a total of 20, with the greatest increase between before and after the development and

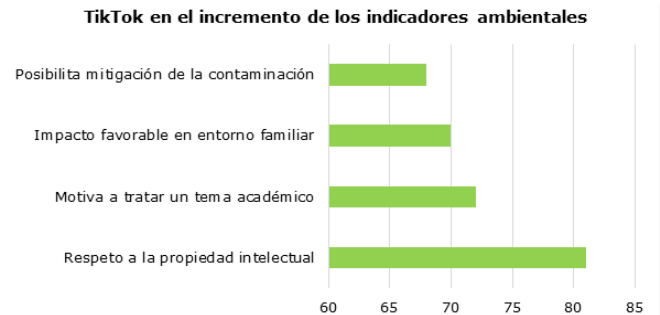dissemination of the TikTok with environmental content.



**Fig. 2-** Indicators with the greatest increase when creating TikTok with environmental content

Hypothesis testing:

The Wilcoxon test statistic was applied to each of the hypotheses, considering p < 0.05 to reject the null hypothesis.

General hypothesis:

- $H_0$: The creation of content on TikTok does not strengthen the environmental responsibility of higher education students.
- $H_1$: Creating content on TikTok strengthens the environmental responsibility of higher education students.

**Table 2-** Wilcoxon signed rank test after-before TikTok

| | | N | Average range | Sum of ranks |
|---|---|---|---|---|
| After - Before | Negative ranges | 21[a] | 42,12 | 884.50 |
| | Positive ranges | 116[b] | 73.87 | 8568.50 |
| | Ties | 28[c] | | |
| | Total | 165 | | |
| | Z | | - 8,257 | |

| | Sig. Asymptotic (bilat.) | | ,000 |
|---|---|---|---|
| a. After < Before | b. After > Before | | c. After = Before |

In table 2, it is observed that p = 0.000 which allows us to reject the null hypothesis and consequently, it was determined that the creation of content on TikTok strengthens the environmental responsibility of higher education students).

Specific hypothesis 1:

- $H_0$: Environmental content developers on TikTok do not improve their skills in motivation, creativity, and respect for intellectual property.
- $H_1$: Environmental content developers on TikTok do not improve their skills in motivation, creativity and respect for intellectual property.

**Table 3-** Wilcoxon test before-after the improvement of skills

| | | N | Average range | Sum of ranks |
|---|---|---|---|---|
| After - Before Improving skills | Negative ranges | 18[a] | 40.83 | 735,00 |
| | Positive ranges | 105[b] | 65.63 | 6891,00 |
| | Ties | 42[c] | | |
| | Total | 165 | | |
| | Z | | - 7,783 | |
| | Asymptotic sign (bilateral) | | ,000 | |
| a. After < Before | b. After > Before | | c. After = Before | |

Table 3 shows that p = 0.000, which allows us to reject the null hypothesis and, consequently, it was determined that environmental content developers on TikTok improve their motivation, creativity, and respect for intellectual property skills.

Specific hypothesis 2:

- $H_0$: TikTok spread by university students who are content developers does not strengthen their environmental responsibility and that of the audience.
- $H_1$: TikTok spread by university students who are content developers strengthens their environmental responsibility and that of their audience.

**Table 4-** Wilcoxon test before-after effects on students and audience

| | | N | Average range | Sum of ranks |
|---|---|---|---|---|
| After-Before Effects on students and audiences | Negative ranges | 31[a] | 35.89 | 1112.50 |
| | Positive ranges | 99[b] | 74.77 | 7402.50 |
| | Ties | 35[c] | | |
| | Total | 165 | | |
| | Z | | - 7,323 | |
| | Asymptotic sign (bilateral) | | ,000 | |
| a. After < Before | b. After > Before | | c. After = Before | |

In table 4, it is observed that p = 0.000 which allows us to reject the null hypothesis and consequently, it was determined that TikTok disseminated by university students who develop content strengthens their environmental responsibility and that of the audience.

## DISCUSSION

TikTok, in the educational field, was established as an innovative tool for the teaching-learning process. Students developed content through TikTok, with the purpose of strengthening environmental responsibility, and in this process, it was determined that the developers of environmental content on TikTok improved their communication skills, synthesis capacity, creativity, motivation, respect for intellectual

property, among others. This agrees with Escamilla-Fajardo et al. (2021) who, in their research "Incorporating TikTok in higher education", mentioned that it promotes motivation and encourages creativity. In addition, in the same sense, Rendón et al. (2022) in their article "TikTok as a teaching tool", stated that students who have used TikTok as a learning tool were shown to be more motivated.

Recent literature also shows the experience of Ding et al. (2022), who conducted research on "Short Instructional Videos for the TikTok Generation," which aimed to examine the effects of short instructional videos on students' statistics learning performance versus virtual lectures. The study, which was quasi-experimental in design, included an experimental group of 119 students, who watched TikTok at their own pace, and the 112 students in the control group, who only listened to the teacher in class. The results showed that students who watched short videos significantly outperformed those who followed the teachers' virtual instruction.

In the same line of research, it is worth mentioning that Nieto-Sandoval and Ferré-Pavia (2023) wrote the article "TikTok and climate change: communicating without sources or solutions", an exploratory study of communication about climate change on the TikTok social network based on the 2021 Climate Summit. Through content analysis, they reviewed the 100 videos with the highest number of views during the Summit. They found a new communication scenario where influencers published the largest number of videos on Climate Change (CC). The media maintained the leading role and continued to lead the communication of CC, giving continuity and relevance to the topic. Another relevant finding was an alarming situation: most of the videos did not cite any type of information source. It was concluded that most TikTok users in the analyzed sample assumed CC as a true fact, however, they did not mention proposals for change and showed a passive attitude.

Regarding the intellectual property of the authors and citing sources, when developing the TikTok content, it was found that this indicator was the one that showed the greatest increase (Figure 2) in its score before and after the intervention (creation of the TikTok). This differs notably from Nieto-Sandoval and Ferré-Pavia (2023), who in their research "TikTok and climate change: communicating without sources or solutions", reported an alarming finding that most of the videos did not cite any type of information source. A possible explanation for the difference that favors this research is that in the guidelines for the preparation of the TikTok that were given to the students, it was indicated to search for information based on reliable sources, leaving evidence that the role of the teacher mediated in the students' actions.

The results of the hypothesis testing show that the creation of content on TikTok significantly strengthened the environmental responsibility of higher education students. In this regard, Rendón et al. (2022) found that students who have used TikTok showed greater dedication to the content than students who did not. In the same sense, Ding et al. (2022), based on their research "Short instructional videos for the TikTok generation", pointed out that the results showed that students who watched short videos significantly outperformed those who followed traditional instruction.

Finally, it was determined that the TikTok disseminated by university students who developed content significantly strengthened their environmental responsibility and that of their audience, as well as improved their motivation, creativity and respect for intellectual property skills.

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The authors participated in the design and writing of the article, in the search and analysis of the information contained in the consulted bibliography.

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