

**THE DIGITAL PULSE AS A SYSTEMATIC APPROACH
TO DIGITAL CONTENT ANALYSIS**
NAVIGATING ADAPTATION CHALLENGES AND EMBRACING
INNOVATIVE VISTAS IN CONTENT ANALYSIS

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Abstract

This paper explores the developments of digital content analysis from a methodological viewpoint. Our aim is to adapt the methods of content analysis to the digital environment. A survey of the digital publications, their structure, and the mechanism of their formation, suggests the introduction of the dichotomy: "fixed part" and "interactive part" to analyze social media publications. To study and investigate the digital contents that have an interactive nature, the notion of digital pulse as a standard model is introduced.

Keywords: Digital Pulse, digital content analysis, systematic approach.

1. Introduction

The foundation, development, and enduring use of a certain methodology rely on the accuracy and effectiveness of the solutions it offers to the problems under study. As the problems resulting from the study of a certain phenomenon vary with the evolving contexts and variations associated with them, the methodology should evolve. This is occurring, in particular, within the rapid pace of technological advancement, which has given rise to a virtual digital environment that now parallels the real world. Through its platforms, this virtual environment has introduced new and ever-changing communication practices, seeking to meet user desires and objectives.

This paper aims to dive deep into the significant debate surrounding the possibility of subjecting digital content to traditional methodologies and tools in research, or to explore emerging approaches that align with the nature and characteristics of the digital phenomenon. In order to navigate through the uncertainty of emerging practices and the challenges they bring, including adaptation difficulties in the methodological treatment of various phenomena related to the digital environment, it has become imperative to develop the methodological aspect in accordance with these evolving communication practices.

Consequently, the methodological burdens for media and communication sciences become even more challenging, as the various phenomena's connection to the digital environment occurs through pure communication practices and technologies. This places media and communication sciences in an intermediary position, situated between the studied phenomena and the digital environment. Thus, there is a pressing need to either adapt traditional methodologies and tools or leap beyond them by establishing a standardized methodological framework capable of effectively dealing with digital content. This standardized approach can be utilized not only within media and communication sciences but also by other disciplines when conducting analytical processes.

In this context, this aspect aims to eliminate the uncertainty surrounding new media research, attempting to highlight epistemological features by linking media and communication sciences to methodology rather than just focusing on specialization and subject matter. This can be seen as a strength since media and communication sciences have covered both subject matter and methodology.

Therefore, it becomes essential to undertake a methodological reconstruction that aligns with the modern forms of communication practices. This can be achieved through exploratory studies that consider the nature of changes and interconnections imposed by the digital environment. Researchers should be given flexibility in the analytical process to adapt to these evolving communication practices.

2. The problematic

The process of content publication on social media platforms represents a manifestation of diverse digital communication practices that are accessible to all users. This has led to the emergence of various phenomena and topics related to the digital environment. Researchers in the field of media

and communication sciences have approached these topics by attempting to adapt and apply research methodologies and tools from the physical world to the digital environment. This was evident in the early twenty-first-century studies.

However, it did not take long before a methodological challenge emerged—a primary focus on exploring the methodologies and tools that align with the digital context. Key to this challenge is the analysis of such topics in these new digital environments, considering the specific practices they entail. This inevitably leads the research to undertake a chronological tracking of how these publications have been formed and to understand the underlying structural flows responsible for their organization and dissemination. This approach is essential for studying and uncovering their implicit aspects.

Our main proposition to solve the problem is to break down content analysis into two parts: **the fixed part** and **the interactive part**. This begins by analyzing digital publications on social media platforms, starting with the fixed part, which is created by the content creator, and then move on to the interactive part, which results from user interactions and enriches the post by generating new secondary contents. The following question is consequently addressed:

How can content analysis in the digital environment be methodically adapted to encompass the evolving context?

3. The crisis of methodological analysis : rigidity of tools versus dynamism of digital content

In the past, the effort of researchers was directed towards analyzing solely the published material. By contrast, within digital platforms, researchers must consider user interactions in the form of responses and comments directed at these posts. Thus, this new image of digital content has become a concern for researchers due to its dynamic nature, as it is content that is not fixed, both in form and substance.

Moreover, the producers of this discourse are the users themselves who benefit from the interactive process provided by digital platforms. They seek to embody their interactions using the available technological options, contributing to the ongoing interactive process. Consequently, this has led to the instability of digital post content, with the posts being reconstituted with each interaction. This, in turn, has raised questions among researchers: What determines our

interpretation of the content posted on the web? Is it the content itself or the comments and interactions surrounding it? (Izotova et al., 2021)

Based on this perspective, it has become essential to take the interactive part of digital content into account when conducting content analysis of digital posts. This is because the interactive part provides related topics and contents that explain, interpret, and clarify the dimensions of the presented content. Moreover, it reflects the opinions and preferences of users towards the topics presented on these platforms. As a result, the content of these comments can be utilized for measuring user opinions and preferences towards the published topics (Zaenudin & Suwatno, 2018). Additionally, these contributions can be considered as an integral part of the total post subject to analysis.

Indeed, when researchers turn to analyze the content of digital platforms, they encounter a fundamentally different nature that contradicts the methodologies they used in analyzing traditional media content. They find it challenging to confine and describe the content accurately or determine its origin due to the involvement of multiple parties in its construction (Sindoni & Moschini, 2021). The digital realm has exponentially expanded the scope, capabilities, methods, and resources for creating meaning. Consequently, the concept of language has changed and broadened to carry meanings beyond written characters.

The language of digital content has become a hybrid mixture of multiple linguistic elements, expressive symbols, icons, and other visual language features. It is difficult to predict how this language production evolves, a situation not previously encountered by traditional methodologies. Sometimes, a single method is insufficient to handle this phenomenon. Researchers, while considering the requirements of analysis, often find themselves combining multiple methodologies to seek methodological control and proficiency. This raises the issue of justifying the overlapping use of these methodologies and the diversity of their employment. Additionally, differences in analytical approaches among researchers can lead to varying results.

In light of these challenges, this study aims to explore the possibility of constructing and developing a standardized analytical model that embodies methodological reliability. This model intends to facilitate the analysis of digital platform contents, providing researchers with a consistent and coherent framework to achieve more reliable results.

4. Standard Structure of Social Media Platform Posts

Users are drawn to social media platforms to share their content, fully aware of the diverse interactive services these platforms offer (Quiring, 2017). The purpose of these posts may vary based on the characteristics of each platform. Content creators seek to elicit behaviors and opinions from users who engage with their posts. By doing so, they enable users to express their views and attitudes towards these posts.

Users' access to and understanding of these interactions allow them to explore the extent of acceptance and response from other users. This is achieved through their use of the various interactive features provided by the platforms (Zaenudin & Suwatno, 2018).

Upon this basis, social media platforms have worked to follow standardized templates in their design process, taking into account the presence of a fixed part that allows content creators to add their posts. Additionally, they have facilitated an interactive dynamic part that allows users to add their interactions, express their opinions, and provide feedback through a variety of multiple options, which vary from one platform to another depending on their orientation and specificity in presenting content.

For example, in the fixed part of posts on some platforms, the following privacy features can be considered:

Platforms like Facebook, Twitter, and LinkedIn offer various forms of content (text, images, videos, etc.). However, the difference between them lies in their focus. Twitter, for instance, leans towards political content, while LinkedIn focuses on academic and educational content. On the other hand, Facebook covers a broad range of topics with diverse specializations.

The same applies to the interactive part, which is a component of these posts. These platforms provide a range of interactive options that accept multiple languages, multimedia, and engagement, among other choices. However, the content of this interaction always remains dependent on the users interacting with the posts.



Figure 1: A Model Illustrating the Fixed and Interactive Components within Social Media Posts.

This study focuses on describing the structural framework of posts within the most important social media platforms, namely Facebook, Twitter, and LinkedIn. Thus, the study will illustrate the distinction between the fixed and interactive components of these posts by showcasing the interfaces of these applications, as demonstrated in Figure (1).

Therefore, relying on the design pattern of these pages, it becomes evident in the design of published topics that there is an initial section posted by the author, indicated by the green color in Figure (01). Its contents rely on the various media options available to present the idea. The section marked in red is the interactive or active part, allowing users space to comment on the fixed part of the post. The interactive part is characterized by continuity, openness, and restructuring, with the feature of network expansion. Additionally, it enables users to comment on previous comments, creating a sub-network within the comments network, and its content is influenced by multiple contributors.

In an attempt to provide a standardized description of the fixed and interactive components, the following is mentioned:

- **Fixed Part:** Visually represented by (account name of the post owner, profile picture of the post owner, the initial part of the post).
- **Interactive Part:** Visually represented by (account name of the commenter, profile picture of the commenter, the contribution, comments, emojis).

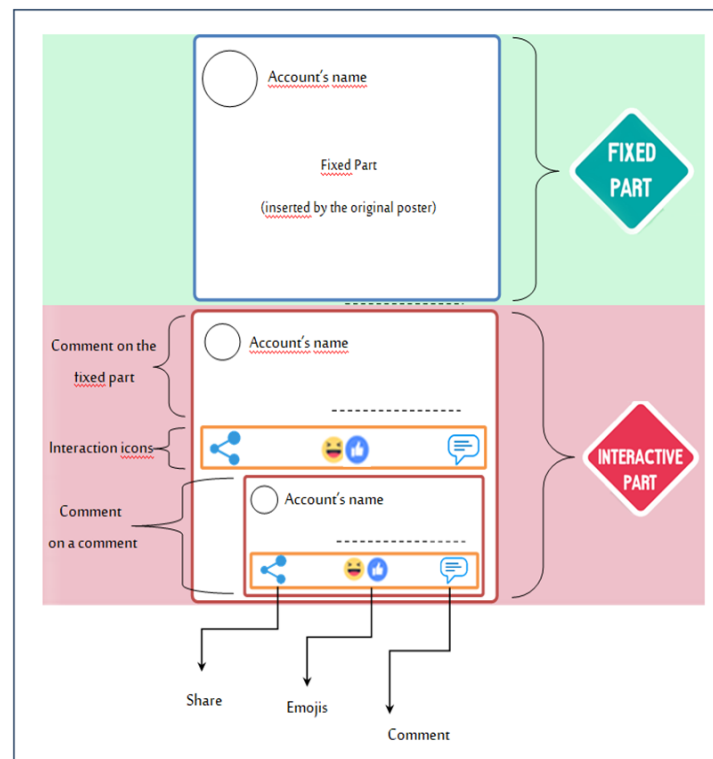


Figure 2: A standard model illustrating the sub-structures of publications within social media platforms.

5. Towards Establishing the Term "Digital Pulse":

When individuals interact with any digital content published in the digital communication environment, whether through comments on the post or exchanging comments among interacting users, new content is generated. Digital platforms strive to utilize these developments to continuously engage users with the published topics and showcase the constant reshaping or evolution of the post. According to this illustrative presentation of the post-building mechanism, the fixed part can be likened to the stimulating nucleus, subject to a series of interactive flows laden with formal and implicit updates accompanying each interaction, effectively acting like a pulse, contributing to the nourishment of the post and keeping it in a nearly constant state of reconstruction.

To clarify this activity, let's refer back to the standardized definition of a "pulse" as the regular flow of blood in the body. By applying this concept to individual interactions, we mean the flow of ideas, opinions, or emotions that users have at a specific moment (*Pulse definition and meaning: Collins English Dictionary, 2022*). In our context, and by applying this concept to the frequencies circulating on a post, we create a digital pulse, where each pulse reflects a specific interaction

carrying distinct attributes and characteristics. Thus, we can define the "**digital pulse**" as the sum of interactions produced by users towards a specific digital post, where each interaction represents a digital pulse. The collective impact of these pulses feeds the post and leads to its continuous reshaping after each pulse.

This is depicted in Figure (03), illustrating the contribution of each pulse in providing a new perspective on the post based on the elements carried by each pulse. Each pulse accumulates around the individual post, and the available interactive options contribute to generating each pulse, either through direct comments, emoji expressions (emoji shape), sharing, or responding to previous replies. It's essential to note the hypertext possibilities associated with each of these interactive options.

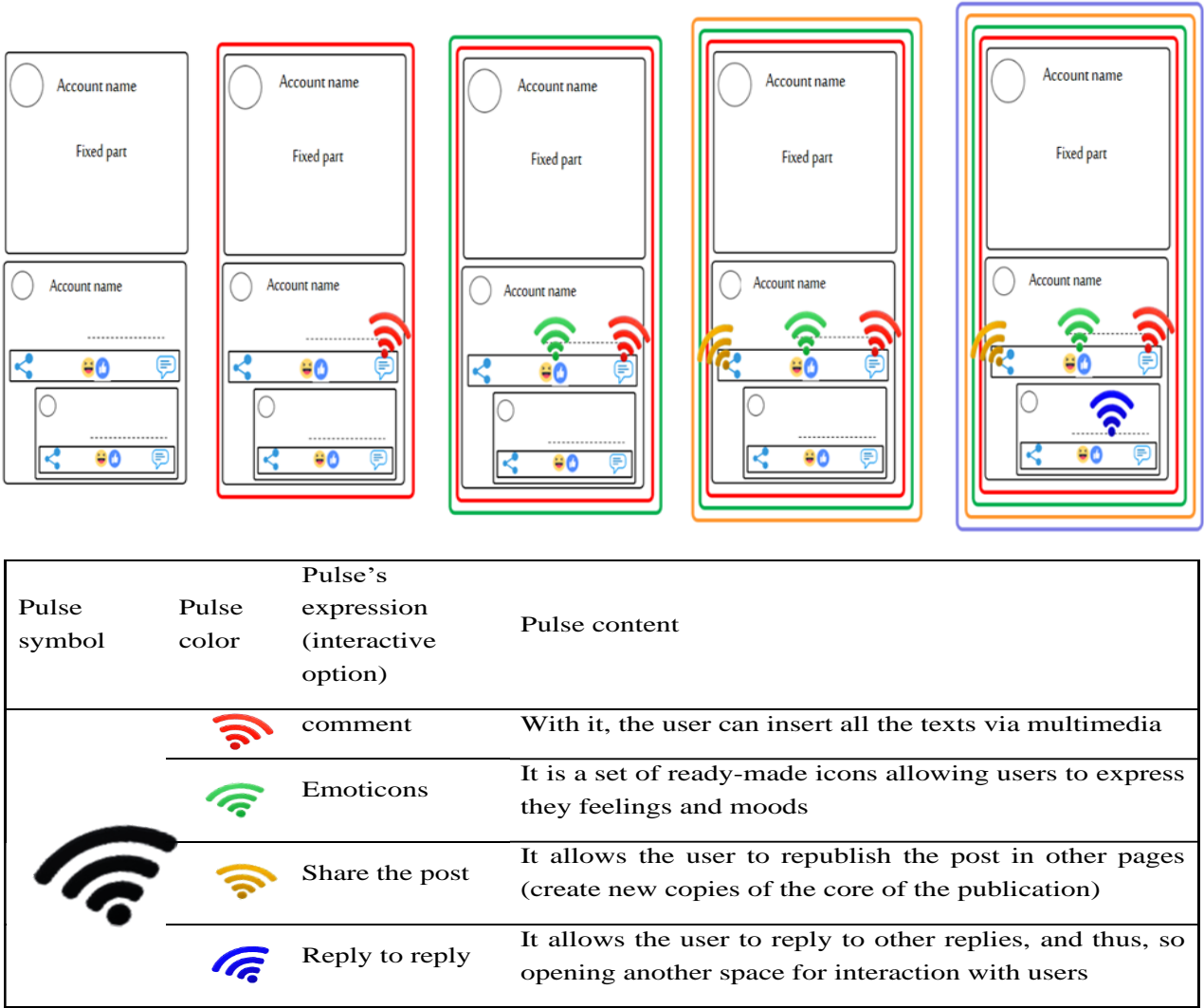


Figure 3: A graphic illustrating how the digital pulses influence digital publications.

In light of the digital nature, these digital pulses play a crucial role in the life, sustainability, and continuity of a post. Therefore, adhering to the requirements of structural analysis, which emphasize revealing both the overall structure and the underlying partial patterns, we recognize that digital posts are, in fact, formed by a series of interactions. The fixed part serves as one of its foundational elements, where each interaction acts as a digital pulse, and a partial pattern that contributes to nourishing the post, considering it as the entire structure. This dynamic gives rise to posts continually reappearing in various representations, depending on what each digital pulse carries and adds.

Consequently, with the aim of methodically controlling the analysis process, the focus will be on analyzing the content of the digital pulses that constitute a single post. As digital platforms have evolved beyond mere technical entities and now possess the ability to express human and social behaviors and interactions, it becomes essential to consider this aspect during the analysis process, even if some elements cannot be explicitly revealed in content analysis. Therefore, there is a must to revert to the fundamental principles that underpin content analysis, giving significant importance to the exploratory phase at the beginning of the content analysis process. This is done to reevaluate the nature of categories and units in a more comprehensive manner, unconfined by the narrow perspective of the content's boundaries itself. Additionally, the researcher will consider the surrounding environment of this content while employing qualitative foresight drawn from the researcher's experience and practices when analyzing these digital pulses. This endeavor aims to construct a new analytical framework for these digital content items, which are shaped by their digital nature.

6. The digital content analysis towards an integrated analytical perspective:

Earl Babbie defines content analysis as the study of recorded human communications, such as books, websites, artworks, laws, etc. More precisely, content analysis is a methodical approach to monitor the occurrence of words, phrases, ideas, or topics in written communications (Wang, 2014).

In this study, the researcher attempts to analyzing what has been termed as "digital pulses," considering them the mechanism responsible for producing these digital contents. These contents possess an immense capacity for expansion across the digital network, with ambiguous boundaries. To measure the impact of media content, we need to assess the content of the feedback in response to this content. Thus, when analyzing the published content on any digital platform, we will work to

elucidate the boundaries and intended areas during the analysis, both structurally and contextually. Consequently, we will consider both the fixed and interactive parts of the content, adapting the content analysis tool according to the digital context in which it is produced.

However, this process remains limited to the comprehensive inclusion of user interactions with the post, which may necessitate incorporating other approaches or methods to achieve a holistic analytical perspective for these contents. Additionally, it is not appropriate for methodologies and approaches to overlap arbitrarily or change with each analysis, driven by the researchers' preferences or biases due to their perspectives and perceptions. Therefore, in this study, we adopt a dynamic analytical model aiming to attempt a standardized approach to delineate digital content, accounting for its digital nature and the human and social practices of users. These practices collectively represent partial mechanisms that arise from user interactions, resulting in interactive flows manifested as digital pulses. These pulses work to transform the post into a new form, nourishing it with updates that perpetuate the process of its reconfiguration.

From this perspective, the problematic question of the study becomes more precise and is posed as follows: **How does the digital pulse work in analyzing posts on social media platforms?**

Thus, to effectively analyze digital posts, a comprehensive understanding of all the underlying building resources is necessary, shaping these digital pulses.

7. The digital pulse as a model for adapting Content Analysis

Firstly, it is worth mentioning that the exploratory and applied aspects of this paper are devoted to the publications on the most used social media platforms, as shows Figure 01. To precise and unify the notions in use, one should determine the procedural definitions of the parts of the publication as a starting point in the analysis process. The latter includes mainly the fixed part -- which remains unchanged – and the interactive part. The analysis of the publications is conducted therefore according to the following steps:

- **Observation.** The process of reading/surveying the content to determine the units and the categories that would be used in the process of analysis.
- **Description.** This is in fact one of the aims of Content Analysis since it determines the structure of the digital content as well as the involved units and categories.

- **Analysis.** Here we move from description to interpretation, and to examine the reasons and relations concerning the phenomenon.

7.1 Exhibiting the units and categories of the analysis of Digital Pulse.

After the exploratory study of publications on digital platforms, it turns out that the used units and categories are as follows:

(A) The units of analysis. In contrast to the usual case, analyzing digital publications requires considering more than one unit. We endeavor to adapt the notion of unit, meaning the element that we are interested in monitoring its frequencies, be it a word, phrase, or idea. We shall monitor the ideas according to the requirements of the study, and adopt the notion of unit according to the division of the publication into two parts (Stemler, 2000):

(A1) The unit of analysis in the fixed part is the *idea* which the OP wants to address to users.

(A2) The unit in the interactive part is the *idea of the comment*. This differs from the first one since it is concerned with single comments, each one has its own feature, depending on the user's orientation and background, and on the context. The totality of these ideas forms the interactive part.

(B) The categories of analysis. Here we mean things, opinions, situations, or conceptions, that describe a set of similar data ordered in the same place. Researchers choose categories to determine sets of symbols having common properties, either to compare them with each other, or to divide them into smaller categories or to gather them in larger ones (Graneheim et al., 2017). That is what we shall extract through our surveying study of the fixed and interactive parts, i.e., surveying the original post and the interactions about it. The latter have the form of comments made through options provided by social media platforms. These comments are the target of content analysis of the interactive part. The next table presents a set of categories that we have extracted in our analysis, although it remains to adapt them according to the requirements of the studied phenomenon.

7.2 The model followed in analyzing the fixed part.

This part is often limited in size and type, as it may consist of few words or just an image or a video, the fact that makes the process of a quantitative analysis inadequate. It remains hence to deal with it qualitatively via extracting the following categories:

- (1) **The background of the topic.** Considered that from the aspect of treating a social, economic, health... phenomena, or a compound of several interfered dimensions.
- (2) **The interactive goal of the OP.** Publishing on Facebook, for instance, is accompanied with an a priori awareness about the interactivity options which the platform provides to users (Quiring, 2017). Beyond publishing, the poster wants to see reflections of users about his publication, a fact that is realized through comments.
- (3) **Persuasion techniques.** These are the tools employed by the poster to reinforce his statements, and to achieve his goals. Through tools of solicitation and persuasion, as well as diversification, repetition, attraction and satisfying needs of the recipients, the publication would have more effective influence.
- (4) **The content of the subject.** This can be a person, an information, an idea, etc.

7.3 The model followed in analyzing the interactive part.

While a single comment is limited, the big number of users inflates this part. The categories concerning the latter are listed below:

- (1) **The option of interaction.** Users of social media platforms, either publishers or just readers/viewers, are equally aware of the interactivity options provided by the new technologies. The diversity of technical options facilitates the interactions between users in different ways directions (Heeter, 1989), noting that these options have the common property of being stemmed from the original subject, the fact the increases the size of the interactive part of the subject. It is worth noting that these options are restricted to replying to the fixed subject, replying to another reply, or to use emoticons.
- (2) **Multimedia.** Here we are not meaning the physical aspect of multimedia (hardware), but the collection of symbols and signals employed in making a single comment, like texts, emojis, videos, pictures and hyperlinks.

- (3) **New additions to the subject.** This includes the users' contributions to social media, such as conversations, messages, exchanging videos, photos and files, and trade of news and information. This forms, on the one hand, a reach source of information about society and its components, and on the other hand, an extension of the fixed part of the publication appearing on the level of comments by interacting users.
- (4) **Background of the interaction.** By this we mean the totality of the intellectual, cultural, political, and ideological backgrounds. It results from this a set of data that can be used in describing the content. Later, we shall analyze the content of comments to determine the previously mentioned backgrounds of users. Note that we shall work on each single comment separately.
- (5) **Orientation of the interaction.** An orientation is an inclination or attitude, being either positive or negative or neutral, towards some persons, actions, values, or ideas, etc. The user/reader shows his orientation towards a publication by means of a reflection in the form of a comment, being either supporter, opponent or neutral.
- (6) **The subject of the interaction.** By the subject we mean the collection of ideas and information employed by the user in his comment. As the understanding of the subject may differ from a user to another, their reactions differ accordingly, so new subjects may emerge, and become themselves the center of ...

Table 1: The units and the categories composing the Digital Pulse

post	Unit	Method	Category	Index 1	Index 2	Index 3
Fixed part	Idea	Qualitative	Interactive goal	Publishing	Allow interaction	Reply
			Topic Background	Political	Ideological	Social
		Quantitative	Persuasion techniques	Words	Typographic elements	Numbers and symbols

			Content of the subject	Actors	Information	Ideas
Interactive part	Idea of the comment	Quantitative	Interaction options	Reply	Interaction icons	Reply to a reply
			Multimedia	Text	Emoji	Photo, video or a link
			New additions	New actors	New information	New ideas
			Interaction background	Political	Ideological	Social
			Interaction orientation	Supporter	Opponent	Neutral
			Interaction subject	Reply to original post	Reply to a comment	Reply raises a new topic

8. The qualitative aspect in analyzing digital pulses

In many cases, the fixed part of digital posts may consist of simple or short content, such as a sentence, an image, or symbols, etc. It may contain elements that are not visible or difficult to quantify through quantitative analysis. In such situations, qualitative analysis can be employed as a companion to the overall analysis process. The researcher can integrate qualitative analysis, as what eludes categorization can be controlled and described through qualitative means, both explicitly and implicitly.

To understand the changes resulting from digital pulses, it is essential to periodically refer back to the comparison between the fixed and interactive parts. The analysis aims to reveal the alignment or divergence between the content of the original post and the subsequent variations that occur with each pulse. This process helps highlight signs and manifestations of the content's reconstruction within the digital post.

9. Digital Content Analysis: Continuous Limitations and Expected Growth

Despite adapting digital content analysis to the posts on social media platforms based on the concept of digital pulse and adopting an inclusive and flexible approach to identifying the building

blocks of these pulses, we have encountered limitations in comprehensively understanding all the constituent elements of these posts. These elements are interconnected and related in a network-like structure with other elements, making it necessary for researchers to consider external contexts that may not align with the principles of content analysis.

Content analysis always remains confined to the boundaries of the content being analyzed and cannot extend to elements outside the content that are directly relevant to the subject matter. Therefore, when extracting units and categories for content analysis, it is essential to consider the technological foundations related to new media and their connection to human and social dimensions. For instance, some digital practices such as commenting, liking, and sharing are technological options that carry values, attitudes, and ideas within them. This requires researchers to delve deeper, follow up, or attempt to understand the context in which these categories and indicators are produced.

10. Conclusion

This study endeavors to bypass the classical viewpoint that dominates Content Analysis; we go back to the basic principles and work on reformulating them according to the requirements of digital content, by showing the boundaries of the content and determining its categories and units. It turns out that the formation of digital content depends on some determined frequencies which we call Digital Pulses. Analyzing the latter amounts to determining the elements that gradually compose the digital content and give it its special character. Accordingly, this study exhibits a standard pattern in forming the digital pulse and shows therefore the mechanism of building the digital content. Although, and in spite of using broad categories of analysis, our understanding remains insufficient or need invoking external elements to reach the actual aim behind making these categories. This is due to the new actions and practices created in the digital context, such as multi-production of the same content, the multi-interaction about it, the interference between the elements of the communication process, and multilingualism. These facts make using classical tools of analysis and interpretation insufficient and makes determining the orientations and goals difficult.

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