O Poder de Ação das Mídias, da Maternidade e dos Lares na Educação Matemática

The Agency of Media, Maternity and Homes in Mathematics Education

El Poder de Acción de los Medios, la Maternidad y los Hogares en la Educación Matemática

Le Pouvoir d'Action des Médias, de la Maternité et des Maison dans l'Enseignement des Mathématiques

Débora da Silva Soares[1]
Universidade Federal do Rio Grande do Sul (UFRGS)
Doutorado em Educação Matemática
https://orcid.org/0000-0003-4534-3675

Marcelo de Carvalho Borba[2]
Universidade Estadual Paulista (UNESP, Rio Claro, SP)
Livre-Docente em Educação Matemática
https://orcid.org/0000-0003-3101-5486

Resumo

Neste artigo desenvolvemos um ensaio acerca do poder de ação (*agency*) da maternidade, dos lares e das mídias em processos de produção de conhecimento. Apoiamos nossas reflexões no construto teórico seres-humanos-com-mídias, o qual foi desenvolvido no contexto da Educação Matemática e sugere que o conhecimento é produzido por coletivos de humanos e não humanos. Metodologicamente, optamos por desenvolver a análise de uma narrativa, a qual apresenta a experiência de uma docente, mãe e pesquisadora, ao elaborar uma palestra durante o período do Ensino Remoto Emergencial, decorrente da pandemia da Covid-19. A análise da narrativa nos permitiu argumentar que a produção de conhecimento foi desenvolvida pelo coletivo docente-com-*maternidade-lar*-software-e-internet, e não apenas pelo coletivo docente-com-software-e-internet. Identificamos, portanto, características do lar da docente que tiveram poder de ação ao longo deste processo e apontamos a necessidade de mais pesquisas que abordem a temática. Neste ensaio - que combina narrativas, uma vertente da teoria da atividade, e o construto teórico seres-humanos-com-mídias – a ideia de que o poder de ação do vírus sobre

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[1] E-mail: debora.soares@ufrgs.br
[2] E-mail: marcelo.c.borba@unesp.br

humanos foi assimétrico, ganhou robustez. Em particular o efeito do vírus, da pandemia sobre mães pesquisadoras é diferenciado.

Palavras-chave: Ensino Remoto Emergencial, Seres-humanos-com-mídias, Poder de Ação, Agency, Educação Matemática.

Abstract

This essay is about the agency of maternity, homes and media in the processes of knowledge construction. We relied on the theoretical construct humans-with-media, which was developed in the context of Mathematics Education and suggests that knowledge is produced by a collective of humans and non-humans. Methodologically, we analyzed a narrative, which presents the experience of a professor, mother, and researcher, when preparing a lecture during the period of Emergency Remote Teaching, due to Covid-19 pandemic. The analysis of the narrative allowed us to argue that the knowledge was produced by the collective professor-with-*maternity-home*-software-and-internet, and not only by the collective professor-with-software-and-internet. We identified, therefore, characteristics of the professor's home which had agency throughout this process, and we pointed out the need for more research that addresses the theme. In this essay – which combines narratives, a strand of activity theory, and the theoretical construct humans-with-media – the idea that the agency of the virus on humans was asymmetrical, gained strength. In particular, the effect of the virus and of the pandemic on researchers who are mothers is different.

Keywords: Emergency Remote Teaching, Humans-with-media, Agency, Mathematics Education.

Resumem

En este artículo presentamos un ensayo sobre la agencia de la maternidad, los hogares y los medios en los procesos de producción de conocimiento. Nos apoyamos en el constructo teórico seres humanos-con-medios, que fue elaborado en el contexto de la Educación Matemática y que sugiere que el conocimiento es producido por colectivos conformados por humanos y no humanos. Metodológicamente, optamos por desarrollar el análisis de una narrativa, que presenta la experiencia de una profesora, madre e investigadora, al preparar una clase durante el período de enseñanza remota de emergencia, a raíz de la pandemia por Covid-19. El análisis de la narrativa permitió argumentar que la producción de conocimiento fue desarrollada por el colectivo docente-con-maternidad-hogar-software-e-internet, y no sólo por el colectivo docente-con-software-e-internet. Identificamos, por lo tanto, características del

hogar de la docente que tuvieron poder de acción a lo largo de este proceso y señalamos la necesidad de nuevas investigaciones que aborden el tema. En este ensayo -que combina narrativas, una vertiente de la teoría de la actividad y el constructo teórico humanos-con-medios- se refuerza la idea de que el poder de acción del virus sobre los humanos era asimétrico. En concreto, el efecto del virus y de la pandemia sobre las madres investigadoras es diferente.

Palabras clave: Enseñanza Remota de Emergencia, Seres humanos-con-medios, Poder de Acción, Agencia, Educación Matemática.

Résumé

Dans cet article, nous développons un essai sur le pouvoir d'action (*agency*) de la maternité, des maisons et des médias dans les processus de production de connaissances. Nous nous appuyons sur la construction théorique humains-avec-les média, qui a été construite dans le contexte de l'enseignement des mathématiques et suggère que la connaissance est produite par des collectifs humains et non humains. Méthodologiquement, nous avons choisi de développer l'analyse d'un récit, qui présente l'expérience d'une enseignante, mère et chercheuse, lors de la préparation d'un cours magistral pendant la période de l'Enseignement à Distance d'Urgence, résultant de la pandémie de Covid-19. L'analyse narrative nous a permis d'affirmer que la production de connaissances a été développée par le collectif enseignant-avec-*maternité-maison*-logiciels-et-internet, et pas seulement par le collectif enseignant-avec-logiciels-et-internet. Nous avons identifié, par conséquent, les caractéristiques de la maison de l'enseignant qui avaient un pouvoir d'action tout au long de ce processus et nous soulignons le besoin de plus de recherche qui aborde le thème. Dans cet essai - qui combine des récits, une branche de la théorie de l'activité, et la construction théorique humains-avec-les média – l'idée que le pouvoir d'action du virus sur les humains était asymétrique a été renforcé. En particulier, l'effet du virus, la pandémie sur les humains est différente.

Mots-clés : l'Enseignement à Distance d'Urgence, Humains-avec-médias, Pouvoir d'Action, Agency, l'Enseignement des Mathématiques.

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The Agency of Media, Maternity and Homes in Mathematics Education

In Soares and Borba (2022), we presented some initial reflections on the agency of homes and maternity during the period of Emergency Remote Teaching (ERE), which was imposed due to the Covid-19 pandemic. Based on a narrative, which presents part of the experience (Larrosa, 2021) lived by the first author of this article, and on the theoretical construct humans-with-media (Borba & Villarreal, 2005), we suggested that during this period, the professor-with-home-and-maternity collective was constituted as a unit that produced knowledge. Soares and Borba (2022) was presented at a conference, in which we received suggestions that are already incorporated into this article, already matured by the exchange of ideas between the authors and collaborators.

The idea that knowledge is developed by collectives of humans-with-media has been supported for more than two decades (Borba et al., 2023). The articles reviewed in the aforementioned publication emphasized the active role of graphing calculators, software such as Cabri and environments for distance education. Thus, knowledge is, according to this perspective, produced by humans and non-humans. During the pandemic, the role of platforms such as Zoom or Meet became evident in ERE and in the countless "Lives" (synchronous online lectures). In Borba (2021) the role of a new non-human actor is emphasized: homes! The collective made up of humans with a house with independent rooms for home-office or ERE started to have a different agency than a collective without adequate spaces. But not only that, in addition to the house, it also depends on the role of the people who worked in these houses. For the second author of the article, with adult children, it was less challenging than for the first author, who, in addition to teaching activities, dealing with technologies, had to take care of household chores and still small children. It is her experience that will be the protagonist of this article. During the pandemic, digital technologies had a highlight never reached before, but as we will see, homes, and the role played in the home is social, and influences the class that is taught, the research that is possible to produce.

In this article, in order to analyze the experience of the professor, methodologically we chose to write a narrative text, relying on Freitas and Fiorentini (2007). For these authors, narratives are used to understand the experiences we live and to interpret them, which mobilizes our beliefs and values. In this sense, the narrative is understood "as a special way of interpreting and understanding the human experience, taking into account the perspective and interpretation of its participants" (Freitas & Fiorentini, 2007, p.63). We are inspired by "narrative analysis" (Freitas & Fiorentini, 2007) and, starting from a narrative, we will make considerations about

the role of the home, motherhood, and technologies during the ERE period, relying on theoretical references about the use of digital technologies in Mathematics Education.

Narrative: experiences of a mother-researcher during the ERE

The invitation was made and accepted... even with a "hole" in the curriculum and with no news in terms of research, I had confirmed leading a seminar, in the SMEM series, at UNESP, Rio Claro (the university where I completed my PhD), using Meet, presenting a lecture… I booked an afternoon in my schedule to start this preparation a few months in advance… I was afraid of not meeting the deadline, in view of the demands and chaos in my routine generated by the ERE, due to the Covid-19 pandemic … The theme was decided: maternity and Mathematics Education. It was not very clear in my mind yet how I was going to connect these two themes, apparently so far apart, but I felt that I needed to share with more people some ideas that had been swarming in my thoughts lately. Maybe, this way, I could free up space in my mind to carry on with my research which, at that point, was almost abandoned?

I turn on the computer and settle in front of the blank screen. Next to the keyboard, on the table, a pile of articles and books that I had set aside to consult and help me structure the lecture. I open the software for creating presentations, place my fingers on the keyboard and stare at that first blank slide… a few minutes pass without me writing anything… I start to feel anxious… my body is still, but my brain is hectic. Suddenly, the office door bursts open..

- *Mommy! Mommy!*

It's the kids asking for attention. A mixed feeling washes over me: relief that I no longer have to look at the slide; concern, because I haven't even started to write anything and I've already been interrupted... I turn around to receive the hug from the firstborn and then I take the little one in my arms, because he wants to nurse. I snuggle him into my lap and turn back to the slide. The older one wants to know what I'm doing, so I explain to her that I need to work and put together a presentation. She wants to work on the computer and, curious, moves the mouse and types a few letters on the keyboard, at random… "At least the slide is no longer blank", I think.

After a few more minutes, I invite them to play in the living room. They don't want to go, after all, if we are all at home, doesn't that mean we're on vacation? I remind my daughter that she is not going to school because of that annoying virus (Covid-19 virus) that is making people sick and, for now, we need to stay at home to stay safe. With some creativity, I manage to convince them to go and play in the living room while I try to advance the work a little.

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I decide to go back to the articles that were printed in the pile on the table. I reread some of the marks I had made with a highlighter pen in the passages that I found most relevant. I interrupt the reading when my daughter calls me and offers me a make-believe coffee and cake. I answer that it's delicious and she leaves happy looking for another delicacy... I try to organize my ideas, working out a general structure for the presentation. As soon as I finish this first stage, I hear the little one crying in the living room... "he got hurt", I thought...I pick him up, give a hug and a kiss to make the pain go away and I take the opportunity to organize the afternoon snack...

I look at the clock and note that it's time for a meeting. I let the children watch a cartoon, since my husband is also working. I connect to the university's web conferencing system. After a few minutes, the cartoon ends and the little one looks for me to nurse. He comes onto my lap, waves at the camera, and snuggles. I reposition the webcam.

Once the meeting is over, I have half an hour available until it's time to start organizing dinner. I go back to the computer and say to myself: "write something, later you can revise it"... I try to follow my own advice and write down some ideas that come to mind, without paying too much attention to whether they are perfectly articulated. My available time ends and I go to the "end of the day" routine with the kids... dinner, bath, story, bedtime...

As I lullaby the kids, I mentally go over activities I still need to finish... unread emails, student assignments to grade, course planning, student texts to review... and the presentation! I can't leave it for later! Sleeping children... I put the little one to bed and go back to the computer. I open the presentation file again, revise the structure I had set up and start creating the first slide. With the silence at home, I am able to concentrate more and get on with my work... I take advantage of the fact that the rhythm is better and I search the internet for other texts that I need, as well as resume some WhatsApp conversations that I exchanged with my advisees, whose master's research will be mentioned in the presentation. I don't even finish doing this survey, I hear the little one calling me from the bedroom. I go check on him resolved to get back to work a little more before going to sleep....

My body, on the other hand, decides it needs to rest... when I wake up, it's morning.

The Narrative as a way of Understanding Experience

Larrosa (2021) teaches us that "experience is what happens to us, what touches us. Not what goes on, not what happens, or what touches" (p. 18). Still, it is "experience that which 'passes us', or that touches us, or that happens to us, and, by passing us, forms and transforms

us. Only the subject of experience is, therefore, open to its own transformation" (Larrosa, 2021, p. 28).

When presenting the previous narrative, we consider that it reports an experience, according to the perspective of Larrosa (2021), as it was not a situation that just went by, that just happened; it was, indeed, a situation that transformed the teacher, as it constituted challenges and also raised anxieties, fears and reflections. Larrosa (2021) stated that:

> The experience, the possibility that something happens to us or touches us, requires a gesture of interruption, a gesture that is almost impossible these days: it requires stopping to think, stopping to look, stopping to listen, thinking more slowly, looking more slowly, and listen more slowly; stop to feel, feel more slowly, linger over details, suspend opinion, suspend judgment, suspend will, suspend the automatism of action, cultivate attention and delicacy, open eyes and ears, talk about what happens to us, learn to be slow, listen to others, cultivate the art of encounter, be silent a lot, be patient and give yourself time and space. (p. 25)

The narrative presented above tells an experience that occurred during one day in the life of the first author. However, situations like these were repeated several days, in a similar way, over more than a year. These events began to require a pause, an attentive look, a slowness. They also demanded to talk about what was happening, listen to others, "be patient and give yourself time and space" (Larrosa, 2021, p. 25). And, throughout this process, fear was transformed into courage to talk about and advance in reflections related to themes involving motherhood, research, ERE and mathematics education. This movement can be illustrated by the following excerpt from the narrative:

> The theme was decided: maternity and mathematics education. It was not very clear in my mind yet how I was going to connect these two themes, apparently so far apart, but I felt that I needed to share with more people some ideas that had been swarming in my thoughts lately.

In Soares and Borba (2022) there is a narrative of the feelings experienced when receiving the invitation to present the lecture: "the butterflies in the stomach" and the doubt of what to do in view of the lack of new research developed by the professor. In this article, the presented narrative registers the movement of encouragement, once the invitation had been accepted and needed to be honored. "The invitation was made and accepted... even with a "hole" in the curriculum and without news in terms of research, I had confirmed participating in the SMEM, at UNESP, Rio Claro, (the university where I concluded my PhD), using Meet, presenting a lecture...".

The narrative registers a particular experience, but, as we present in Soares and Borba (2022), has the potential to illustrate some research results presented by Staniscuaski et al. (2021), as the "hole" in the curriculum. According to these authors, race and motherhood are the main factors that impact the reduction in the number of publications by female academics in Brazil and also in other countries. In particular, in the period of social isolation due to the Covid-19 pandemic, the reduction of the support network and new demands that emerged, had a significant negative impact on the productivity of academic mothers.

Casting an attentive, curious and time-consuming look at these narratives of experiences seems potentially rich for understanding what was experienced. In this sense, we are inspired by "narrative analysis" (Freitas & Fiorentini, 2007), and our thinking is based on concepts related to the epistemological view about the use of technologies, discussed in the context of research in Mathematics Education, to reflect on the roles of motherhood and of homes in the teacher's production of knowledge during the period of social distancing.

Borba (2021) emphasized that the pandemic has brought about changes in trends in Mathematics Education: the most obvious is the change in the trend that deals with the use of digital technologies, which has come to be analyzed by researchers of all trends and all Working Groups of national and international societies of Mathematics Education. There are also, on the other hand, changes in epistemology, in the theory of knowledge. In particular, it is noticed that few still doubt that digital technologies have the power to act, and the role of homes in a thinking collective (Levy, 1993) that produces knowledge, as already alluded to above, becomes more evident. Borba (2021) also pointed out how the increase in social inequality brought about a strengthening of the Critical Mathematics Education trend, which emphasizes discussions of social issues. When watching the SMEM of the first author of the article, the second author invited her to write the article previously published in a Symposium (Soares & Borba, 2022) and then this one, which deepens and shows how the condition of women mothers in homes are distinctive. Thus, we hope that not only the role of homes and inequality are established, but also the role of the mother of young children, in a situation of intense work from home.

The Agency of Non-Humans: Collective humans-with-media that produces knowledge

In Soares and Borba (2022) we stated that the unit that produced knowledge during the period of social distancing was teacher-with-home-and-maternity. This note was based on the understanding that knowledge is produced by collectives of human and non-human actors, which is represented by the theoretical construct humans-with-media (Borba & Villarreal,

2005). In this sense, both humans and media are actors in the knowledge production process and, therefore, both humans and media have agency.

> The notion that both humans and non-humans are empowered is part of an effort to model artifacts – in particular, software, hardware, and the Internet of Things (that is, things that are connected to the Internet) – as historical, social and cultural factors in the collective that produces knowledge. It emphasizes a view that knowledge is produced (both from a philosophical and psychological perspective) by humans-with-artifacts. (Borba, 2021, p. 391).

In Cunha (2023), the concept of agency is discussed in detail. In particular, it discusses how non-human actors can manifest the agency. This notion is linked to aspects of Activity Theory - which do not understand artifacts as inert external mediators, but as co-participating agents in the production of knowledge - in articulation with the construct humans-with-media. This debate becomes even more relevant with the emergence of CHATGPT, as suggested by the editorial in this special issue of Educação Matemática Pesquisa.

In the context of Mathematics Education, the research area in which the human-with-media construct was developed, media are exemplified, in general, by technologies such as pencil-and-paper, software, internet, cell phones, calculators, blackboards and chalk, etc. As highlighted by Borba (2021), "humans-with-graphical-calculators are easier to accept as having agency than human-beings-with-libraries or human-beings-with-classrooms" (p. 7). However, the arrival of the Covid-19 pandemic and the impacts generated by it, particularly in the field of education, highlighted what, perhaps, was not so simple to accept:

> Yet despite being non-living, the virus has dramatically changed the way humans live. Viruses are closely connected to us: they cannot exist for long apart from living things, like humans, who have cells; the symptoms of COVID-19 arise under certain conditions when the virus is inside human cells. We can say that the virus has agency in the sense that it has changed the way we have to do things. This analogy helps us to understand how certain things are much more likely to happen if certain actors are present. To use the metaphor of the virus, software also needs humans to "survive." Software, and later on the Internet, has changed the environment of educational settings, in a similar way to how SARSCoV-2 has suddenly turned children's bedrooms into classrooms. (Borba, 2021, p. 392).

Thus, children's rooms and other spaces in the house became classrooms. As well as bedrooms, living rooms, offices and even other spaces in teachers' homes. As Borba (2021) observed, "SARS-CoV-2 has pushed homes into the center of a collective that produces knowledge" (p. 394), and an important consequence of this is that different house configurations will have different impacts on this process. For example, "Trying to solve a mathematics problem in a crowded house in a slum is very different than doing so in a spacious,

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luxurious apartment with a veranda" (Borba, 2021, p. 394). The theoretical construct humans-with-media and the discussion about agency is supported by the Activity Theory (Borba et al., 2023). A more complete discussion of this theory can be found in the aforementioned article and in Cunha (2023).

Narrative Analysis

Considering the aspects explained so far, it seems important to us to understand characteristics of the configuration of the professor's home during the ERE period in order to understand the possibilities and restrictions generated by them for the knowledge production process, which helps us to understand the role of the home and motherhood in this process. The Narrative brings some elements that can give us some clues about these aspects, which we will now analyze[3].

A primary characteristic that we can list is the constant interruptions suffered in the teacher's knowledge production process, as we can see in the following excerpts:

> I reread some of the marks I had made with a highlighter pen in the passages that I found most relevant. I interrupt the reading when my daughter calls me and offers me a make-believe coffee and cake.

> I open the software for creating presentations, place my fingers on the keyboard and stare at that first blank slide… a few minutes pass without me writing anything… I start to feel anxious… my body is still, but my brain is hectic. Suddenly, the office door bursts open. - Mommy! Mommy! It's the kids asking for attention.

The above reports illustrate an attempt on the part of the professor to produce a work, which cannot be developed continuously due to the interruptions of the children, who seek attention from the mother. This behavior is completely expected, considering the age of the children at the time and also their understanding of the situation: "[...] if we are all at home, doesn't that mean we're on vacation?". It is also important to observe that the interruptions were not "passive", so to speak, as they were not like a noise that interrupts the reasoning and then passes; they were interruptions that required the involvement of the teacher, as we can see from the excerpts below:

> **I snuggle him** into my lap and turn back to the slide**.** The older one wants to know what I'm doing**, and I explain** to her that I need to work and put together a presentation**.**

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[3] We consider pointing out that, when analyzing the professor's narrative, our position is not one of judgment, recrimination or complaint. As we have mentioned, the proposal to analyze such a personal narrative is in the sense of understanding what was experienced, and making visible the challenges that several teachers (and students) mothers faced during the ERE period and face until today. Our position is to welcome these women and our desire is for this topic to be increasingly visible so that it is possible to propose support policies for them.

With some creativity, **I manage to convince them** to go and play in the living room while I try to advance the work a little.

I answer that it's delicious and she leaves happy looking for another delicacy...

He comes onto my lap, waves at the camera, and snuggles. I reposition the webcam..

I don't even finish doing this survey, I hear the little one calling me from the bedroom. **I'll answer him**, determined to get back to work a little more before going to sleep....

We highlighted in bold verbs that indicate actions taken by the professor in response to different interruptions; actions that are fully justified and that value children and try to meet their demands. We observe, therefore, that, between the development of the work and the care for the children, there is a transit in the focus of thought and reasoning: sometimes on what is being produced, sometimes elaborating responses to children. Considering the reflections provided by the construct humans-with-media, we could say that there was a reorganization of the professor's thinking, generated by the development of her role as a mother and by the configuration of the house during the ERE.

Although caring for children is considered fundamental by the professor, it is impossible not to notice a certain anxiety and also self-demand, as illustrated by the excerpts below:

I booked an afternoon in my schedule to start this preparation a few months in advance… **I was afraid of not meeting the deadline**, given the demands and chaos in my routine generated by the ERE, due to the Covid-19 pandemic…

Once the meeting is over, **I have half an hour available** until it's time to start organizing dinner. I go back to the computer and say to myself: **"write something, later you revise it"**...

As I lullaby the kids, I mentally go over activities I still need to finish… unread emails, student assignments to correct, course planning, student texts to review… and the presentation! **I can't leave it for later!**

In these excerpts, it is also possible to perceive the overlapping of work-related thoughts while carrying out care activities with the children. A moment that used to be one of connection, was interrupted by other matters, with demands coming from work.

The Covid-19 pandemic and the period of social distancing brought new demands and forced the removal of the support network of many families, as well as dissolved the barriers that existed between the time to work, the time to nurse and pay attention to the children, time to take care of household chores. In many moments, these tasks overlapped, as observed in the excerpt below.:

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I connect to the university's web conferencing system. After a few minutes, the cartoon ends and the little one looks for me to nurse. He comes onto my lap, waves at the camera, and snuggles. I reposition the webcam.

As Soares and Borba (2022) point out, moments that were intimate and of connection between the mother and the children, at various times began to be exposed to other people outside this circle. Further, tiredness and often night work, in order to cope with the demands, became a frequent reality.

Sleeping children… […] **With the silence at home, I manage to concentrate more** and move on with the work… […] I don't even finish doing this survey, I hear the little one calling me from the bedroom. I go to nurse him, determined to go back to work a little more before going to sleep… **My body, on the other hand, decides that it needs to rest… when I wake up, it's already morning**.

As reported in the previous excerpt, a quieter environment was an important motivation for the work to be carried out during the night, after the children went to sleep, and that it lasted as long as possible, even if it invaded the early hours. This environment was also important for the consolidation of exhaustion. After many days with similar routines, the body could not keep up with the desired production rate. It is worth noting that the characteristics mentioned so far can be present in a mother's life, regardless of the Covid-19 pandemic. However, the intensity with which all of them occupied time and space during the ERE was maximized.

In summary, the discussions we have had so far allow us to identify that the professor was producing knowledge in an environment with the following characteristics: frequent interruptions in work moments, which required an active response from the professor; concomitance between moments of work and care; exhaustion and high emotional demand. All this, in an ERE context, in which the media played a prominent role and even dominated the possible forms of communication. We ask ourselves: in what ways could an environment with this configuration impact the knowledge production process?

As we noted earlier, the concept of agency highlights the power of something to transform our lives, our way of thinking and even acting. The analysis of the narrative above allows us to understand that the knowledge production process was affected due to the characteristics of the professor's home during that ERE period. It is clear that each home has a different configuration and, in this sense, we can consider that "[...] the notion of agency should be seen as something "diffuse", [...] in which we can have degrees or nuances of agency" (Borba et al., 2022, p. 115). In this sense, Soares and Borba (2022) observed that "depending on the characteristics of this motherhood, for example, the presence or absence of a support network, the age of the child, the specific demands of each child, physical and mental health of the

mother, and *n* other factors, the agency of motherhood will be different" (p. 10). Likewise, we understand that different characteristics of homes will promote different degrees of agency in knowledge production processes.

So far, we have highlighted in the analysis of the narrative configurations of the professor's home that refer us to her role as professor and mother, simultaneously. However, there is another characteristic to be considered in this ERE context: the presence of digital technologies.

> [...] I had confirmed participating in the SMEM, at UNESP, Rio Claro (the university where I studied my doctorate) using **Meet**, presenting a lecture …

> I open up the **presentation-making software**, place my fingers on the keyboard, and stare at that first blank slide.

> **I connect to the university's web conferencing system.**

> I take advantage of the fact that the rhythm is better and **search the internet** for other texts that I need, as well as resume some **WhatsApp** conversations that I exchanged with my advisees, whose master's research will be mentioned in the presentation.

The narrative excerpts presented above illustrate that the professor had access to digital technologies. The planning of her lecture was developed using these technologies: the computer, the software to create presentations, the internet, Meet... In other words, the lecture was produced by the collective professor-with-computer-software-and-internet and was presented by the collective professor-with-Meet. But, the analysis of the narrative developed so far leads us to understand that other actors were involved in this process, with agency. Thus, we can say that the lecture was produced by the collective professor-with-maternity-home-computer-software-and-internet. Or, still, by the collective mother-professor-researcher-with-home-computer-software-and-internet.

The narrative above also illustrates the dominant mediation of these technologies for communication during the ERE period: meetings were held via web conferencing; entire conversations were developed by apps like WhatsApp, either by text message or by audio exchanges. In particular, moments of concurrence between meetings and child care, for example, were possible due to the use of these technologies. This could be perceived, initially, as an advantage, since it became possible for this mother to participate in a work meeting and, simultaneously, breastfeed her child, as reported in the narrative. I mean, it wouldn't be necessary for her to deprive herself of taking care of the child at this time. However, looking more carefully, would that really be an advantage? Returning to what we mentioned earlier, the

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moment of care and connection with the child started to be invaded by work. It seems to us that this is yet another example of the agency of these media, on which we need to direct a careful and cautious look. The agency of the virus, which led us to "stay at home", results in an intensified use of digital technologies in professions, such as teaching, so that the life of a mother was intertwined with the life of work in a much more intense way.

Borba (2021) pointed out that the news reported the anguish of teachers with the demands of communicating with students and family members through applications such as WhastsApp and other social networks during the ERE. Reports that corroborate these news and other challenging situations involving this period can be found in works such as those by Bueno (2021), in which students with Mathematics majors share their experiences during their teaching internships during the ERE. Closed cameras, little participation of students in classes, difficulties in monitoring the development of students, and children's difficulty accessing the internet, are some of the aspects mentioned by research participants. On the other hand, there are studies showing that there was greater participation and use of digital technologies, such as those by Villa-Ochoa et al. (2023), which highlights the diversity of experiences that occurred during the ERE period.

We believe that the narrative was a powerful methodological means for this exploratory study on the centrality of motherhood in collectives that bring together humans and non-humans to produce knowledge. Soares and Chiari (2023) present two other narratives that can bring different insights about the role of motherhood in these collectives. As already mentioned, the agency is fuzzy and has different degrees. Borba (2021) suggested that "The idea of seeing fuzzy agency in non-humans should be developed further to include not only good access to internet, but to housing, which is a site of brutal inequality in Brazil and elsewhere" (p. 394). In this same direction, it seems to us that it would be important that more systematic studies, even with the pandemic under control, be carried out to investigate the "degree of agency" of maternity, homes and digital technologies in the production of knowledge (in mathematics education). How to think of a fuzzy degree for motherhood? And its combination with homes and digital technologies? It is possible that measuring degrees of fuzzy is not adequate, but that this notion can be used to think about the role that different factors - human, non-human and the border-integration between both - have in the production of knowledge in mathematics education.

Final Remarks

In this article we emphasized a different side of the agency of a virus, of homes, of non-humans, on the lives of humans. In particular, the way in which the pandemic – caused by this "thing" virus, which biologists cannot decide whether it is a living being or not – impacted a certain group of humans: mothers. When preparing classes to teach at UFRGS, or a lecture, called Live, during the pandemic, given by a collective of professor-with-Meet-platform, other non-human actors appear with a relevant role. Of course, there is the role of the computer, the application for presentations, the internet, and these have already been discussed in depth in several studies, such as those developed by GPIMEM, where the first author is an associate researcher and the second is a coordinator. Research related to the first four phases of digital technologies in Mathematics Education synthesize such concerns (Borba et al., 2014). On the other hand, in the fifth phase (Borba et al., 2022), characterized by the widespread use of digital technologies, it is thought to emphasize how non-human actors affect humans not only cognitively, or existentially, but in their daily lives, in their experience.

During the pandemic period, mothers like Débora Soares had not only the first, but the second and third workdays developed in a combined and overlapping way. According to Talavera (2020), the first workday refers to unpaid domestic work; the second shift corresponds to paid work; and the third journey comprises "a general duty of care in the management of the home and the cohesion of the affective bonds that promote the personal, social and economic balance of the family" (Talavera, 2020, p.154), as well as the professional qualification demanded by the world of work. Issues related to the invisible work of women has been presented for decades (e.g. Borba et al., 1998). We wonder if, during the ERE period, it would not even be possible to identify n-the work shifts.

This is how mothers-professors-researchers-with-homes-and-technologies produced new knowledge, taught classes and at the same time helped their children to become students, and "took care of the house". Children, parents, single people, etc. were also affected, but it is clear that mother-teachers had to unfold in "n" roles. There is no doubt that what D'Ávila (2019) discusses in her book about the social role attributed to mothers in comparison to fathers needs to be considered. As this author points out, one does not live in a bubble and games and programs shape children from an early age. Thus, children "naturally" sought out their mother more than their father.

The analysis of the narrative presented here makes visible part of this journey and the demands experienced by a mother-professor-researcher during the pandemic. We relied on the

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construct humans-with-media and in the concept of agency as elements that would help us to understand what was lived in this experience, and we found indications that other actors besides humans and media have agency in the processes of knowledge production. In our analysis, we highlight the agency of home and motherhood. Other actors may be part of this collective, such as implicit bias, gender stereotype (Staniscuaski et al., 2021) and the double standard (D'Ávila, 2019). We invite the community to broaden this debate and take a close and curious look at these issues.

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