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Collaborative Convergence: finding the language for Trans-Disciplinary Communication to occur

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ABSTRACT

The proper study of communication from existing models opens the doors to scientific research that allows exploring language and coding as an integral part of effective communication to generate new models that include Trans-Disciplinary Collaboration. The authors analyze the factors of communication to describe the application of Trans-Disciplinary Communication.

This paper aims to define the communication processes and their relationship with language, considering their impact on Trans-Disciplinary Collaboration for innovation.

After conducting a systematic literature review the article explored the concepts of communication, functions, language, and Trans-Disciplinary Communication. This led to its application in the convergence research approach as presented in the Collaborative Convergence Pyramid.

Keywords: Scenario, Collaboration, Communication, Trans-Disciplinary Communication, Idiolect, Factors, Convergence.

1. INTRODUCTION

Over the past 100 years, a wide variety of communication models have been explored and debated(Bryson, 1948; Shannon & Weaver, 1963). After reviewing this set of knowledge, we could arrive at the common factors of communication(Fonseca Yerena et al., 2011), understanding the importance of language functions and their coding. As we move beyond the simplified models of communication, more factors are nested under the components of communication to describe the growing complexity of the phenomena.

Goal. Define communication processes and their relationship with language, considering their impact on trans-disciplinary collaboration.

Thesis. The proper study of communication from existing models opens the doors to scientific research that allows exploring language and coding as an integral part of effective communication to generate new models that include trans-disciplinary collaboration.

2. SYSTEMATIC LITERATURE REVIEW

The review of the literature focused on academic peer-review documents that included definitions, factors, elements cases, applications, and models on the main general dimensions of Communication Trans-Disciplinary, and Collaboration. The authors agree with the ideas of Dowd & Johnson on the importance of systematic reviews as “they offer clear and compelling answers to questions related to the ”who,” "why," and "when" of studies” (2020). The process of the Systematic Literature Review (SLR) (Bedenlier et al., 2020; Higgins et al., 2019) used the mapping method (Hernández Sampieri et al., 2014, p. 76) to create a “Concept Map”(Novak & Cañas, 2006)to build the a GPE Model matrix (Yáñez León et al., 2021).

Utilizing the information yielded from this review this paper will analyze the common factors of communication models, the functions of language, and its ever-changing nature.

3. COMMUNICATION

When doing TD research you don’t necessarily need TDC but when you are doing collaborative convergence you need TDC because, without innovation in your communication, it is difficult to achieve integration. As you move to integration and innovation without TDC endpoints are not achievable. Without TDC the messages are lost in translation.

3.1 Uniformity and data transmission.

The transmission of data or signals has a low need for feedback, so the functions of the language tend to be very simple therefore we can identify 3 factors since the data tends to be also more uniform, for example, the Baudot code: Data source, Data package, Data receiver(as mentioned in Tomasi, 2003).

In its most basic form, communication models (Barnlund, 2013; Berlo, 1960; Frey et al., 1999; McCornack & Ortiz, 2016; Schramm, 1954; Shannon & Weaver, 1963) need 3 components: Sender

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(encoder), Message (signal), and Receiver (decoder).

As the data requires more complexity, it will be necessary to add more factors to the communication model. In other words: The further we move away from uniformity, the closer we will get to complexity.

Table 1.- The components of communication

Models	Source (encoder) / Encoding	Code/codebook/Decoding	Destination	The feedback loop	Channel or Medium/Noise	Content/Context/Treatment
Linear	X	X	X	X	X	X
Shannon–Weaver	✓	X	✓	X	X	X
Circular	✓	✓	X	✓	✓	X
Transactional	X	✓	X	✓	✓	✓
Schramm[1]	✓	✓	✓	X	✓	X
Barnlund	X	✓	X	X	✓	✓
Constructionist	✓	✓	X	✓	✓	✓
Interactive/convergence[2]	X	✓	X	✓	✓	X

All these models have certain commonalities as they, generally speaking, assume that there is a degree of uniformity in the sender's message.

Hence you are bringing together multiple disciplines and applying TDC the complexity is increased to the diversity of the stakeholders and the specifics of the scenario. The less trans-disciplinary you are the more you treat the barriers to effective communication as factors to be dealt with. For example, the lack of understanding of your message is attributed to the noise, coding, or medium rather than a complex issue like intercultural nonverbal communication. TDC recognizes that in scenarios of collaboration: language, shared vision and culture are essential factors.

[1]This model includes "Semiotic Rules"
[2]This model includes "Behaves"

4. THE COMPLEXITY AND FUNCTIONS OF LANGUAGE

The transcendental functions of language, "that accompany the basic intentions of man when he wants to communicate with others" Bühler (cited in Pons, 1978, p. 13) are representative, expressive, and appellative.

When communication requires the use of language, intangibles such as context and purpose will be added. To do this the interaction requires specification of the scenario, which is the common parameters including "goal, target and situation"

It is necessary to analyze the functions of language, which adds an extra degree of complexity depending on: the use that the speaker makes of the language.

Generally, there are six particular functions of the language to consider: the Conative (or appellative) function, emotive (or expressive) function, phatic function, metalinguistic function, poetic function, and referential function(Blake & Haroldsen, 1977; Pons, 1978; Valdes et al., 2007). Additionally, the authors agree with the ideas of María del Socorro Fonseca Yerena "language is a vehicle to communicate ideas, communication is the interaction and interchange of ideas with others and idioms are the particular way to say or name things" (2011, p. 5). Effective communication is a means of negotiating shared understanding amongst individuals and groups each with an idiolect.

At this level, the messages acquire greater meaning, so there is a greater need for feedback since it is necessary to check the effectiveness of communication through feedback. All these variables change according to the situation so that the context begins to have greater value. These particular functions of language will be used in different situations for different reasons or purposes, this fact is what increases the complexity of communication because the same message said by the same sender can be interpreted and reinterpreted by different receivers in different circumstances. So it is important to understand the overall purpose of the communication intent. When intangibles such as emotion or gender are added to the message, it is imperative to understand that there is a new relationship between context and purpose. Language and its ever-changing nature.

The successful coding of said relationship will facilitate the decoding of the message and therefore effective communication will have to face fewer barriers (Ivancevich et al., 2006).

5. TDC AND COLLABORATION

At the heart of our discussion is the application of TDC to explore how collaboration adds a new level of complexity to the scenario. The models presented thus

far tend to collapse the many factors into a reduced image of TDC. Then when issues arise, the categories of existing workarounds are applied to limit, categorize, and investigate the interaction of phenomena. Our question is what model arises when TDC is applied to convergence, seeking to move beyond integration at the Inter-Disciplinary level to attain an innovation that describes a new-shared space.

In this collaborative place, TDC serves to identify and elaborate the many aspects of a new language necessary for effective work, initiation of new collaborators, and a fully integrated way of both disseminating and divulging the essential elements of the work being undertaken.

6. THE INNOVATION OF LANGUAGE

The more the TDC is sought to be a full TD collaboration the more the various factors of communication must be identified, aligned, and shared. In this way, the individual collaborators build a new space in which the shared language includes aspects like culture, climate, context, and other aspects of the new shared circumstance that is understood by the participants. This new space then creates a lexicon of induction so that levels of fluency with the specific factors of the scenario mark varying levels of collaboration in the TDC space described within the Collaborative Convergence Pyramid (CCP) (Lipuma & Yáñez León, 2022).

7. CONCLUSION

The aspects of this new language are varied, complex, and numerous. Moreover, they are aligned with the specified scenario. As individuals come together they must negotiate common sociolects to represent their idiolects. However, in TDC where there is communication, this is not a one-time activity of alignment. This should happen continuously due to the nature of the innovative space that is being created, the shared vision as well as other factors tied to the growth of the common space including areas like culture, organizations, and systems.

8. ACKNOWLEDGMENTS

We want to acknowledge the support and ongoing collaboration from our strategic partners necessary for the flourishing of the ideas presented.

9. ABREVIATIONS

CD = Co- Discipline (Cross- and Across)
CoP = Community of Practice
e.g. = exempli gratia
et al. = and others
ID = Inter-Discipline
MD = Multi-Discipline
p./pp. = page/pages
TD = Trans-Discipline
UD = Uni-Discipline

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NJIT

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Introduction


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COMPUTING SCIENCES
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MANAGEMENT

Aerospace Studies

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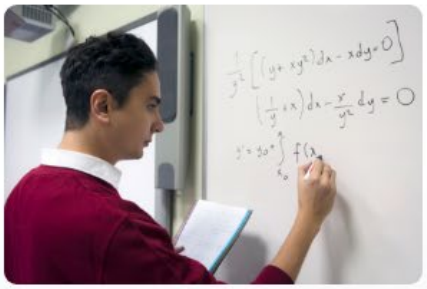

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Currently, Cristo Leon is the Director of Research for the College of Science and Liberal Arts for the New Jersey Institute of Technology where he assists faculty in pursuing their academic research. His own research focuses on digital innovation and social responsibility.

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When you envision effective communication, do you…?

Communication Models

In its most basic form, communication models (Barnlund, 2013; Berlo, 1960; Frey et al., 1999; McCornack & Ortiz, 2016; Schramm, 1954; Shannon & Weaver, 1963) need 4 components: **S**ender (encoder), **M**essage (signal), **C**hannel, and **R**eceiver (decoder).


Sender
Message
Channel
Receiver

Models	Source (encoder) / Encoding	Code/codebook/Decoding	Destination	The feedback loop	Channel or Medium/Noise	Content/Context/Treatment
Linear	X	X	X	X	X	X
Shannon–Weaver	✓	X	✓	X	X	X
Circular	✓	✓	X	✓	✓	X
Transactional	X	✓	X	✓	✓	✓
Schramm[1]	✓	✓	✓	X	✓	X
Barnlund	X	✓	X	X	✓	✓
Constructionist	✓	✓	X	✓	✓	✓
Interactive/convergence[2]	X	✓	X	✓	✓	X

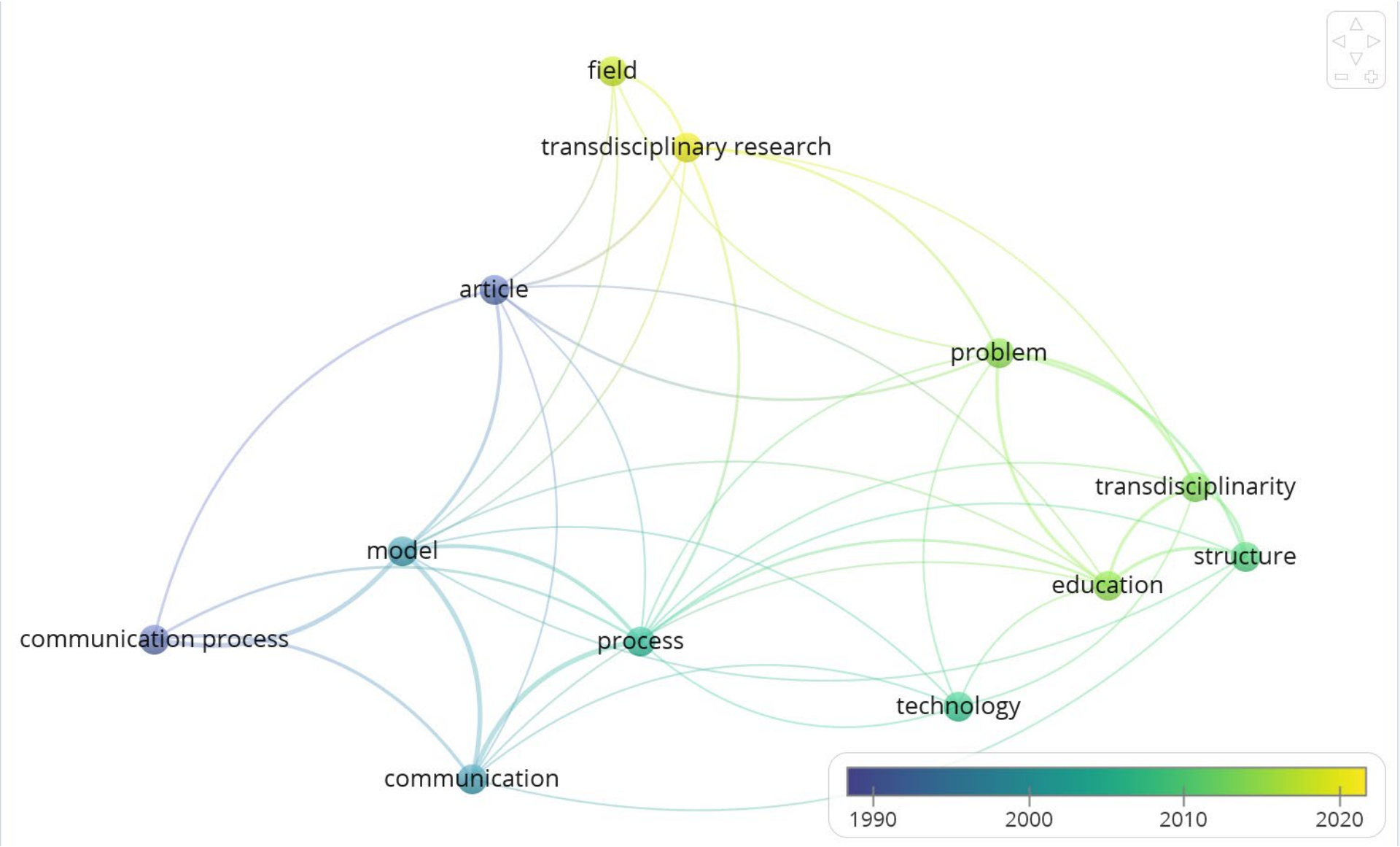
- Source (encoder) / Encoding
- Code/codebook/Decoding
- Destination
- The feedback loop
- Channel or Medium/Noise
- Content/Context/Treatment

When you communicate, do you…?

Functions of language

Specific functions of language:

Conative (or appellative) function	Emotive (or expressive) function	Phatic function	Metalinguistic function	Poetic function	Referential function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1990
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"Effective communication is a means of negotiating shared understanding amongst individuals and groups each with an idiolect"

When you collaborate, does your language...?

TD Communication and TD Collaboration

"If you don't create a new language for TDC when collaborating, you may end up just talking to your self in the mirror"

Thank you! Q&A

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