

Ethnomathematics: videos and humans-with-media

Juliana Çar Stal

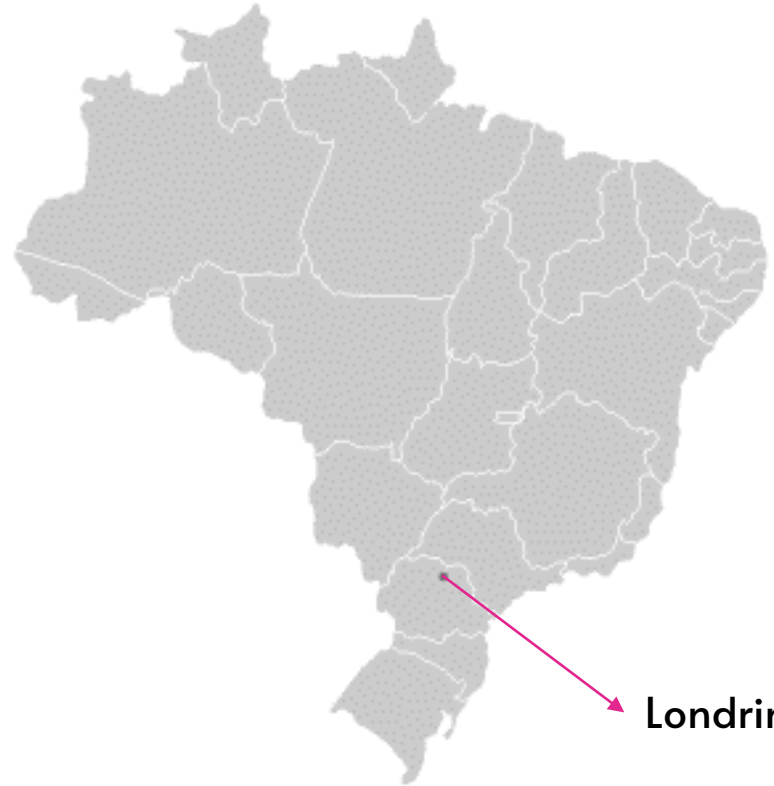
About me



- In 2015 - Masters in Science Teaching and Mathematics Education at the Universidade Estadual de Londrina.



UNIVERSIDADE
ESTADUAL DE LONDRINA

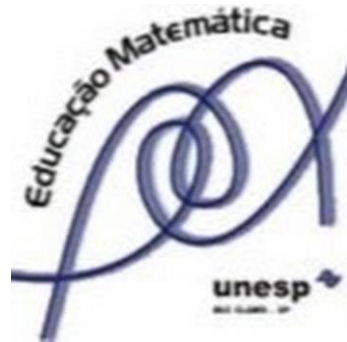


Londrina

- In 2017 I returned to Ponta Grossa and I worked in a school: Centro Educacional Marista Santa Mônica until December 2019.
- In 2020 I moved again. I've been studying doctorate degree in UNESP in the postgraduate program in Mathematics Education.



unesp 



Research Group in Informatics, Other Media and Mathematics Education (GPIMEM)



Sueli L. Javaroni

Marcos V. Maltempi

Ricardo Scucuglia

Marcelo C. Borba

Sueli L. Javaroni

that guides and researches about Mathematics Teacher Education, Digital Technologies in Mathematics Education, Mathematical Modeling, Computational Thinking and Mathematics Teaching and Learning.

Marcos V. Maltempi

that guides and researches about Computacional Thinking, Mathematics Education, Financial Math Education.

Ricardo Scucuglia

that guides and researches about Mathematics Education, with an emphasis on Teaching-Learning, Computing, Arts and History of Mathematics.

Marcelo C. Borba

that guides and researches about Digital Technologies in Mathematics Education, videos, Mathematical Modeling and Qualitative research Methodology.

DIGITAL VIDEOS AND MATHEMATICS EDUCATION FESTIVAL

- One of the activities developed for this group;
- The idea is to create a video collection with mathematical content and the culture of video production.
- Since 2016;
- Up to 2020 was part of actions of big Project E-licm@t-Tube;
- Now, is part of a new Project, funding by CNPQ “ Digital Videos Festival, Mathematics Education and classroom on the move: between virtual and face-to-face”;





“

The face-to-face event consists of lectures about mathematics education and videos, exhibition of the top-placing videos, and the award ceremony. This environment is both the locus of research, and at the same time is a virtual space for exchange, show and discuss mathematics ideas between students, teachers and the whole community outside the school. This project therefore encompasses both teaching research and outreach work (DOMINGUES; BORBA, 2021, p.259)

Researches about this festival

Domingues (2020)

I Festival

Activity Theory

Carvalho (2019/2023)

III and IV Festival

Semiotics, Critical
Mathematics Education

Gimenez (2019/2023)

III Festival

Arts and Mathematics

Stal (2020/2024)

IV Festival

Etnomathematics and
phenomenology



What and how are the
festival's relationships
with my research?

IV DIGITAL VIDEOS AND MATHEMATICS EDUCATION FESTIVAL

- The first 100% online festival, because of pandemic situation;
- I select six videos this festival for analysis;
- The videos of all editions were produced by students, teachers, parents and so on.

made with
Biteable.com

Matemática

Financeira :

SISTEMAS DE AMORTIZAÇÃO



made with
Biteable.com

⏪ || ⏩ 🔊 0:01 / 3:49



Matemática Financeira Sistema de Amortização Constante
Educação



<https://www.youtube.com/watch?v=LhLqml3YvG0&list=PLiBUAR5Cdi60f4XMJVrwF8IKBk-7oODrR&index=1>



<https://www.youtube.com/watch?v=SxqtCxUDUso&list=PLiBUAR5Cdi60f4XMJVrwF8lKBk-7oODrR&index=5>

“

Videos can be produced collectively, with help of parents, friends, and different media. Differences in resources, including degree of parental aid received, can be considered by teachers and school systems in a “non-ranking” type of assessment.

(BORBA, 2021, p.389)

Is it possible
produced a video
without human?

Is it possible
produced a video
without media?


NO!

A video can be produced by humans and media, collectively! So, humans-with-media.




That is why we support the notion that humans-with-media (or humans-with-technology or humans-with-technology-of-intelligence) should be the basic unit of knowledge. This collective, formed of humans and non-humans, produces meaning as it connects different nodes of a network. Network of meanings is the metaphor for how this collective of humans-with-media produces knowledge. But we can also think of an intelligence that is collective. In such a view, one intelligence does not compete with another. They collaborate! Different combinations of humans with media, located in different parts of the world, gain power in some domain that becomes part of this collective intelligence.

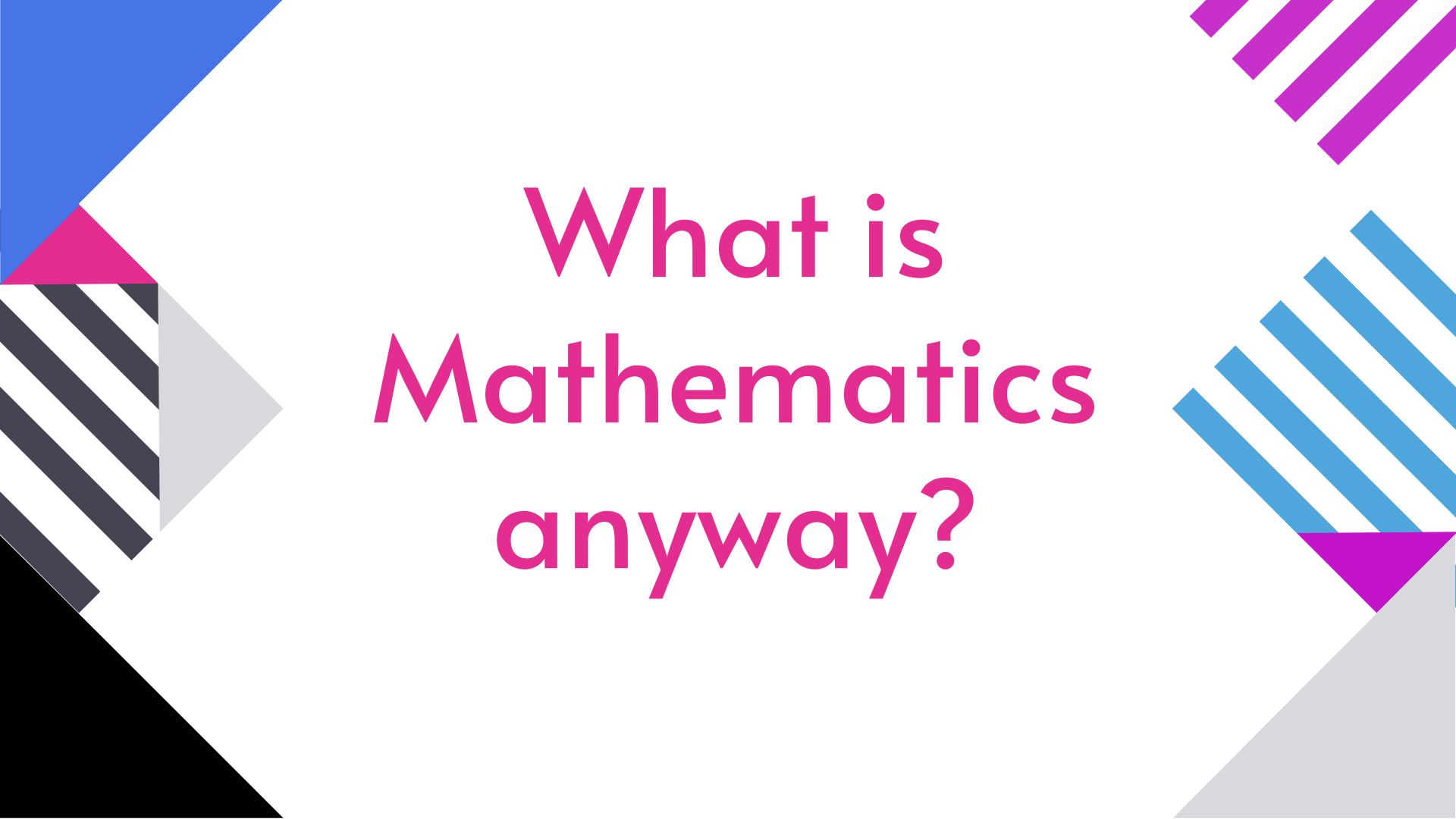
(BORBA; VILLARREAL, 2005, p.26)



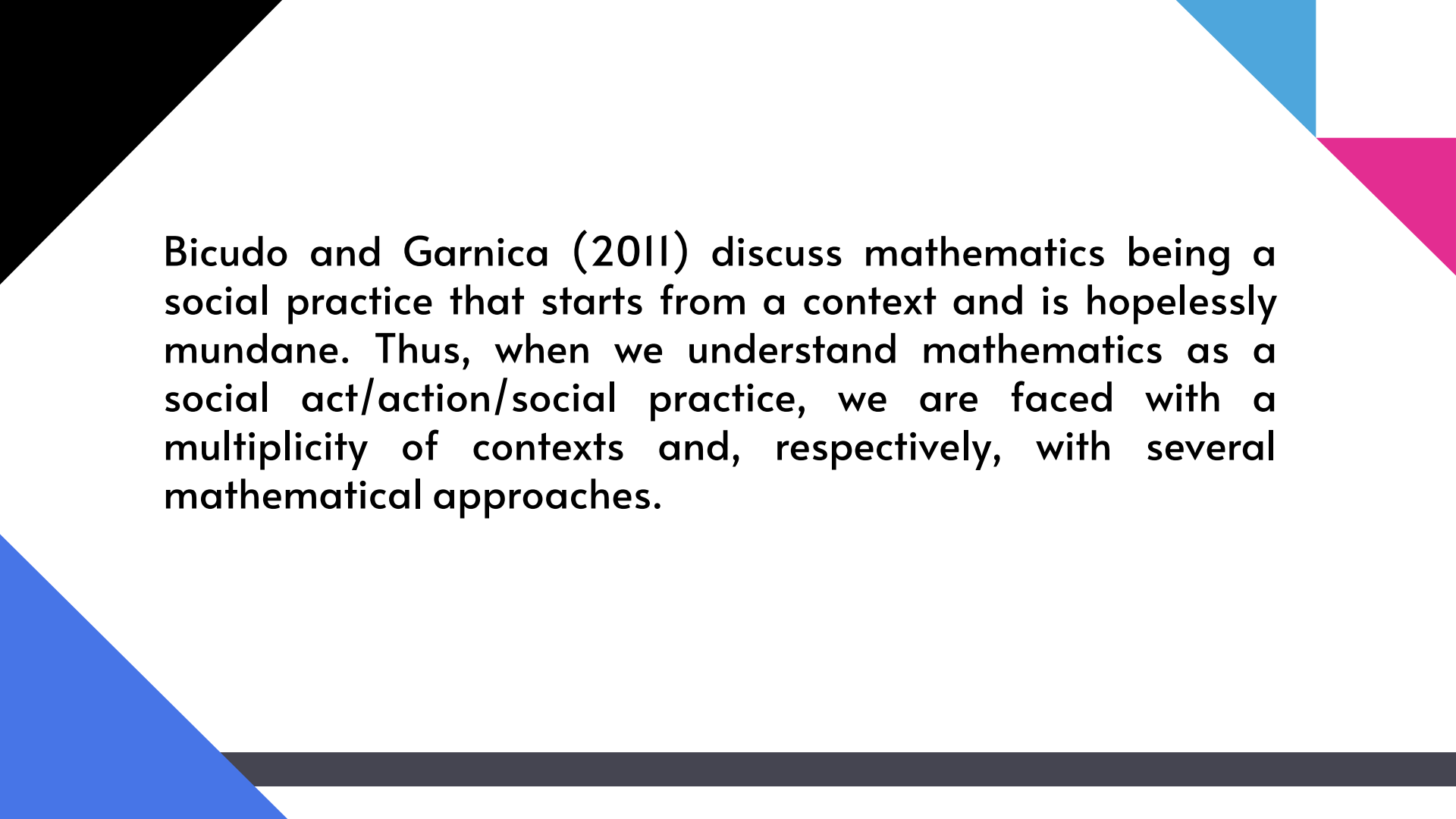
If the videos are produced by the collective of humans-with-media, can we infer that the mathematics that is present in the videos is produced by this collective?

This is one of the questions that generate this research...





What is
Mathematics
anyway?

The slide features a white background with decorative geometric shapes. A black triangle is in the top-left corner. A blue triangle is in the top-right corner. A pink triangle is in the middle-right area. A blue triangle is in the bottom-left corner. A dark grey horizontal bar is at the bottom.

Bicudo and Garnica (2011) discuss mathematics being a social practice that starts from a context and is hopelessly mundane. Thus, when we understand mathematics as a social act/action/social practice, we are faced with a multiplicity of contexts and, respectively, with several mathematical approaches.



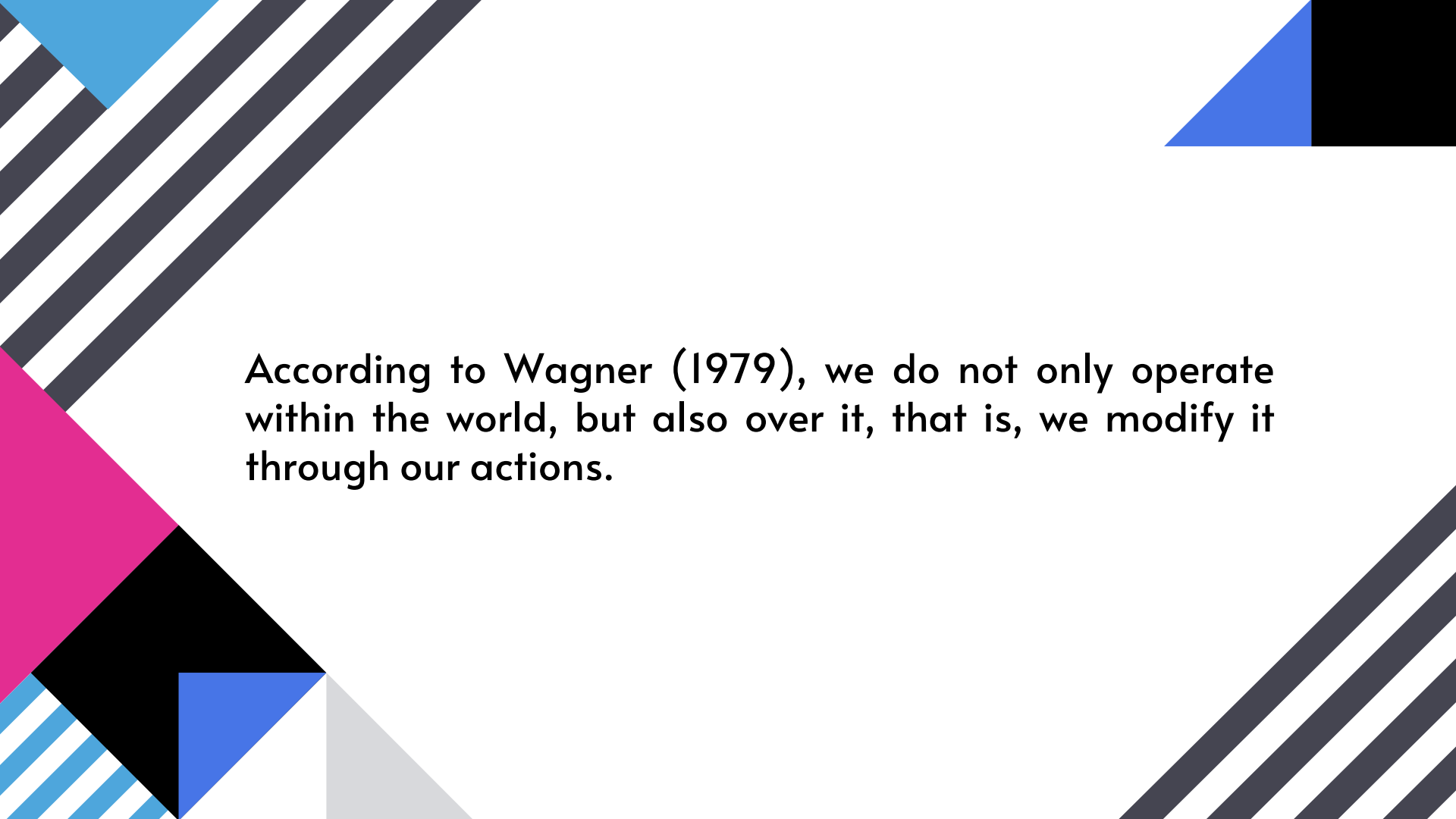
“

[...] every view of the world, in addition to being knowledge about it, is also an attitude towards it. In this sense, Mathematics Education must incorporate mechanisms to promote this attitude. (CIFUENTES, 2010, p. 29).

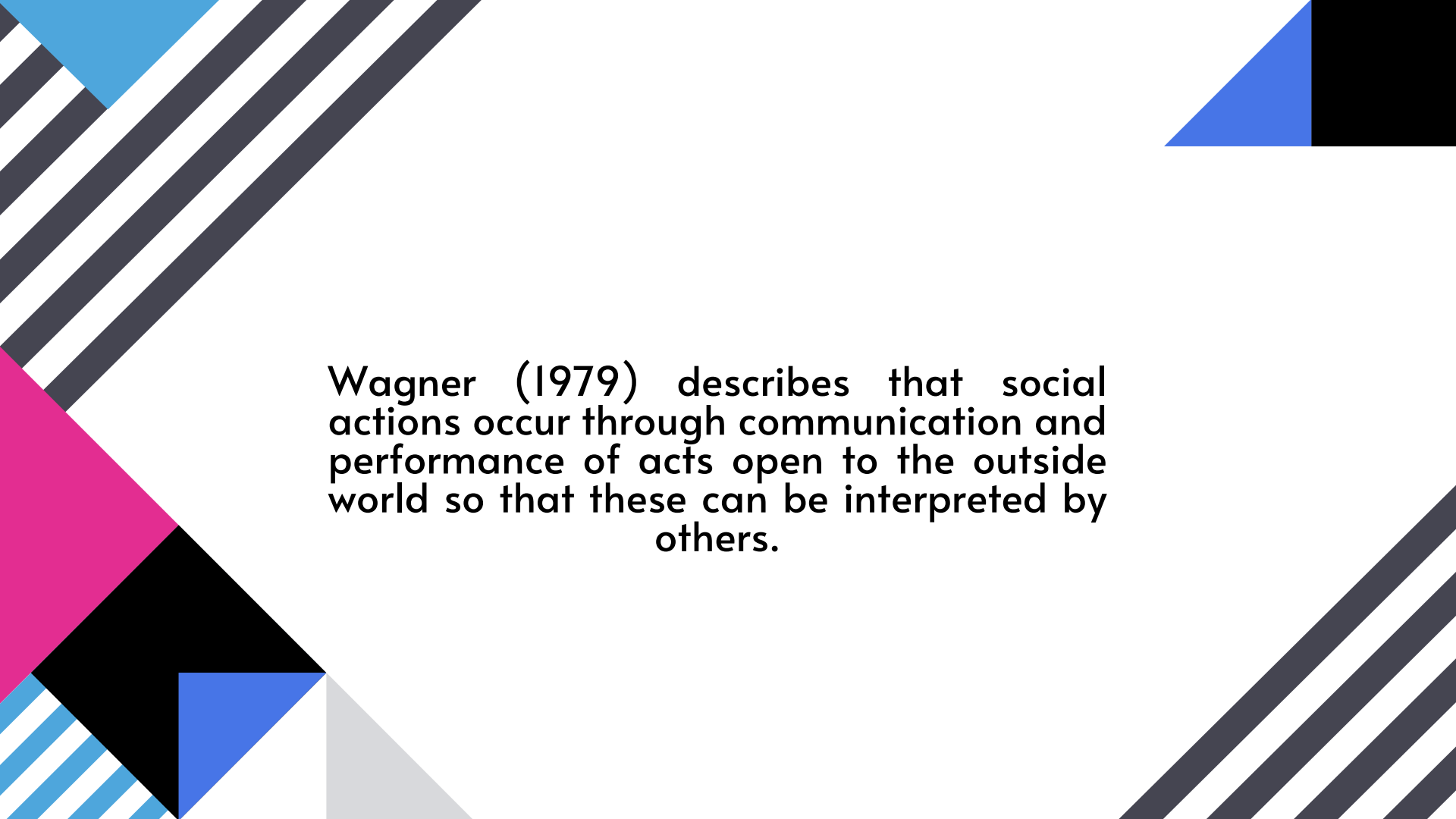


“

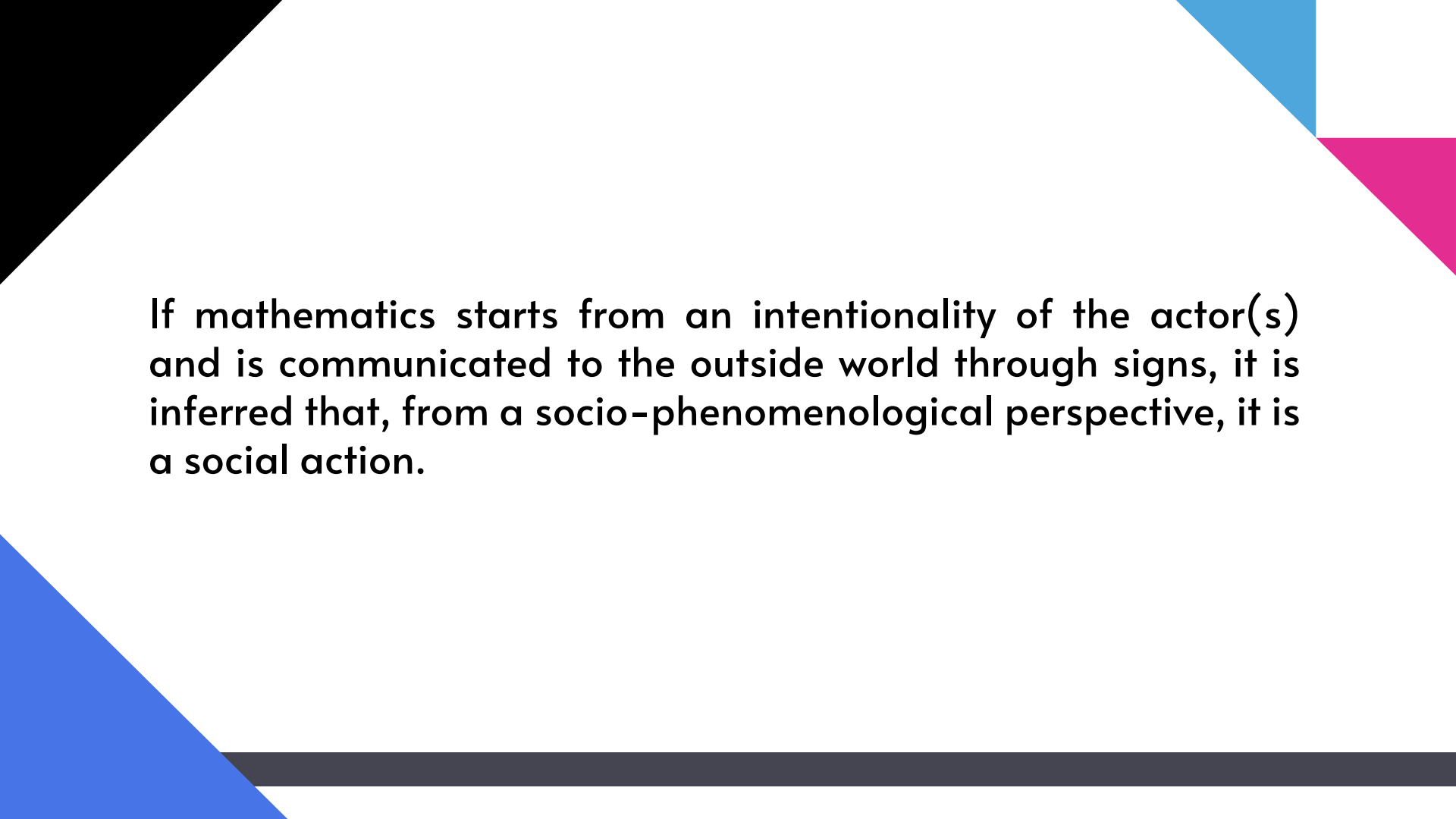
“[...] social action occurs when, according to the actor's intention, the action is directed towards other people, whom he sees as conscious humans. The action itself remains, then, unidirectional.”
(WAGNER, 1979, p. 31)



According to Wagner (1979), we do not only operate within the world, but also over it, that is, we modify it through our actions.

The background features a white central area with abstract geometric patterns. On the left, there are diagonal stripes in dark grey and light blue, along with a large pink triangle and a black triangle. On the right, there are diagonal stripes in dark grey and light blue, and a blue triangle. The text is centered in the white space.

Wagner (1979) describes that social actions occur through communication and performance of acts open to the outside world so that these can be interpreted by others.



If mathematics starts from an intentionality of the actor(s) and is communicated to the outside world through signs, it is inferred that, from a socio-phenomenological perspective, it is a social action.



ETHNOMATHEMATICS



“

Mate and ethno to signify that there are several ways, techniques, skills (tics) to explain, understand, deal with and live with (mathema) different natural and socioeconomic contexts of reality (ethnos) (D'AMBROSIO, 2017 , p. 83).

Differents conceptions about Ethnomathematics

D'Ambrosio	Interference in reality through processes generated "in loco"
Knijnik	Investigation of mathematical practices and conceptions directed towards pedagogical work.
Ferreira	Mathematics embedded in the real nature of the student.
Borba	Investigation of processes generated in a culture with a view to pedagogical applications.
Gerdes	"Hidden" mathematics in underdeveloped cultures.
Os Ascher	Symbolic mathematics verified in "underdeveloped" peoples.

SOURCE: RICARDO; MAFRA, 2004, p.91 – Our translate

Points in common

- 1) Use of ethnomathematic knowledge as usual (utilitarian) and/or pedagogical practice that meets the intrinsic needs of the context in which it is identified;
- 2) the non-reductionism of ethnomathematics, in the sense of analyzing only mathematical practices;
- 3) Strong tendency towards historical studies not only in mathematics, but also in other areas of knowledge;
- 4) Questioning western mathematics as being the only existing one.
(RICARDO; MAFRA, 2004, p.90)

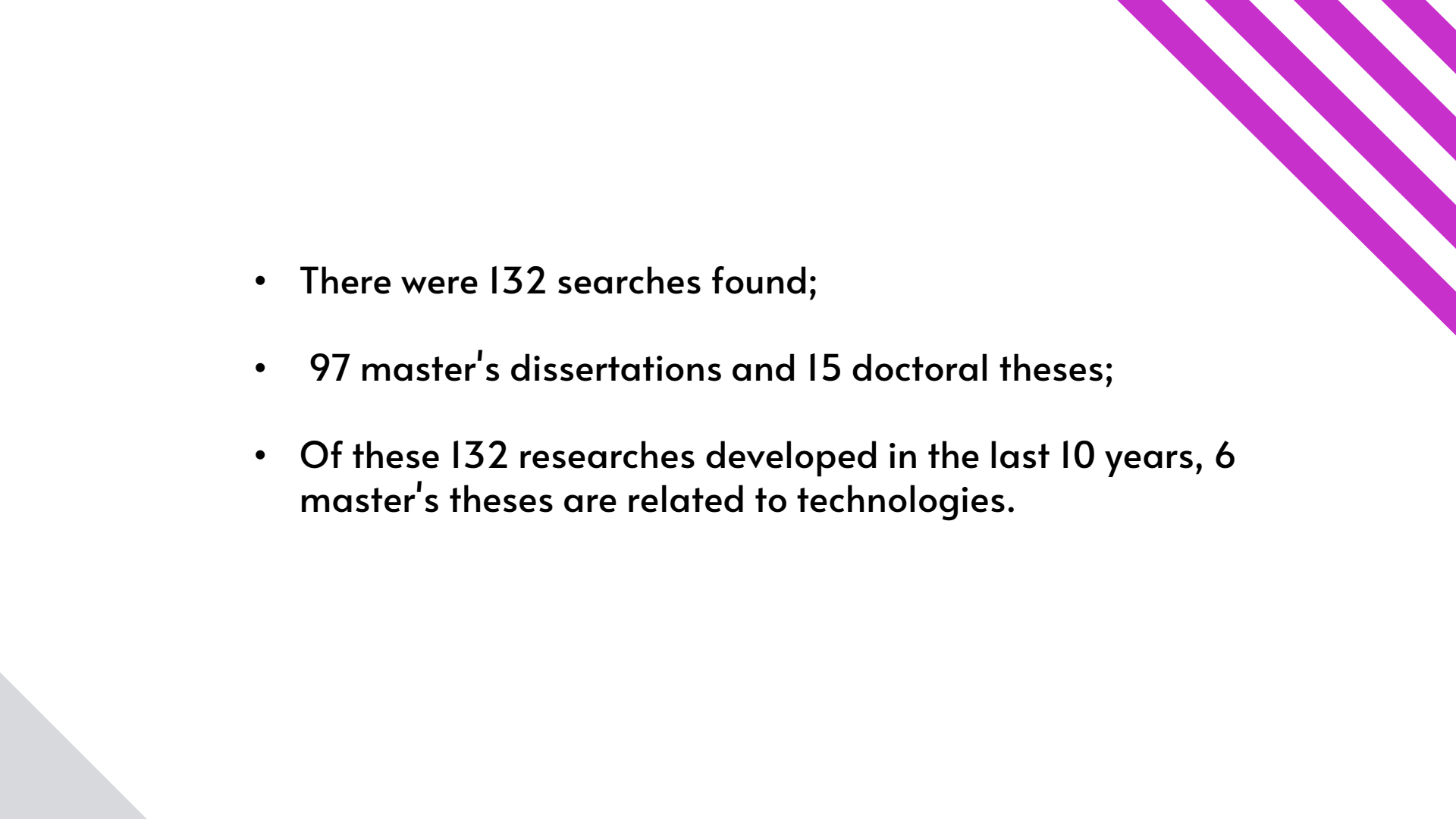


“

Ethnomathematics reveals itself as a research program that does not start from a rationality framework, but is open to other systems of truth construction. In this way, we see it as a path that can contribute to the understanding of aspects of Mathematics perhaps more linked to anthropological possibilities of man being in the world with others (BICUDO; GARNICA, 2011, p. 93).


Literature Review

Searches were carried out in the CAPES Theses and Dissertations Catalog and in the Brazilian Digital Library of Theses and Dissertations, with the Ethnomathematics search command in the period from 2011 to 2021, with the purpose of identifying research on the same theme as my research, in order to highlight common points and show the differential of the research I am developing.

- 
- There were 132 searches found;
 - 97 master's dissertations and 15 doctoral theses;
 - Of these 132 researches developed in the last 10 years, 6 master's theses are related to technologies.

- BERNSTEIN, TATIANE CRISTINE. **ENSINO DE MATEMÁTICA E JOGOS DIGITAIS: UM ESTUDO ETNOMATEMÁTICO NOS ANOS INICIAIS'** 31/03/2017 131 f. Mestrado Profissional em ENSINO DE CIÊNCIAS EXATAS Instituição de Ensino: FUNDACAO VALE DO TAQUARI DE EDUCACAO E DESENVOLVIMENTO SOCIAL - FUVATES, Lajeado.
- GERSTBERGER, ANDRE. **UM OLHAR ETNOMATEMÁTICO ACERCA DA UTILIZAÇÃO DOS SMARTPHONES NOS PROCESSOS DE ENSINO DE MATEMÁTICA NOS ANOS FINAIS DO ENSINO FUNDAMENTAL'** 27/04/2017 173 f. Mestrado Profissional em ENSINO DE CIÊNCIAS EXATAS Instituição de Ensino: FUNDACAO VALE DO TAQUARI DE EDUCACAO E DESENVOLVIMENTO SOCIAL - FUVATES, Lajeado.
- SILVA, CLACI CLAIR ROPKE DA. **A TECNOLOGIA COMO ESTRATÉGIA ETNOMATEMÁTICA: UM ESTUDO DE CASO SOBRE O USO DAS TECNOLOGIAS NO ENSINO DE MATEMÁTICA NO SEXTO ANO DO ENSINO FUNDAMENTAL'** 07/08/2017 114 f. Mestrado Profissional em Ensino de Ciências Instituição de Ensino: UNIVERSIDADE ESTADUAL DE GOIÁS, Anápolis.

- ALTENBURG, GERSON SCHERDIEN. **Contextualizando Cultura e Tecnologias: Um Estudo Etnomatemático Articulado ao Ensino de Geometria'** 31/10/2017 102 f. Mestrado Profissional em ENSINO DE CIÊNCIAS E MATEMÁTICA Instituição de Ensino: UNIVERSIDADE FEDERAL DE PELOTAS, Pelotas.
- DEOTI, LILIAN MATTE LISE. **A etnomatemática e o ensino de geometria na escola do campo com uso de tecnologias informáticas'** 29/11/2017 undefined f. Mestrado Profissional em Matemática em Rede Nacional Instituição de Ensino: UNIVERSIDADE FEDERAL DA FRONTEIRA SUL, Rio de Janeiro.
- KOVALSCKI, ADRIANA NEBEL. **Produção de Vídeo e Etnomatemática: representações de geometria no cotidiano do aluno'** 25/04/2019 193 f. Mestrado em EDUCAÇÃO MATEMÁTICA Instituição de Ensino: UNIVERSIDADE FEDERAL DE PELOTAS, Pelotas.

The top left corner features a black triangle pointing down and a pink triangle pointing up. The top right corner features three parallel dark grey diagonal lines.

Although these have common themes, the research I am developing is different in that it looks at the production of knowledge by SHCM and because it seeks aspects of digital culture, cyberculture, media culture and the identity of social media.

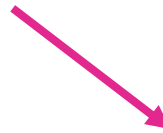
Ethnomathematics



Mathematics



Videos



Digital culture



Humans-with-media



Theoretical Framework

Ethnomatematics

Digital Technology and videos

Philosophy of Mathematics Education

Be-with

Humans-with-media

Phenomenological Sociology

Cyberculture, media culture, cyberspace and Identity of Social Media

Methodology

- I select six nominee videos of the category: High School;
- This research is qualitative;


Bicudo (2017, p.116) claims that,

The qualitative encompasses the idea of the subjective, capable of exposing sensations and opinions. The meaning given to this conception of research also encompasses notions about perceptions of differences and similarities of comparable aspects of experience.

I use phenomenological approach to analyze


“

These are researches that allow us to understand the characteristics of the phenomenon investigated and that, in doing so, provide an opportunity to open up possibilities of possible understandings when the interrogation of the phenomenon is directed to contexts different from the one in which the investigation was carried out (BICUDO, 2011, p.21).



Being the phenomenon of this, the videos which were produced by humans-with-media and are in a festival collection whose intention is to understand the mathematics produced (if it is produced)

[...] construction/production of reality and construction/production of knowledge are faces of the same movement, so that the conscious investigator always asks himself 'what are the characteristics of what I want to know?' and 'how to proceed to advance in knowledge of what I propose to know?' no longer satisfy linear answers [...]. (BICUDO, 2011, p.12 - 13)





“

The phenomenon/perceived pair characterizes the phenomenological conception of reality and knowledge and requests that the description and what it expresses be analyzed and interpreted, paying attention to the ambiguity inherent in language, given the density of meanings it conveys. There is no, a priori, a framework of categories on how to interpret what is reported, but one must be attentive to rigor in order not to fall prey to “thinking”, pontificating on what is said there from visions individuals, either by the researcher or by studied authors. (BICUDO, 2011, p.20)

For this, some procedures are adopted for data organization and analysis, which consist of:

- watch the selected videos over and over again;
- write a short description about the video format;
- Transcribe the lines, describe the scenario corresponding to the lines;
- describe the technological resources used that are presented in the video.



Where am I?

To conclude this work, I need make somethings:

1. Qualify exam;
2. Finish the theoretical framework;
3. Finish the data analisys.

Bibliography

- ARAÚJO, J. L. **Pesquisa Qualitativa em Educação Matemática**. 5. ed. Belo Horizonte: Autêntica, 2017. Reimpressão. (Coleção Tendências em Educação Matemática).
- BICUDO, M. A. V; GARNICA, A. V. M. **Filosofia da Educação Matemática**. 4. Ed. Belo Horizonte: Autêntica Editora. (Coleção Tendências em Educação Matemática), 2011.
- BICUDO, M. A. V. Pesquisa qualitativa e pesquisa qualitativa segundo a abordagem fenomenológica. In: BORBA, M. C.; BORBA, M. de C. The future of mathematics education since COVID-19: Humans-with-media or humans-with-non-living-creatures. *Education Studies Mathematics*. In press. 2021, p.385-400.
- BORBA, M.C.;VILLARREAL, M.V. **Humans-With-Media and the Reorganization of Mathematical Thinking**:information and communication technologies, modeling, experimentation and visualization. New York – United States: Springer, 2005.
- CIFUENTES, J. C. *Do conhecimento Matemático à Educação Matemática*: Uma “Odisséia Espiritual”. In: CLARETO, S. M.;
- D’AMBRÓSIO, U. **Etnomatemática: Elo entre as tradições e a modernidade**. 2.ed. Belo Horizonte: Autêntica Editora, 2017.
- DETONI, A. T.; PAULO, R. M. **Filosofia, Matemática e Educação Matemática**: compreensões dialogadas. Juiz de fora: Editora UFJF, 2010.
- DOMINGUES, N.S. **Festival de Vídeos Digitais e Educação Matemática**: uma complexa rede de Sistemas Seres-Humanos-Com-Mídias. 2020. 279 f. Tese (Doutorado em Educação Matemática) - Instituto de Geociências e Ciências Exatas, Universidade Estadual Paulista “Júlio de Mesquita Filho”, Rio Claro.
- DOMINGUES, N. S.; BORBA, M. de C. **Digital Video Festivals and Mathematics**: Changes in the Classroom of the 21st Century. *Journal Educational Research in Mathematics*.v.31,n.3, p. 257 – 275.
- RICARDO, J.; MAFRA, S. Reflexões sobre alguns conceitos de etnomatemática. In: FOSSA, J. A. (org.) **Presenças Matemáticas**. Natal, RN: EDUFRRN, 2004, p. 75-96.
- WAGNER, H. **Fenomenologia e Relações Sociais**.Rio de Janeiro: Zahar, 1979.

Thanks!

Do you have any questions?



juliana.stal@unesp.br

@jucstal



Juliana Stal

CREDITS: This presentation template was created by [Slidesgo](#), including icons by [Flaticon](#), and infographics & images by [Freepik](#).

Please keep this slide for attribution.