Technology Normalisation in Rural Education: Narratives of Public School Teachers from Colombia

Yimmy Alexander Hoyos-Pipicano
https://orcid.org/0000-0001-8743-8651
Secretaría de Educación del Huila, Colombia
yimmy.hoyos@sedhuila.edu.co

María Fernanda Jaime-Osorio
https://orcid.org/0000-0001-8938-8248
Universidad Surcolombiana, Colombia
mariafernanda.jaime@usco.edu.co

Abstract

The fallacy of a technified and globalised world conceals education inequality in peripheral contexts. Hence, this narrative inquiry article analyses technology normalisation, drawing on rural public-school teachers from Colombia. Teachers explored their technology-oriented beliefs, pedagogical practices, and factors that influence technology normalisation. The data collection process was conducted over three years through narrative frameworks and a focus group, which were analysed using a narrative inquiry approach. Initial findings showed that micro-teaching practices were distant from technology normalisation due to teachers' lack of confidence. Ultimately, they overcame these issues and described technology-oriented pedagogical practices and ethical strategies to address potential technology risks. However, meso- and macro-level factors, such as a lack of technological devices and ungrounded national policies, make it unlikely that technology normalisation occurs in the teachers' contexts. Therefore, rural stakeholders ought to problematise whether it is worth struggling to achieve technology normalisation or detach from such a narrative. This article may be of interest to those studying the intersections among technology, teachers' beliefs, and pedagogical practices in the Global South.

Keywords (Source: UNESCO Thesaurus)

Colombia; educational research; rural education; teachers; technology.

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Apropiación de la tecnología en la educación rural: narrativas de profesores de colegios públicos de Colombia

Resumen

La falacia de un mundo tecnificado y globalizado oculta la desigualdad educativa en contextos periféricos. Por lo tanto, este artículo de investigación narrativa analiza la apropiación de la tecnología a partir de las experiencias de docentes de escuelas públicas rurales en Colombia. Los docentes participantes exploraron sus creencias orientadas hacia la tecnología, sus prácticas pedagógicas y los factores que intervienen en la apropiación tecnológica. El proceso de recolección de datos se realizó durante tres años mediante marcos narrativos y un grupo focal, analizados bajo un enfoque de investigación narrativa. Los hallazgos iniciales revelaron prácticas de microenseñanza alejadas de la apropiación tecnológica debido a la falta de confianza de los docentes. Sin embargo, finalmente superaron estos obstáculos y describieron prácticas pedagógicas orientadas a la tecnología, así como estrategias éticas para abordar posibles riesgos tecnológicos. No obstante, factores a nivel meso y macro, como la falta de dispositivos tecnológicos y unas políticas nacionales poco fundamentadas, hacen poco probable que la apropiación tecnológica suceda en los contextos de estos docentes. Por ello, los actores rurales deberían cuestionar si vale la pena esforzarse por lograr la apropiación tecnológica o si es preferible desvincularse de esa narrativa. Este artículo puede interesar a quienes estudian las intersecciones entre tecnología, creencias docentes y prácticas pedagógicas en el Sur Global.

Palabra clave (Fuente: tesauro de la UNESCO)

Colombia; educación rural; docentes; investigación educativa; tecnología

Apropriação da tecnologia na educação rural: narrativas de professores de escolas públicas na Colômbia

Resumo

A falácia de um mundo tecnificado e globalizado oculta as desigualdades educacionais em contextos periféricos. Portanto, neste artigo de pesquisa narrativa, analisa-se a apropriação da tecnologia a partir das experiências de professores de escolas públicas rurais na Colômbia. Os professores participantes exploraram suas crenças orientadas para a tecnologia, suas práticas pedagógicas e para os fatores envolvidos na apropriação tecnológica. O processo de coleta de dados foi realizado ao longo de três anos, utilizando referenciais narrativos e grupo focal, os quais foram analisados sob uma abordagem de pesquisa narrativa. Os achados iniciais revelaram práticas de microensino bastante distantes da apropriação tecnológica, devido à falta de confiança dos professores. No entanto, os docentes superaram esses obstáculos e passaram a descrever práticas pedagógicas orientadas para a tecnologia, bem como estratégias éticas para lidar com possíveis riscos tecnológicos. Contudo, fatores nos níveis meso e macro, como a falta de dispositivos tecnológicos e políticas nacionais mal fundamentadas, tornam improvável a apropriação tecnológica nos contextos desses professores. Por isso, os atores rurais devem questionar se vale a pena empenhar esforços para alcançar a apropriação tecnológica ou se é preferível desvincular-se dessa narrativa. Este artigo pode interessar a pesquisadores que estudam as interseções entre tecnologia, crenças docentes e práticas pedagógicas no Sul global.

Palavras-chave (Fonte: thesaurus da UNESCO)

Colômbia; educação rural; professores; pesquisa educacional; tecnologia.

Introduction

Technologies have not only offered teachers opportunities to enhance learners' communication skills (Chapelle, 2009) but also to achieve various educational purposes worldwide. Technology integration has proven successful in enhancing autonomous learning, as well as in teaching mathematics (Camargo-Uribe & Sandoval-Cáceres, 2017; Palmas-Pérez, 2018) and foreign languages (Arias & González, 2019), among other applications. These studies suggest advancements regarding technology normalisation, a state in which technologies play a continuous role in the class without disrupting its development (Bax, 2003). However, they fail to address technology normalisation from the perspective of stakeholders in rural areas, where technologies are scarce and obstacles abound (Ertmer et al., 2015; Farfán-Sossa et al., 2015; Hoyos-Pipicano, 2024; Hoyos-Pipicano & España, 2025; Leal et al., 2022). Therefore, the present study attempts to fill this gap in the literature by exploring rural teachers' beliefs, pedagogical practices and factors that affect technology normalisation in their schools.

To achieve this goal, we build on seminal and recent studies. Chambers and Bax (2006) found logistics, stakeholders' conceptions, knowledge and abilities, training development and support issues at two universities in the USA. More recently, Balchin and Wild (2022) found similar issues in 22 secondary schools across Malaysia. Thus, if such are the states of technology normalisation in urban contexts which usually have more adequate settings than rural areas (Hoyos-Pipicano, 2024; Kormos & Wisdom, 2021; Leal et al, 2022; Molina-Pacheco & Mesa-Jiménez, 2018; Oki et al., 2023), it is paramount to shed light into the state of the latter. Hence, we conducted this study to answer the following question longitudinally: *What do the narratives of rural school teachers reveal about technology normalisation in their contexts?* Specifically, we shall address the following research objectives.

1. To explore teachers' beliefs about technology-oriented pedagogical practices.
2. To unveil teachers' technology-related pedagogical practices.
3. To identify teachers' perspectives about factors that may enhance or hinder technology normalisation in their rural context.

We draw theoretically on technology normalisation, pedagogical practices, and teachers' beliefs, and methodologically on narrative inquiry to "explicate the relationship between teachers' pedagogical beliefs and their uses of digital technologies" (Ertmer et al., 2015, p. 403). This research method has rarely been employed to study technology normalisation, so the present paper aims to reveal a renewed and *humanistic* angle on the theme.

By the same token, we challenge the exploration of teachers' beliefs in isolation and from privileged individuals (Fives & Gill, 2015) by focusing on the voices of four rural teachers and their respective contexts. Accordingly, this study offers novel insights into the field of general education, aligning with the global promotion of technology. In Colombia, it can inform the national policy that "aims to promote digital inclusion in rural areas" (Leal et al., 2022, p. 21), considering that little is known about such an endeavour. Thus, this study is especially valuable to understand technology integration in education beyond urban areas and in the Global South.

In what follows, we provide detailed theoretical and methodological information that led us to identify four research categories (see Figure 1). Afterwards, we discuss these categories and invite rural stakeholders to analyse technology normalisation from a critical and decolonial standpoint.

Technology Normalisation

We start by framing technology normalisation to identify factors that may enhance or hinder this state. Technology normalisation refers to "the stage

when the technology becomes invisible, embedded in everyday practice and hence normalised" (Bax, 2003, p. 23). The literature reveals that human and non-human variables hinder technology normalisation in rural education. For instance, in Asia, Hu et al. (2023) report issues at a secondary school, such as "unbalanced educational resources, cultural cognitive barriers, lack of customised programs, and insufficient digital literacy of teachers" (p. 217). In Latin America, Raza and Matamoros (2024) found that ICT infrastructure was inadequate, negatively affecting rural education, as educational actors lack access to appropriate technological devices and connectivity to keep pace with the world's ongoing changes. Therefore, the latter two studies demonstrate that technology integration is hindered by issues beyond teachers' control.

These technological needs in rural education gained special attention during the COVID-19 global pandemic, which pushed teachers to integrate technologies during Emergency Remote Teaching (Castañeda-Trujillo & Jaime-Osorio, 2022; España, 2023; Jaime-Osorio et al., 2023). In alignment with this, Olanrewaju et al. (2021) examined the digital gaps among students in rural areas of Nigeria. The authors argue that issues such as "lack of ICT strategies and policies in Nigeria, socioeconomic status, poor internet connectivity, electricity, and a high poverty level" (p. 1) hindered technology integration during the COVID-19 pandemic. Hence, the pandemic highlighted the technological shortcomings that rural education has historically endured.

However, as students return to their classrooms, it is paramount to explore whether administrators' and teachers' approaches to technology are moving forward or backwards. Therefore, we invited the rural self-contained teachers to analyse their beliefs, pedagogical practices, and factors that enhance or hinder technology normalisation in their contexts during and after the COVID-19 pandemic. After all, teachers' pedagogical practices set influential learning environments (Salazar Aristizábal, 2015). Nevertheless, this influence does not exempt educational authorities from their co-responsibilities to achieve technology normalisation (Barrero-Galindo et al., 2022).

Pedagogical Practices

This study also aims to identify the technology-oriented pedagogical practices of rural teachers. They are defined as the interplay between the teacher's actions and sociocultural factors (Insuasty & Jaime-Osorio, 2020) at macro-, meso-, and micro-levels (Bonilla et al., 2022). Bonilla et al. (2022) argue that the macro-level refers to national policies that influence curriculum, the meso-level includes practices that draw on teachers' sociocultural environments, and the micro-level involves teachers' actions in the classroom. The authors suggest that analysing pedagogical practices with the mentioned levels in mind helps to understand the dialogical nature of pedagogical practices. Thus, this configuration serves as our theoretical pedagogical practice lenses.

The literature shows that pedagogical practices have been studied from different angles, such as racialisation (Bonilla et al., 2022), ELT (Insuasty & Jaime-Osorio, 2020; Quintero, 2019; Valle et al., 2022) and technology in urban contexts (Castañeda-Trujillo & Jaime-Osorio, 2021; García-Botero et al., 2021; Kusuma, 2022). However, the relationship between technology and pedagogical practices in rural contexts, as well as the perspectives of rural teachers, requires further exploration (Fives & Gill, 2015).

To illustrate, we identified only two studies that align with technology, rural education, and pedagogical practices. In Taiwan, Cheng and Yang (2023) reported that smart classrooms combined with project-based learning most effectively enhanced rural students' problem-solving skills. In Colombia, Leal et al. (2022) analysed national educational digital policies and identified four main factors hindering technology-driven pedagogical practices: insufficient access to technology, deficient

connectivity, digital illiteracy, and inadequate monitoring and assessment of the use, access, and impact of digital technologies in education. We believe that those four reasons remain relevant today. Thus, the disparities between the latter studies are apparent: one demonstrates a successful implementation of technology (Cheng & Yang, 2023), while the other highlights the gaps that need to be addressed before achieving the same goal (Leal et al., 2022).

Whilst the previous ideas provide some insights into technology-driven pedagogical practices in rurality, there is insufficient empirical evidence from other contexts. Consequently, we set as our second research objective to identify the technology-related pedagogical practices of four rural teachers.

Teachers' Beliefs and Technology

Teachers' beliefs, which are embedded in their pedagogical practices, are also explored in this paper. These refer to "propositions individuals consider to be true, and which are often tacit, have a strong evaluative and affective component, provide a basis for action, and are resistant to change" (Borg, 2011, p. 370). Hence, exploring teachers' beliefs calls for a multimodal approach that unearths hidden worldviews (Fives & Gill, 2015).

Embracing a multimodal approach implies valuing not only the teacher as a professional but also as a human being. That is to say, personal experiences, self-efficacy, sociocultural elements, and educational policies become relevant factors in understanding teachers' beliefs (Buelh & Beck, 2015; Bullough, 2015; Galvis, 2012). Additionally, contextual and social conditions may (de)activate specific teachers' beliefs because classroom practices are social (Skott, 2015). Then, teachers should be aware of their own beliefs and teaching dynamics to effectively implement technology-oriented pedagogical practices. In this fashion, the influence of teachers' beliefs regarding technology normalisation on their pedagogical practices has been asserted by some authors (Bandura, 1997; Ertmer et al., 2015; Galvis, 2012) while challenged by others (Buehl & Beck, 2015; Skott, 2015).

Notwithstanding, the increasing access to technology at schools has prompted the exploration of teachers' beliefs in light of 21st-century skills: collaboration, critical thinking, information literacy, media literacy, and ICT (Cheng & Yang, 2023; Ertmer et al., 2015; Leal et al., 2022; P21, 2024). For instance, in South Africa, Oki et al. (2023) found lukewarm worldviews among rural teachers regarding the integration of technology, largely due to their unawareness of potential benefits, lack of training, poor or non-existent connectivity, and limited support from the national government. Similarly, Kormos and Wisdom (2021) argue that rural teachers' potential *disbelief* may be triggered by external factors, such as a lack of support, financial difficulties, or connectivity issues. Bearing in mind that the four rural self-contained teachers might endure similar conditions, we sought to explore their beliefs about technology-oriented pedagogical practices in their contexts.

Methodology

This qualitative narrative inquiry study addresses technology normalisation, drawing on the accounts of four rural public school teachers who were invited to explore their beliefs, pedagogical practices and perspectives about the factors that may enhance or hinder technology normalisation through written and oral narratives during a three-year period. Freeman (2015) argues that narrative inquiry enables a longitudinal and profound reflection on events, helping researchers grasp the ideas of the person telling their story and make sense of underlying beliefs. Hence, we approached narrative inquiry so that participants deconstructed their pedagogical practices and beliefs from a critical and socioemotional perspective. Additionally, we set aside spaces for teachers to discuss their insights both chorally and horizontally, compiling a narrative account of their stories. In fact, the findings presented below emerged from a metaphor proposed by participants. All in all, narrative inquiry was suitable to help us

reach our research objectives (see Table 1) from a critical and horizontal approach, which differentiates it from other studies' vertical and canonical research methodologies (Cheng & Yang, 2023; Hu et al., 2023; Leal et al., 2022; Raza & Matamoros, 2024).

Context and Participants

This study was conducted at rural public schools in Huila and Caquetá, Colombia. In general, teachers' accounts reveal precarious conditions for technology use and normalisation, such as no telephone signal service or the community relying on solar electricity, which is useless under unfavourable weather conditions. Participants were two female and two male teachers with different ages and work experiences, who were invited to participate through purposeful sampling (Patton, 2011). Thus, we gained insights into worldviews from different generations to explore these teachers' beliefs from a longitudinal perspective. Table 1 shows a detailed description of the participants.

Data Collection Instruments

We resorted to two data collection instruments. First, participants received and signed an informed consent form via email. We then collected data using two narrative frameworks and conducted a focus group interview over a three-year period. Bullough (2015) argues that stories help humans to make sense of their worldviews and contexts. Likewise, self-reflective writing exercises help teachers obtain profound reflections and analyse their beliefs longitudinally (Schraw & Olafson, 2015). Hence, teachers constructed the first narratives in 2020, designed to elicit stories about their pedagogical practices and beliefs in light of technology normalisation in their contexts. The narrative framework was written in the participants' first language—Spanish—and sent via email. Three years later, in March 2023, after the COVID-19 pandemic and a new normality had already taken hold in educational institutions, participants received a second narrative framework with the same scope and intention as the first one.

Second, after analysing the two narrative frameworks, participants were presented with the preliminary results during a focus group (in August) that sought to give them an active role in the construction of a collective story and get a profound understanding of the issues under study. In this meeting, participants engaged in choral and horizontal discussions that led to the pivotal "reaching the moon" metaphor (see Findings section). This focus group took place via Meet and lasted approximately 1.5 hours. In general, participants completed two narrative frameworks and the focus group.

Table 1. Participant Profile Overview

Teacher (pseudonym)	Age	Teacher education	Tech-related education	Department	
				Huila	Caquetá
Ana	62	Specialisation in the Teaching of History		x	
Jessica	28	Primary Teacher Certificate[1]			x
Daniel	32	Master of Arts in Physical Education	ICT at High School (2008)	x	
Wally	53	Specialisation in the Teaching of Mathematics	Technical Education course (2005)	x	

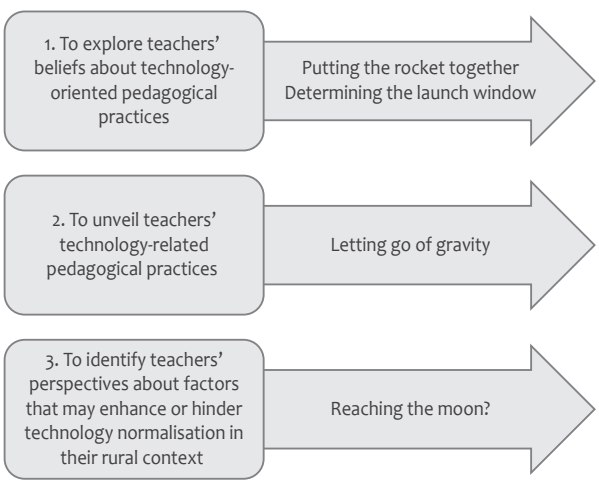
Source: Own elaboration.

1 Graduate from a Superior Normal School.

Data Analysis

We employed thematic analysis (Mihas, 2023) to analyse the narratives of rural school teachers in light of technology normalisation and technology-oriented pedagogical practices in their contexts. We read the narrative frameworks with the three research objectives in mind, while also coding emergent topics (Charmaz, 2014; Saldaña, 2021). Since teachers reflected on their beliefs and practices twice within the three-year period, we analysed their narratives in parallel and transversally using a comparative table. This preliminary analysis yielded potential research categories and gaps in teachers' narratives that were considered for the group interview. Finally, we analysed the group interview considering the preliminary categories and maintaining the inductive lenses. After conducting a global analysis, we identified four research categories (see Figure 1).

Figure 1. Objectives and Research Categories



Source: Own elaboration.

Findings

This section presents teachers' technology-oriented beliefs and pedagogical practices, as well as the factors that may enhance or hinder technology normalisation in their contexts. A metaphor proposed by participants (see Figure 2) was used to present the findings. Teachers argued that reaching technology normalisation in their contexts aligned with reaching the moon.

Figure 2 illustrates the four crucial stages required to reach the moon. *Putting the rocket together* and *determining the launch window* provide insights into teachers' beliefs, which account for the first research objective (see Figure 1). *Letting go of gravity* unveils teachers' pedagogical practices and answers the second research objective. Finally, *Reaching the moon?* elaborates on factors that enhance or hinder technology normalisation.

Putting the Rocket Together

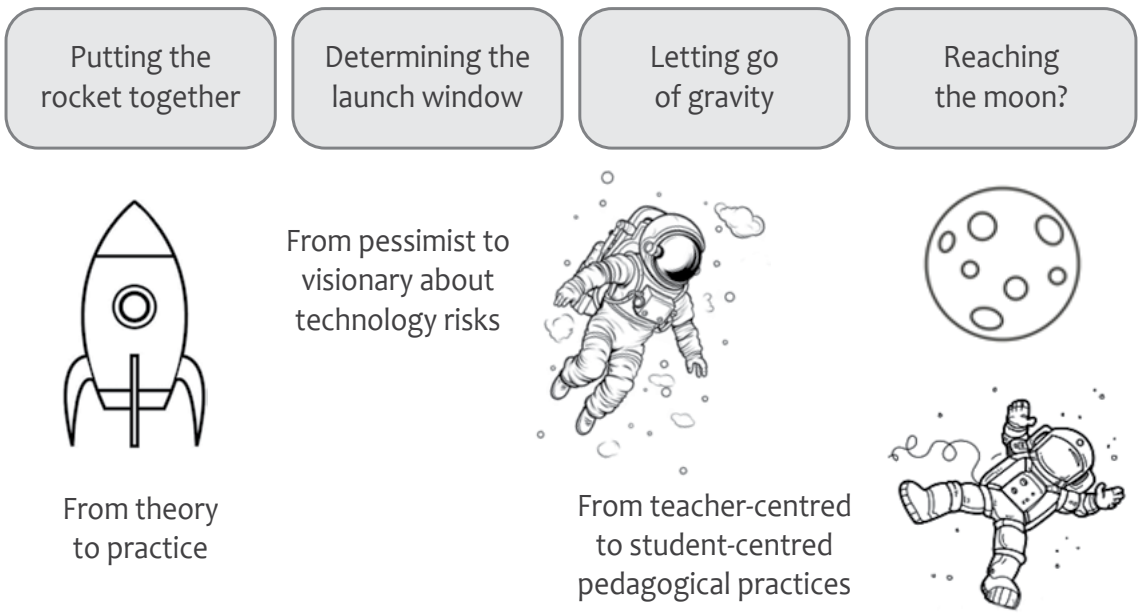
The first category shows teachers' beliefs about technology-oriented pedagogical practices. We found positive beliefs despite initial narratives showing animosity towards technology integration. Thus, teachers put *the rocket pieces together* to initiate their moon mission. This process, however, was not an impromptu moment but a progressive one.

These excerpts demonstrate that participants' reconfigured insights align with technology normalisation. For instance, Wally went from feeling nervous about interacting with a computer and thinking that using technology was imposed to showing eagerness to teach the Net Generation (Arini et al., 2022) in their terms and acknowledging the social value of technology. Similarly, Daniel overcame his fear of using technology to provide multi-didactic opportunities for his students and keep updated with recent technological trends, such as artificial intelligence (AI). Therefore, they acknowledge the value of technologies in education and show openness to integrating them, which implies technological normalisation advancements.

Determining the Launch Window

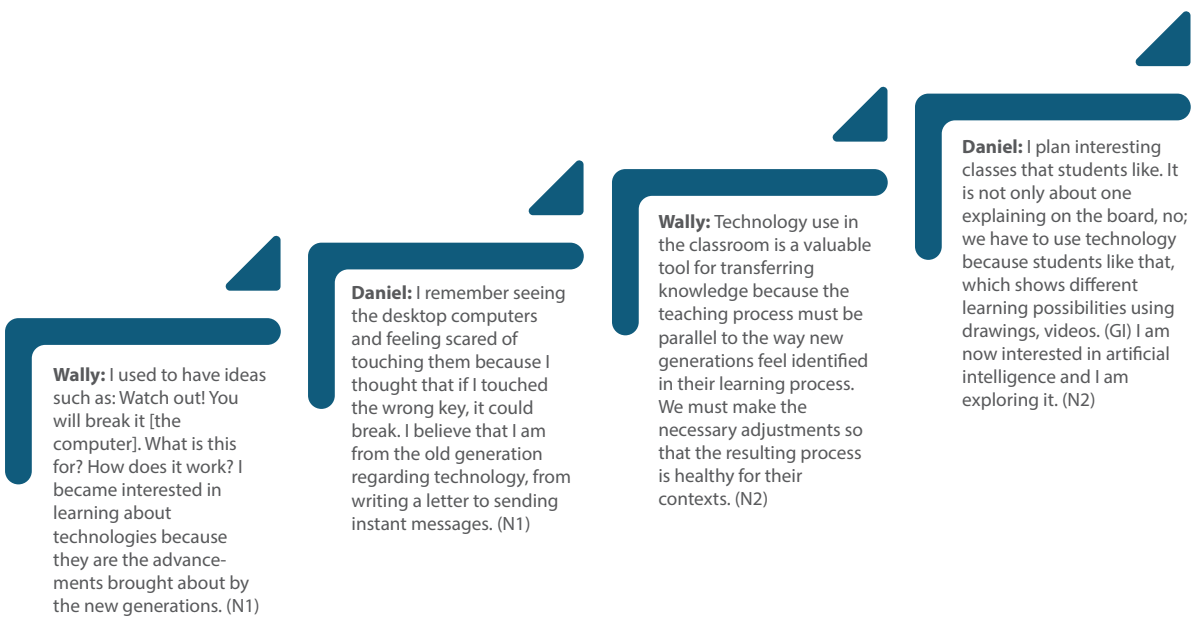
The second category shows that teachers moved on to *determining the launch window*; that is to say, they not only embraced the idea of integrating technologies but also calculated the potential

Figure 2. Metaphorical Illustration of Technology Normalisation as Reaching the Moon



Source: Own elaboration.

Figure 3. Evolution of Teachers' Beliefs about Technologies in the Classroom



Source: Own elaboration.

risks of technology integration. This process was also progressive, and teachers were initially vague about potential technology risks.

> **Jessica**: *I want to teach online classes, communicate with my students, and share with them the advantages and disadvantages of technology. (NF1)*
>
> **Daniel**: *We must use technologies responsibly because there are countless actions that students can take with them, which can be either good or bad. (NF1)*

Although these teachers understand the necessity of incorporating technology into their teaching practices, their launch window often fails to ensure a safe route. They comment on the potential advantages and disadvantages of technology, as well as the positive and negative directions to which students are exposed. Nevertheless, they do not provide specific information, as in the following reflections by the same participants three years later.

> **Jessica:** *One of the biggest risks is related to the privacy and storage of personal data, as well as the addiction to technology. Not only students, but also adults, are exposed to this issue. For example, I sometimes spend two or more hours watching TikTok videos instead of doing college work. The same situation happens with students whose social and interpersonal skills are weakened. In my case, I don't see my students as much on social media. So, once we even watched TikTok videos here after regular school hours. It was a moment of joy and entertainment for them and for me. (GI)*

The participant addresses privacy, binge-watching, and isolation, among other risks, affecting students and adults. She draws on personal and professional experiences that illustrate both the positive and negative effects of technology. For instance, she recalled feeling joy from watching TikTok videos with her students after class hours, but also regretted getting caught up in the same social app. Thus, her accounts describe a launch window that foresees personal and academic consequences, going beyond her previous broad comments. Likewise, Daniel commented on a profound social technology risk at his school.

> Technology is good, but I cannot encourage its use to the point that the break is over because of being on a phone, especially here, where such a situation has never occurred, because students do not have phones. (GI)

The participant describes technology risks from a socio-affective perspective and expresses concern that students may *lose* their break if current dynamics are changed. Thus, even though he is eager to integrate technology into his teaching practices, the break is off-limits due to the social risk. In any case, teachers foresee the implementation of technology at their schools; metaphorically, they have determined a launch window.

Letting Go of Gravity

The third category addresses a switch from vertical to horizontal teaching practices and aligns with the objective of identifying technology-related practices. This switch implies a conscious and committed effort on the part of the students and teachers; therefore, this category was called 'letting go of gravity,' as this phenomenon only occurs under specialised and well-thought-out circumstances. The following excerpt shows one of the teachers' initial teacher-centred practices in 2020.

> **Wally:** *When planning classes, I resort to technology to connect what I want students to learn and students' knowledge about technologies, which is excellent for transferring knowledge. (NF1)*

The participant demonstrates a willingness to integrate technology in his lessons and take advantage of students' preparedness; however, he makes

it clear that technology integration responds to the knowledge that *he* wants to *transmit* to students. In turn, he holds to a traditional teacher-centred paradigm and is still caught up in gravity. Nevertheless, in 2023, the participant elaborated on a different perspective, as shown in the excerpt below.

> **Wally:** *Teaching practices must be parallel to how the new generations feel identified, so teachers must educate students efficiently without them [students] feeling coerced, but leading them to a life project that is healthy for their contexts. It is important to awaken students' creativity and free oral expression, making the class both motivating and accessible to them. (NF2)*

Wally comments on teaching practices from a student-centred approach, acknowledging the importance of integrating new generations' feelings and contextual needs into teaching practices. Likewise, he identifies creativity and participation as important teaching elements to put students' capabilities and feelings at the centre, which shows an approach that is not only student-centred but also social.

Similarly, other participants commented on technology-oriented teaching practices inspired by self-driven learning, emotional intelligence, and interactive learning environments.

> **Wally**: *I use a computer in most of my classes to explain topics, search for queries, and confront students with different contexts because an image is worth a thousand words. (NF2)*

> **Jessica**: *I have used my personal technological devices, like my cellphone, to find images. The computer has also been an instrument to sit the Evaluar para Avanzar[1] tests. (GI)*

> **Daniel**: *I enjoy working with technology. I usually use the video beam and other tools with students. I do not feel that they will damage these devices because I have explained to students how to use them. (GI)*

Therefore, we argue that teachers are *expanding their reach into outer space* through their pedagogical practices. Specifically, teachers mention the role of cell phones, computers, and video beams to help them diversify teaching practices, foster autonomy, raise awareness about others' realities, and engage in online testing practices. Thus, technology normalisation appears closer compared to initial accounts in which teachers expressed fear and unwillingness.

Reaching the Moon?

The final category should address *reaching the moon* to finish the mission; however, this task is unreachable within teachers' current contexts. Instead, the present category identifies meso- and macro-level factors that may enhance or hinder technology normalisation. To begin with, meso-level factors are related to teachers' immediate contextual conditions (Bonilla et al., 2022). In this regard, teachers focused on the lack of technological resources and isolated environments as factors hindering technology normalisation.

> **Daniel:** *The school has five laptops for sixteen students, and we do not have an internet connection. [There is also] a big TV, a DVD, and an audio recorder. That is what the school had when I joined in 2017. (NF1)*

> **Daniel:** *Now I only have one working computer because the other four broke down after the pandemic. I have reported this situation because the lack of computers affects the information and technology class, given that I have 14 children and only one computer. However, as a teacher, I need to have internet connectivity, so I pay for satellite internet, which is very expensive, and I do this only to have this tool available for my class. (NF2)*

1 This is a national online/offline standardised test designed to diagnose students' competencies in five core subjects: mathematics, natural sciences, citizenship competencies, reading comprehension, and English (Icfes, 2024).

The teacher comments on meso-level factors, showing a downward trend regarding technology normalisation, such as reducing the number of working computers from five to one or assuming extra economic responsibilities due to state abandonment. This situation implies that the student-computer ratio has decreased to one computer per 14 students, as rural teachers often work on the same subject simultaneously (GI). Additionally, participants commented on other meso-level factors hindering technology normalisation.

> **Daniel:** *I have to ride a horse to bring pedagogical materials to my school and prepare lessons, which is demotivating. Parents' low educational level is another factor because they do not provide adequate support at home. Likewise, poor signal services due to typographic and weather conditions affect teaching every day. (GI)*

> **Wally:** *My school has two obsolete computers, dated, a video beam, and a TV, but we do not have connectivity. It is necessary to walk three kilometres from the school to find a private Wi-Fi connection, which, by the way, is very inefficient. This situation makes my job of integrating technologies more difficult. (NF2)*

These testimonies remind us that education is holistic and inclusive of social and contextual relationships. Although having an internet connection and computer access is normalised in many scenarios, it remains a privilege in these teachers' rural contexts. Thus, the reported meso-level factors show globalisation as a centralised phenomenon only.

Likewise, participants highlighted factors related to macro-level issues (Bonilla et al., 2022), such as the need for more support from educational authorities to develop 21st-century skills, which align with global policies (Ertmer et al., 2015; P21, 2024).

> **Jessica:** I believe the government should train us, but it doesn't do so. I have done seminars on *Evaluar para Avanzar*. What did I learn? Well, precisely that technology is not only a technological device. They told us that in such challenging contexts like ours, we made cardboard computers. (GI)

There appears to be a contradiction in the teacher's narrative. Jessica reports a lack of technology-related professional opportunities. Yet, she was enrolled in a technology-driven seminar focused on the *Evaluar para Avanzar* test, in which she was taught that technology integration goes beyond technological devices. That experience prompted her and her students to design a *cardboard* computer, making it evident that there is a mismatch between the national policy and the participant's teaching conditions. Therefore, the teacher was exposed to at least one technology-related policy, even though she *felt* like she had not received any training.

Finally, Daniel explains from a political standpoint why *reaching the moon* remains an everlasting mission.

> **Daniel:** Technology normalisation in the classroom is something disastrous, neglected, insufficient (**NEFASTO, NEGLIGENTE, INSUFICIENTE)**[2]**.** A proof of this is the government's mismanagement, as evidenced by the use of fictional contracts during the pandemic, when schools were not equipped with the necessary technological devices and internet connections. It was magically discovered during the pandemic that the rural sector had nothing...due to the ICT Minister's mismanagement, it is unknown where the money went. We are just as we were before the pandemic, without anything. (NF2)

This last excerpt reaffirms a problem reported throughout the present category: macro-level forces neglect rural contexts. The participant elaborates on this worldview by reporting a well-known

2 Capitalised and bold was the font style used by the participant. We decided to use it here to make the teacher's beliefs visible.

corruption situation in Colombia that prevented many schools from obtaining new technological equipment and an internet connection. In the end, the teacher concludes that school conditions for normalising technology are the same as before the COVID-19 pandemic. Therefore, it is valid to wonder: Are we ever *going to reach the moon?*

Discussion

The previous metaphors demonstrated that teachers have undergone a transformation process, building their confidence to integrate technology into their practices. However, they have also encountered internal and external factors beyond their control that hinder *reaching the moon*, as imagined by the participants. To begin the discussion, we will focus on teachers' beliefs about technology-oriented pedagogical practices. Succinctly, teachers feel drawn to technology for educational purposes despite initially showing a lack of self-confidence or even fear. They were interested in exploring new technologies, such as AI and online educational platforms, on their own. This curiosity suggests that teachers are eager to develop digital skills to best suit their students' needs (Kern, 2014; Murcia et al., 2025), contrasting with studies that suggest otherwise (Bax, 2011, 2018; Chambers & Bax, 2006; Koehler et al., 2014; Oki et al., 2023).

Teachers also expressed their beliefs regarding 21st-century skills (Cheng & Yang, 2023; Ertmer et al., 2015; Leal et al., 2022; P21, 2024) and the role technology integration could play. Specifically, they expressed concerns about the impact of technology use on students' interpersonal skills and relationships, highlighting potential risks such as screen addiction, isolation, and loss of privacy, among others, as also reported in Murcia et al. (2025). Hence, like Oki et al.'s (2023) participants, the teachers' numerous concerns may indicate apathetic beliefs about technology integration. However, these ethical considerations address safety, which is one of the five essential digital competencies that teachers should promote (P21, 2024). Hence, their awareness of potential risks could suggest their preparedness to integrate technology into their classroom dynamics.

By the same token, teachers elaborated on micro pedagogical practices (Bonilla et al., 2022) in which technologies play a role in their contexts. To illustrate, they expose students to other realities or conduct assessments using technology. Hence, this idea contradicts Koehler et al.'s (2014) assertion that teachers often lack the knowledge to integrate technologies effectively into their teaching practices. Additionally, it provides a glimpse into what the four rural teachers could propose to their students if they had adequate settings, similar to those of Cheng and Yang's (2023) learners, who benefited from smart classrooms.

In a similar vein, the rural teachers commented on moments in which technology should not be part of their practices for a greater benefit. For instance, a teacher established off-limit screen moments to strengthen interpersonal skills among students. This resolution is significant because the lack of monitoring regarding the use, access, and impact of technologies is a national-level issue (Leal et al., 2022; Murcia et al., 2025); yet, teachers are already addressing this gap at the local level. Therefore, the teacher prioritises a local and humanistic agenda, which supports the notion that teachers' beliefs and practices respond to sociocultural and political particularities (Bullough, 2015; Ertmer et al., 2015; Hoyos-Pipicano & Jaime-Osorio, 2025; Insuasty & Jaime-Osorio, 2020; Kormos & Wisdom, 2021).

So far, teachers' beliefs and pedagogical practices are in alignment with technology normalisation; however, there are factors beyond teachers' immediate control. In this regard, we first refer to Chambers and Bax's (2006) seminal work in the USA, which was published almost two decades ago, as participants' narratives reveal both similar and different issues. For instance, whereas Chambers and Bax's (2006) participants comment on logistics

issues related to the computer laboratory location, room layout and lack of time, the four rural teachers have one or zero computers. These claims align with Raza and Matamoros' (2024) findings in Latin America, as the ICT infrastructure is insufficient. Thus, we reaffirm infrastructural shortcomings as factors hindering technology normalisation (Balchin & Wild, 2022; Hu et al., 2023; Leal et al., 2022; Oki et al., 2023; Raza & Matamoros, 2024).

Notably, teachers still denounce the lack of resources and professional support from educational authorities following the COVID-19 pandemic. In truth, the poor socioeconomic status and connectivity described by participants align with those reported in other rural areas in Africa (Olanrewaju et al., 2021; Oki et al., 2023) and even in the USA (Kormos & Wisdom, 2021). Therefore, it is paramount to analyse national official statistics, such as the eight-to-one ratio computer (MinTIC, 2023). Likewise, it is necessary to contest Arini et al.'s (2022) idea that "they [students] have grown up with computers and the Internet, and they are the generation that teachers are dealing with today" (p. 89). As narrated by participants, their students have not grown up with computers or the internet, making a case for studying who the so-called digital natives are and how the Net Generation narrative gained predominance.

However, this is not to say that providing schools with the needed computers and connectivity will do the job automatically (Barrero-Galindo et al., 2022; Chapelle, 2009; Rativa et al., 2012). On this matter, Galvis (2012) posits that 'abundant investments are not tantamount to successful implementation and use of computer technology' (Galvis, 2012, p. 106). For instance, national ICT policies, such as *Evaluar para Avanzar* seminars or *Computadores para Educar* (mentioned by participants), have attempted to bridge the technological gap nationwide; however, they have failed due to a lack of resources, inadequate monitoring, and limited digital literacy (Leal et al., 2022; Murcia et al., 2025). Consequently, it is paramount not only to provide adequate settings but also to dignify teachers' beliefs, identities, and pedagogical practices.

In this regard, participants have demonstrated the impact of their beliefs on technology-driven pedagogical practices. For example, Daniel felt responsible for preparing students for the outside world, so he assumed extra economic responsibilities to bring connectivity, and Jessica enrolled in professional development seminars to achieve adequate assessment using technology. Interestingly, these kinds of efforts were not reported in similar rural studies (Cheng & Yang, 2023; Hu et al., 2023; Olanrewaju et al., 2021). Hence, we argue that teachers who are determined to integrate technology into their micro-pedagogical practices are likely to do so, even within educational contexts that are utterly unprepared for technology normalisation.

Conclusions

This paper explored teachers' technology-oriented beliefs and pedagogical practices, as well as the factors that may enhance or hinder technology normalisation in rural public schools in Colombia. In what follows, we address these research objectives separately.

First, the teachers demonstrated significant growth in their perceptions of technology integration for educational purposes. Initially, they were apathetic and hesitant to explore technological tools; however, these tools ultimately became valuable assistants in diversifying and enhancing learning within controlled environments. Thus, their beliefs are now more aligned with achieving technology normalisation.

Second, teachers' technology-oriented pedagogical practices have shifted from teacher-centred lesson planning and implementation to a more collaborative or student-centred approach, meaning that students' roles and well-being are gaining attention in teachers' decisions about technology use. Third, although teachers' micro-level pedagog-

ical practices enhance technology normalisation, meso- and macro-level issues, such as the lack of resources and support from educational authorities, hinder this state in the participants' contexts.

This panorama reveals that the four rural self-contained teachers work in inadequate teaching environments, making technology normalisation appear unlikely in their schools. We argued earlier about the power of teachers' beliefs about their pedagogical practices; however, educational authorities must first address sociocultural and technological needs, which continue to deteriorate. Thus, technology normalisation in the four rural teachers' contexts is going backwards after the COVID-19 pandemic. Moreover, considering the overwhelming reports of technology-related issues here and worldwide, it is fair to wonder whether macro and meso teaching conditions will ever be prepared for technology normalisation. If not, as has been historically, should everybody aim to *reach the moon?*

In closing, we believe this study makes a significant contribution to the ELT field in three aspects: it expands the scarce literature on rural ELT, addresses technology normalisation from a humanistic and longitudinal perspective, and presents narrative inquiry as a novel method for exploring the intersections between technology and teachers' beliefs and pedagogical practices.

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