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SOCIO-TECHNOLOGICAL ENROLLMENT AS A DRIVER OF SUCCESSFUL DOCTORAL EDUCATION

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ABSTRACT

Aim/Purpose	This article uses the enrollment approach contained in the Actor-Network Theory (ANT) to challenge the deterministic perspectives of doctoral socialization and offers a new perspective based on co-construction between social and technological entities mobilized during the doctoral education as a driver of success.
Background	Most studies have used deterministic approaches to show that the success of doctoral education is the outcome of socialization as shaped by the individual/personal, racial/ethnical, national/cultural, organizational/institutional and disciplinary contexts in which supervisors and supervisees cooperate. In doing so, they overlook the complexity of student-supervisor relationships and the gradual power-based processes of negotiation and persuasion that make the doctoral education successful. Analyzing the author's own doctoral journey, the article highlights that the doctoral success is rather the result of a socio-technological enrollment as reflected in power-based supervisory politics.
Methodology	The methodological approach consisted in an autoethnography that self-reflected on all stages of the doctoral processes and the author's collaboration with his thesis supervisor from March 2012 until October 2016.
Contribution	This paper reveals that the use of an approach of co-construction between technology and society also makes it possible to better understand the relationships between students and supervisors and the implications for socialization in a doctoral setting.
Findings	The success of doctoral socialization is not necessarily a matter of individuals, disciplines, or contexts, but rather it depends on the level of articulation and implementation of the supervisory politics inspired by the imbalanced power relations among those involved. The deconstruction of the doctoral supervisory politics reveals that enrollment is an important component that mobilizes human and non-human resources from various scales. Enrollment strategies play a key role in how doctoral students start, progress and complete their doctorate.

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Recommendations for Practitioners	The results and analysis on socio-technological enrollment-based doctoral education can be useful in the context of support policies towards improving student supervision and facilitating doctoral studies in higher education.
Recommendations for Researchers	The paper invites researchers in sociology, anthropology, psychology, education sciences, and other scientific disciplines to a theoretical reconsideration of student-supervisor relationships in the context of research and support to higher education.
Impact on Society	The content of this article will help improve collaboration among supervisors and supervisees in higher education and could, thus, contribute to reducing attrition and doctoral dropout.
Keywords	doctoral education, doctoral socialization, PhD students, supervisory politics, Actor-Network Theory (ANT), socio-technological enrollment

INTRODUCTION

The relationships among doctoral students and doctoral fathers/mothers (directors, coaches, mentors, or supervisors) are described in the scientific literature as a two-way street: either they evolve in the direction of a good mutually functional collaboration, or they degenerate into dysfunctional conflict that is detrimental to both partners (Gill & Burnard, 2008; Gunnarsson, Jonasson, & Billhult, 2013). A good relationship between a doctoral student and his or her supervisor is so important that most of the universities across the world provide specific regulations in managing crises, as they often occur. In the doctoral study book of the Faculty of Social Sciences of Göttingen (Germany), the rules on thesis committee composition provide that "a change in the primary supervisor [is possible] […] where further advisory support is no longer acceptable due to a breakdown in mutual trust" (Faculty of Social Sciences, 2016, p. 37; emphasis added).

Authors put emphasis on PhD supervision as being a complex and soft process. For the purpose of providing useful advice for coping successfully with the challenges of doctoral supervision processes – resulting in building new expertise and creating a new colleague – Watters, Marche, and Pelzer (2008) point out that "supervision is not an exact science and varies not only on an individual basis but also along disciplinary lines. Sometimes this relationship works out terrifically and sometimes not so!" Gérard (2013, p. 154) also adopted the same perspective and revealed that PhD supervision must be taken as contextual help, in that it differs from one discipline to another along binomials, since the supervisor must adapt to the PhD student and their degree of socialization. Gérard (2013) conceived the supervisor-doctoral student relationship as an activity including support in writing a doctoral thesis and also as an accompaniment to integrating the doctoral student in the researcher's profession within a disciplinary field. The collaboration between supervisors and their doctoral students appears as the intersection of two social entities resulting in a written scientific treatise (dissertation) and beyond. This allows for the continued socialization of the students including various other activities that integrate them into a discipline and a future profession.

Socialization in doctoral education has been one of the central topics in studies of doctoral processes, as was apparent in recent literature reviews by Jones (2013) and Bastalich (2017). It is known for preventing isolation and alienation, reducing attrition, and improving student retention and success in doctoral studies (Ali & Kohun, 2007; Barnes, 2010; Gardner, 2008a, 2008b, 2010a, 2010b). A socialization perspective sees students in doctoral journeys as gradually acquiring knowledge, skills, values and attitudes towards building appropriate professional behavior through interactions with their supervisors and colleagues (Bastalich, 2017; Boud & Lee, 2005; Gopaul, 2011; Holley, 2009). Effective doctoral socialization results from successful supervisory relationships that provide students with necessary resources for integrating into their academic discipline and culture and achieving profes-

sional goals (Ampaw & Jaeger, 2012; Barnes, Williams, & Archer, 2010; Bastalich, 2017; Bragg, 1976; Felt, Igelsböck, Schikowitz, & Völker, 2012; Golde, 1998; Halse, 2011).

Most studies emphasizing the value of socialization in doctoral education treat it in a "deterministic" way, based on actors (i.e., individual traits, characteristics, identities, cultures, backgrounds, and experiences), environments, phases, activities, and practices. The general trend is that socializing a student into a new discipline, or integrating the student into a professional network, is seen as the outcome of the supervisor-supervisee relationships as shaped by the individual/personal, racial/ethnical, national/cultural, organizational/institutional, and disciplinary contexts in which they cooperate (Becher & Trowler, 2001; Felder, Stevenson, & Gasman, 2014; Gardner, 2008a, 2008b, 2010a, 2010b; Gemme & Gingras, 2006; Skakni, 2011; Weidman, 2006; Weidman & Stein, 2003; Weidman, Twale, & Stein, 2001). Jones (2013, p. 99) summed up this approach well, arguing that "the student-supervisor relationship looked at *elements which work* to ensure an optimal relationship between the student and their supervisor" (emphasis added). For example, Gardner (2008b), focusing on how minorities or underrepresented populations "fit the mold" of doctoral education, came to the conclusion that socialization according to the disciplinary and institutional contexts produces different results for women, students of color, older students, students with children, and part-time students.

Beyond these passive perspectives of analyzing attrition and retention geared towards the identification of personal and/or situational factors of doctoral success, recent studies, notably those of Goller and Harteis (2014), have used the professional agency approach to study how doctoral students shape their own experiences. This more actor-oriented perspective conveys that doctoral candidates as "agentic" constructors influence their own academic development and success by relying on "proactive networking, negotiation of external demands and deliberate information and feedback seeking" as part of their professional agency. Despite the advances made by these various works on the understanding of the relationships between supervisors and students in the graduation framework and the success of the doctoral candidates, they failed to highlight how the power relations play in the definition of roles and the alignment of interests of actors for successful doctoral education. The authors did not discuss the game plays of those involved and the processes through which they continuously negotiate their commitments towards a successful socialization throughout the doctoral education. Little has been written on the political dimension of the supervisory relationship, although there are politics in the way an experienced researcher or academic decides to devote time and resources (intellectual, social, material, or financial) to socialize a novice in a discipline where there is already an expert.

Looking more closely, socialization does not take place on its own, based simply on individual backgrounds, activities performed, or according to the goodwill of actors submitting to the dictate of academic institutional norms and procedures or according to the influence of circumstances. In this article, I take a different posture, assuming that the socialization of a student is dependent on sociotechnologically implemented politics whose success depends strongly on the level of enrollment of one partner in an actor-network set up by the other. In the context of this article, I refer to my having been enrolled by my supervisor, but there is also the possibility that some supervisors are enrolled by their students. The objective of the article is to give a full account of how I became a PhD holder. I was driven by the ambition to better understand the processes through which a student like myself, with a disciplinary background in agronomy and pursuing a related professional vision, can become a scientific "product" of a supervisor who is a specialist in anthropology, with his own vision on scientific research and academic careers. Making use of enrollment in an actor-network as an analytical concept, I sought to answer the question about how socialization is negotiated in supervisor-supervisee relationships during doctoral education. This could help deconstruct the doctoral supervision politics, while laying the foundation for theoretical reconsideration of the processes through which students become experts in a field through mentorship.

THEORETICAL BACKGROUND: MICRO-POLITICS AND ENROLLMENT IN AN ACTOR-NETWORK

Actor-Network Theory (ANT) provides abundant resources to decrypt the micro-politics that lead to socio-technological change. This theory was developed by Bruno Latour, Madeleine Akrich, Michel Callon, and John Law as an approach that challenges the classical sociological analysis by further questioning social links, machines, objects, users, and scientific practices (Akrich, Callon, & Latour, 2006; Callon, 1986; Latour, 1986, 2005; Law, 1992). Basically used in analysis of science and technological innovation, it offers a great opportunity to address complex socio-technological systems by observing, describing and analyzing actors' practices and strategies (Duarte, Rosa, & Seruya, 2006; Geisler & Wickramasinghe, 2015; McLoughlin, 1999; Zangana, 2017).

As ANT is based on the premise that there is no difference between nature and society, it offers material-semiotic tools, sensibilities, and methods to capture how human and non-human resources federate to give rise to associations, assemblages, or heterogeneous networks. It is a matter here of considering that nothing is purely technical or purely social in our attempts to explain socio-technological change, but that everything in the world is the result of co-construction between different entities of unforeseeable nature and scale (Law, 2008; Wickramasinghe, Tatnall, & Bali, 2010). In other words, ANT globally rejects any perspective that establishes *a priori* differences between technological resources and societies in making the socio-technological change occur (Sismondo, 2010, p. 81). Rather, it considers socio-technological change as a result of more complex co-construction processes, bringing various heterogeneous components to undergo an engineering that propels them into a stable configuration (Law, 1992, 2012; Vinck, 2012). Destabilizing the former socio-technological order leads to the emergence of a new order – a new assemblage or actor-network involving new arrangements and new connections (Vinck, 2012, p. 136). From a descriptive perspective, relationships between natural or human-made stuffs or artifacts (material), and concepts, ideas, and understanding (semiotics) are more easily uncovered (Zangana, 2017). The material-semiotic approach makes it possible to account for how a new and more or less stable socio-technological order is set up in place of an old order, based on engineering of scientific, technological, and social events, actions, and organizational processes (Law, 2008; Tatnall, 2010).

The socio-technological constellation put in place from both human and non-human players is assumed to be the result of a *translation*, a concept which reflects the process through which social or technological forces are dissociated from the initial networks to which they belong, to be recruited and integrated into an emerging socio-technological network. Callon and Latour (2006, pp. 12-13) proposed a more comprehensive definition referring to "all negotiations, intrigues, acts of persuasion, calculations, violence, thanks to which an actor or force takes, or causes to be conferred on itself, authority to speak or act on behalf of another actor or force". By saying "we" for example, an actor "thereby translates other actors into a single aspiration of which he becomes the master or the spokesperson. He gains power. He develops […]". Translation could then be seen as "politics" of change, whereby some actors try to gain power by mobilizing strategically the necessary human, technological and persuasive resources for success. Attempts by the French researchers concerned about the decline of scallop population in St. Brieuc Bay (Callon, 1986) and those by news producers in Kurdish newsroom networks (Zangana, 2017) can be cited as examples.

Four main steps lead to a successful translation (Callon, 1986). As part of a *problematization*, some actors raise the need for socio-technological change and identify and target other human and non-human entities to eliminate or recruit, as appropriate, to ensure success. In targeting issues and defining the roles of other stakeholders, they make themselves unavoidable to be able to achieve success, thereby becoming *obligatory passage points* (OPPs). An OPP, in translation language, refers to the actor who strategically poses as the indispensable and inescapable channel, transforming initially personal interests into collective aspirations, indicating to other actors the direction to follow, representing them or speaking on their behalf, as part of solving some identified problems and bringing an action-

program or an actor-network into being. The OPP gradually – through speeches, objects, or devices, etc. – dissolve the ties that bind the other actors to their former networks by seducing, attracting, and integrating them into the new network in process. This is the *interessement*, which deals mainly with the resources involved in the process of negotiating and taking into account the interests of the different actors, who must agree to cooperate in order to make the intended network a success (Tatnall, 2014). Callon (1986) framed "interessement" as the group of actions – using various devices – by which an actor tries to impose and stabilize the identity of the other actors that they define for the resolution of the problematized issues. There is no obligation for an actor to accept and pursue the roles assigned to them by other actors; some actors may not accept playing the game and may place their identity, goals, and interests in other projects or tasks (Gunawong & Gao 2010; Zangana, 2017). When actors are well "interested", they then undergo the *enrollment* that stabilizes them in their roles as defined in the dynamics of problematizing, to play their part to the collective success. The enrollment supposes that the actors involved accept their respective roles and positions during the process and put their interests in order within the network. Finally, all human and non-human entities mobilized adjust to achieve alignment by which the new network is consolidated and become somehow stabilized. This *mobilization* of allies results in a "sole" and "ultimate" spokesperson and a more or less stabilized network (Callon, 1986).

Instead of focusing on the entire process that "translated" me from agronomy to anthropology, and specifically to Science and Technology Studies (STS), this article considered the enrollment, perceived as fundamental for once-diverging interests to be put in line and for establishing an actor-network (McLoughlin, 1999, p. 94). This choice also responds to the logic that not every step of translation is carried out one after the other as an ordered series in the network under construction (Lilley, Lightfoot, & Amaral, 2004; Zangana, 2017). Callon and Law (1982, p. 622) summarized the theory of enrollment in its most simplified version, which is to scrutinize the ways in which a provisional order is proposed and achieved through aligning various actors' interests. The study of this alignment highlights the "political" and conflictual nature of interactions between actors, the existence of choices and their ramifications, the diverging interests and visions according to the actors, and the need to create agreements, alliances, and compromises without which success would never be possible (Vinck, 2012, p. 140).

From this perspective, I asked myself, how is it that my scientific and professional interests and those of my supervisor lined up so that I successfully completed my PhD and achieved better socialization in anthropology? Influenced by the ANT approach, I kept in mind that this was not innocuous, and that one of us certainly enrolled the other; and that one of us was disconnected from his former network to become part and parcel of a new actor-network initiated by the other. Talking about a network implies that other "actants" were also involved, since the "successful networks of aligned interests are created through the enrollment of a sufficient body of allies, and the translation of their interests so that they are willing to participate in particular ways of thinking and acting which maintain the network" (Walsham, 1997, p. 469). Hypothesizing that a successful enrollment process took place between me and my supervisor, I also admitted that several social and technological allies were mobilized and cooperated until this happened. Then, it became important to identify these allies and the roles they played in the success of my doctoral studies, as consented and successfully guided by my supervisor. The decryption of my doctoral socialization will definitely highlight the continual processes of persuasion and control as they enable behavior change in the actors who finally act in accordance with a set of socio-technological arrangements (Allen, 2004, p. 172).

METHODOLOGICAL APPROACH

As shown above, ANT appeared as an interesting approach to look at the PhD in the making and to better understand the doctoral processes. Latour and Woolgar (1986), through their ethnographically inspired study of scientific practices in a laboratory of the Salk Institute for Biological Studies, highlighted the social processes through which scientific facts are constructed. The processes studied in

"laboratory life", and which inspired many other academics in the production of scientific knowledge, could also be studied in the doctoral arena. From this ANT-oriented perspective, I considered in this research the doctoral setting as a "laboratory" where various social or technological ingredients are mixed together in making a PhD student totally socialized in the chosen discipline and better prepared professionally. To thoroughly decrypt the supervisor-supervisee collaboration in the doctoral context, I adopted an autoethnographic approach that was open to all ways in which I could understand better and follow up the professor supervising my doctoral research and supporting me to become a well-equipped anthropologist.

Postmodern-oriented and linked to debates on reflexivity and voice, autoethnography has emerged in recent years as a promising qualitative research method that give researchers the opportunity to extend, in a very personalized way, sociological understanding of cultures and social processes from their own experience (Choi, 2016; Dean, 2018; Ellis, 2004; Ellis, Adams, & Bochner, 2011; Ellis & Bochner, 2000; Pelias, 2003; Sparkes, 2000; Wall, 2006). It challenges conventional methods in social science research to draw on more evocative and personal turns, mobilizing new and unique ideas and feelings of the researcher, which contribute to building interesting yet equally valid scientific knowledge. This is based on the premise that "an individual is best situated to describe his or her own experience more accurately than anyone else" (Wall, 2006, p. 148). Within this framework, it mobilizes non-linearly and fluidly various sources of data including personal diaries and notes, interview notes and transcripts, poems, artworks etc., analyzed thoroughly through "discussion, introspection and thought" (Wall, 2006, p. 150). The power of autoethnography as "action research for the individual" lies especially in that it can also be used alongside other formal qualitative research methods and be shared through various styles and structures, including "short stories, poetry, fiction, novels, photographic essays, personal essays, journals, fragmented and layered writing, and social science prose" (Ellis & Bochner, 2000, pp. 739-757).

Alongside ANT, which is also open, flexible, and rejecting all *a priori* distinctions between natural and social, autoethnography appeared relevant in accounting for my interactions with my thesis supervisor and in better understanding doctoral socialization. The data used are those from my everyday interactions with my supervisor in various settings, since our first contact in March 2012 until October 2016 when I defended my thesis. With all the methodological flexibility involved, I was able to mobilize data mainly from "email exchanges" and "face-to-face communications" with my supervisor, and "participant observation" in the doctoral setting. Throughout my doctoral studies, I have often exchanged with my supervisor in French in contexts involving only the two of us; but all discussions involving a larger group of supervisees and/or other non-French-speaking colleagues were in English, and a few times in German. For the purposes of this article, I translated all excerpts of discourses, email texts, and personal notes into English. In all written texts, oral speeches and observed actions, I traced how enrollment as stated in ANT actually occurred, and which allies were mobilized for its success. The overall analysis of the data consisted of looking in-depth into the links between them in order to grasp the general understanding that emerges concerning the success of a doctoral education. However, the data were processed and analyzed based on their sources, some during the graduation process and others after my defense, as I explain hereafter.

Electronic Communication

I set up a database of 150 emails my supervisor exchanged with me between March 2012 and October 2016. These were messages directly addressed to me or to the entire student body that he supervised. Electronic messages are not passive means of communication between actors who are producers or recipients of information and data. Rather, they are rich media through which various meanings are actively produced, beyond the dictionary meaning of the words used to compose these texts (Lee, 1994). Taking inspiration from Lee, I considered that there is the "world" of my supervisor standing behind any of his email communication. Therefore, the understanding I had of his email texts could include, and even transcend, what he himself had in mind. Enacting meaning for his vari-

ous emails, I came to make sense of his supervisory politics by seizing the social realities behind his electronically transmitted bytes (Lee, 1994, p. 153).

Face-to-face Discussion

The discussions I had with my supervisor during my three years of thesis preparation were also considered to the extent that they offered me opportunities to take notes to follow the course of the events taking place. These were dialogues (i.e., between only two people), usually in his office (an average of two meetings each lasting an average of 30 minutes per semester), or in my office only rarely. Several other informal discussions took place in various settings (after a seminar, coffee, or lunch breaks, field visits, breaks at international conference, etc.), of which I took personal notes in my diary, to be seen in this context as supervisory report or research notebook (Gill & Burnard, 2008; Jutras, Ntebutse, & Louis, 2010; Romainville, 2011). This allowed me to trace the supervisory strategy and figure out the rationale behind some practices and discourses. All these were data that I did not "provoke" in methodological terms through interviews, but were rather the products of the "natural" course of my interactions with my supervisor during my study period. Therefore, I made a conversation analysis, as the data are more "talk-in-interaction" than "artificial" empirical material (ten Have, 2007, p. 9).

Participant Observation

I conducted participant observation during STS seminars and doctoral colloquiums organized within the team of my supervisor, and conferences in larger groups within the Göttingen Institute for Social and Cultural Anthropology (GISCA). I also made observations and took personal notes during the field visits undertaken by the professor to supervise me during my fieldwork in Benin. I also visited several times the personal website of my supervisor, where he displayed his works and where each of his doctoral students, including myself, had a special page to inform visitors on their background, achievements and a summary of their doctoral project. I analyzed the practices and discourses of my supervisor in these various contexts, as this article attempts to highlight the complexity of the implemented supervisory politics. The key to the success of my observations remains in my strong integration – both in the professor's team as well as in the GISCA – as long-term immersion ensures the ethnographer a good understanding of social and cultural realities in his or her research setting (Bernard, 2006, pp. 342-386).

The limitations of my approach coincide with the general critique of autoethnography itself as a research method in a context of prevailing well-established scientific philosophy and tenets. By opting for the ethnographic self-discovery and narrating openly several pieces of stories on my relationship with my supervisor, I will certainly be reproached for being non-formal, very literal, not methodologically rigorous, highly subjective, less ethical, emotional, or "emphasizing a single" (Anderson, 2006; Campbell, 2016; Dean, 2018; Wall, 2006). However, I found it more authentic in reporting my feelings and ideas in connection with my doctoral experience, which could also serve to strengthen the autoethnographic culture among doctoral students. Therefore, "transferability" or "generalizability" might not be achieved through this article, but I myself have learned something through this experience, and my story can help many others to better understand or cope with their doctoral "worlds" – and this gives my autoethnography some legitimacy and usefulness (Ellis, 2000, p. 275). By giving meaning to my supervisor's email messages, interacting with him through various conversations, and participating in several events associated with my doctoral journey for three years, I came to the conclusion that doctoral socialization implies actively articulated enrollment politics. My posture does not necessarily reflect my current worldview, which is difficult to clarify at this early stage in my scientific experience. Depth of experience, with introspection and continuous learning, will make it possible to choose my philosophical position over time. For now, I wish to share with others, in the simplest way, what I learned from my doctoral experience, since enabling doctoral students to express themselves and document their thoughts in the form most comfortable for them is also a way to

facilitate learning and improvement (Dean, 2018). I will now get into the substance of my case, starting with my first contacts with my supervisor and what we had in common. Then, I will highlight how the enrollment occurred during the main stages of my doctoral training.

FINDINGS

FINDING A SUPERVISOR AND ENTERING A NEW DISCIPLINE

Finding a suitable supervisor is one of the keys to the success of a doctoral education. The supervisor-searching phase can cover a long period of time, but the hope is that it leads to the right person who can help the student achieve his or her objectives (Jutras et al., 2010). In my case, the search did not take long relative to that of my colleagues. I entered first into contact with my supervisor [I will keep him anonymous and refer to him with the pseudonym SUPERVISOR] in March 2012, through my home-country mentor who supervised me two years earlier to graduate in Agricultural Economics and Rural Sociology (Faculty of Agronomy, University of Parakou, Benin). He praised my work ethic, diligence, and scholastic interest in pastoralism in Africa to my prospective supervisor through phone calls, emails (one of which carried a soft copy of my graduate thesis), and an opportune two-month visit of my home-country mentor in Germany. The prospective supervisor provided a reference letter that I attached to my application in August 2011 to seek support from the German Academic Exchange Service (DAAD: *Deutscher Akademischer Austauschdienst* in German) to conduct doctoral studies at the University of Göttingen (Germany), where the supervisor is based. In March 2012, I was finally selected among the DAAD fellows of that year. After the supervisor was informed about my having been granted a DAAD doctoral scholarship, he congratulated me first and then sent me an email in which he wrote: *"Hello AUTHOR. Today I would like to send you four texts that I published on Wodaabe (Fulani) in eastern Niger. I think it would be good if you read them to begin research as part of your doctoral project. Regards"* (SUPERVISOR, 16/04/12).

As reflected in this email and the attached articles, I shared with this supervisor the same scientific interest for pastoralism in West Africa, in which he is an expert. This was also why my home-country mentor, who was a friend of the German supervisor, having been a fellow doctoral student with him in Germany, managed to establish the contact, so that I could specialize and carry out further research on issues related to pastoralism. This was the scientific partnership from which a framework for collaboration emerged, as I sought to be a DAAD fellow to also fulfill my own purpose of becoming an expert in pastoralism. I would like to highlight that mailing and sharing personal scientific achievements were the means by which my personal contact with my doctoral advisor in Germany was first established. Thus, emails and published articles were allies through which my doctoral supervisor tried to put me in connection with his works and thoughts, from which I should learn to become an anthropologist like him.

However, asking me to read his writings was not the only way through which my supervisor sought to introduce me into the anthropology of pastoralism. This was very evident in his second email with the subject line *"Reading"*: *"Collective volume by all the great names of French pastoralism, and those not listed as authors, appear as references"* (SUPERVISOR, 19/06/12). The edited volume by Toutain et al. (2012), *"Pastoralisme en zone sèche: Le cas de l'Afrique subsaharienne"*, was the first scientific book with content that should put me in contact with the great figures of French scientific research on pastoralism in sub-Saharan Africa. I then understood that doctoral research is not only a matter of a proposal, a supervisor and a scholarship, but also a matter of belonging to a "family" of scientists, becoming familiar with "big names" and celebrities in the field of my specialization. After these emails and sharing of relevant literature, my supervisor and I were not able to share further issues before my trip to Germany on 30 September 2012 to take German language classes for a semester.

The main lesson at this stage is that one does not become a PhD student of anyone, anywhere, anytime, anyhow, and for anything. Becoming a doctoral student is the result of choices and negotiations, the scrutiny of which helps to grasp the underpinning arrangements. This is where the doctor-

al supervisory politics starts. The friendship of my home-country mentor with my future supervisor, my "hardworking profile" in graduate studies, and my interest in pastoralism were factors that worked to my advantage in order to interest the Göttingen faculty member to agree to become my supervisor. As soon as he agreed to this, he also used various resources including a recommendation letter, congratulatory words, emails, and various scientific works by himself and other writers to put me in condition to effectively start a doctorate. This is part of the enrollment plan on which I will provide more details later. In the next section, I will present how I established personal contact with my supervisor in Göttingen and how our scientific relationship evolved over time.

Personal Contact and Dynamics of Social Integration

I informed my supervisor about my presence in Göttingen on 1 October 2012 through an email, in which I gave him some details about my accommodations in Göttingen, my registration for the language course, and my proposed visit to GISCA, where I was to spend the next three years for my research. After this initial email contact and others that followed, we arranged a face-to-face meeting. My supervisor's reply of 2 October 2012 was very clear on this point: *"Hello AUTHOR. I am glad that the trip went well and that you are settling down in Göttingen. I will be happy to see you in person after my return on 12 October. Regards"* (SUPERVISOR, 02/10/12). Thus, our collaboration was initiated. I enthusiastically replied in the afternoon of that day to agree to this meeting, which would allow me not only to see the person who would accompany me in my doctoral adventure for the next three years, but also to continue an earlier effort to better prepare my thesis proposal, which was to be ready for the next semester (Summer Semester 2013). My joy and fervor were reflected in the content of my response: *"Ok, thank you Prof. I myself am looking forward to seeing you in person. Then I think our meeting will be very interesting when you are back from the trip. Wishing you pleasant journey and welcome back in Göttingen"* (AUTHOR, 02/10/12).

Through friendly addresses conveying interest to meet me personally but also to have me well integrated into my new living and working place, my supervisor managed to enroll me in his interactional model. This strategy was reinforced when I was included in various groups of new students to visit the different compartments of GISCA and to view its ethnographical collection, the assets of which my supervisor profusely advertised. I certainly was not the only one targeted by this showcasing (see Bierschenk, Chauveau, & Olivier de Sardan, 2000, p. 27; Bierschenk & Olivier de Sardan, 1997, p. 448; Djohy, 2017, pp. 238-244), through which the GISCA staff members praised the qualities of their institution in order to recruit new students and visitors. Doubtless, this brokerage fostered my social integration, with my supervisor being very accustomed to his role as a broker. The prestigious nature of the university and the international dimension of its ethnographic department, highly lauded to me through words and internal guided tours, were all sources of motivation to seek a doctorate from the University of Göttingen. Without being inactive in what was happening, I paid special attention to the formulation and content of my words and messages, so as not to give a poor image of me to this supervisor whom I had known only virtually through email exchanges and photos of him I had found earlier on the Internet. This was my precautionary approach towards someone whose character and way of being and acting were totally unknown to me. I will now present how we started working together on my research project and the other forms of enrollment that occurred during our collaboration.

Enrollment in Proposal Preparation

At my first meeting with my supervisor on 4 December 2012, he asked me which authors I had read in anthropology. As an agronomist who had only a few months of specialization in Rural Sociology, I certainly did not have the right references that could convince my supervisor. The few names I was able to cite awkwardly that day could not exceed some less known authors that I had come across during my agricultural studies and my initial research experience in Benin. I had not yet finished revealing my lack of adequate knowledge when my supervisor replied: *"AUTHOR, do not strain yourself*

for that, there is no problem if you do not know. You came here to learn, so there is no problem" (personal notes, 04/12/12). Thus, my first scientific challenge was clearly posed: getting to know the good references that my supervisor wanted to hear became one of my major concerns while in Göttingen. By laying bare my shortcomings and engaging my interest to fill the gap, my supervisor made me align with what he regarded as "good references", as will be shown later in this article. My supervisor provided me with an office, so I could also access office stationery and facilities (printing, scanning, photocopying, and telephoning) at the institute as part of my doctoral training. This confirms that the supervision of a thesis is not only of a relational nature; it also depends on the provision of various material and financial resources (Jutras et al., 2010). Details on this point will be provided below.

My research proposal initially submitted to the DAAD was entitled *"Adaptation capacity of West African migratory animal husbandry facing climate change: cases of Benin and Niger"*. The presence of Niger in this title and the research proposal was to take into account my supervisor's interests; I learned that he had much scientific interest in the Wodaaɓe pastoralists in Niger. This could be seen as an attempt on my part to enroll him in my own actor-network. Through this project, I was aiming broadly to analyze how pastoralists adapt to the spatial and temporal variability of productive resources in areas bordering the cross-border Park W in both Benin and Niger. My first encounter with my supervisor was memorable, as many aspects of this proposal were set aside. I then developed a new research proposal, as I wanted to register at the University of Göttingen for the summer semester beginning in April 2013. As many doctoral students experienced in their early interactions with their supervisors (Gemme & Gingras, 2006, pp. 35-36), I was demoralized, since the multi-agent modeling approach, one of the most important aspects in my initial proposal, was completely dismissed by my supervisor: *"Your modeling, I do not do that. You cannot achieve this with me. [...]"*. I felt as if I had lost part of my ambition, as I had become too enamored with the social modeling I had come to know a few months earlier and in which I had wanted to become one of the specialists and pioneers in my home country. My great focus on climate change, on which I have been concentrating since my prior studies, was also shaken during our discussion. With a feeling of having lost my original vision, I still managed to finalize a second proposal, after three further visits with my supervisor for discussions in his office, and submitted the proposal in time for the summer semester.

Two key concepts became central to my new doctoral orientation and also seemed to match well with the aspirations of my supervisor, not to say that he was the one who led me there strategically, as I will show later: "Technologies" and "Associations" in pastoral areas in Benin. Therefore, my doctoral proposal was reformulated as follows: *"Pastoralism and socio-technological transformations in northern Benin: Implications for environmental change policies"*. As shown in this new title of the project, both of our interests seemed to be well considered. My supervisor, who was engaged in scientific debates on technologies, appeared to be satisfied with the title; while I, who specifically wanted to work on climate change, was also pleased with the subtitle. Solving "dubious advice" is a way around disagreements in tutoring relations (Gunnarsson et al., 2013). The positive outcome is that I managed to design – although this might be far from the type of excellent proposal desired by my supervisor – a proposal that finally allowed me to meet the requirements of the Faculty of Social Sciences of Göttingen University in order to start my PhD studies in April 2013. This process went simultaneous to my German courses, and I rejoiced in being officially registered at the University by the time I completed my language training.

The doctoral education at the GISCA is subject to the graduation program of the Faculty of Social Sciences of Göttingen University, spread over six semesters and including 20 credits collected after matriculation (Faculty of Social Sciences, 2016). It focuses on the preparation of an individualized curriculum in collaboration with a thesis committee of three members or authorized examiners, one of whom is the main supervisor, whose consent is the basis of registration in the doctoral course. The graduation program involves four compulsory modules for 12 credits through methodology courses, doctoral seminars, interim workshop, and scientific communications; and two elective-compulsory modules for eight credits through advanced scientific presentations, science and research

project management, scientific teaching, proposal development, planning, fundraising, fieldwork, and networking. All contributions must be confirmed by the primary supervisor by signature in the doctoral study book, which is submitted with the dissertation to the Dean's office for admission to the doctoral examination. This program, like most doctoral programs worldwide, grants the supervisor considerable power in admitting students to the doctoral course and validating their achievements, while also promoting the inclusion of the student's interests within the framework of a successful collaboration between both actors: "Not only should individual interests be taken into consideration, but also general research developments integrated in the respective discipline, and the candidate's perspective on interdisciplinary involvement should be broadened" (Faculty of Social Sciences, 2016, p. 13). With my successful admission to the program, I had passed a major milestone in my doctoral education.

Enrollment in Fieldwork Preparation

Once I had my proposal accepted and my registration as a doctoral student, preparing my field trip was the next step in my doctoral plan. But before travelling to northern Benin, where data would be intensively collected, I still had to complete a literature review on pastoralism and socio-technological change, and also to better design my research methods. On this last point, my supervisor, who was deeply engaged with STS, organized a semester-long seminar to which I was also invited. This was an opportunity to learn and become familiar with new perspectives in studying technology and society interactions and, therefore, appeared to be useful for my research. On 12 April 2013, I received from my supervisor an email with the subject *"erste Texte"* (first texts) whose content was as follows: *"Dear participants in the technology seminar, the texts sent to you with this email, will be useful in either case, if PowerFolder does not work very well. In PowerFolder is also the file "Technology seminar planning" […]. Best wishes"* (SUPERVISOR, 12/04/13).

This email for eight people, including myself, was accompanied by three files: a technology seminar plan *"Seminarplan-Technologie"*, the introductory chapter of Mackenzie and Wajcman (1985): *"The social shaping of technology: how the refrigerator got its hum"* and a paper by Pfaffenberger (1992): *"Social anthropology of technology"*. Thus, I was packed into the STS ship, as some of my colleagues who were already motivated a bit earlier than I, to this new approach and others who joined the group later on. We should read in the week and discuss every Monday afternoon the texts of various authors. In the offices of each other, also in mine, there were only names such as Bruno Latour, Madeleine Akrich, Michel Callon, Donald Mackenzie, John Law, Trevor Pinch, Wiebe Bijker, Thomas Hughes, Judy Wajcman ,and Bryan Pfaffenberger, to name a few. We should increasingly acquaint ourselves with concepts such as "assemblage", "appropriation", "inscription/de-scription" and "translation". In other words, like all of my other colleagues, I was fully *STS-ized*. This *STS-ization* made me perceive technology as what is most attractive in the world, which I came to know through my supervisor. I felt I was among the privileged young scholars in discovering the social anthropology of technology. Lots of white and recycled yellow paper, black ink, and printers available to us at the institute were dedicated to printing and reprinting – as many times as necessary in the week – articles or book chapters by the above-mentioned celebrities, as we all sought to be updated before the 4 pm session each Monday. Skillfully recruited into this new STS network, I detached myself gradually from some literature that had formed my daily bread since 2008, when I had made my first steps in scientific research.

Climate change, unadulterated, was no longer a research priority in this context, but it is taken into account in a diluted form in a research topic more oriented towards other priorities. By choice for some (my case), or possibly by necessity for others (I know nothing about the cases of my colleagues), no one could escape this new network in which STS should now guide the research projects of the largest possible number of doctoral students. Thus, my advisor managed to establish himself as the OPP (Callon, 1986), through the fact that all the doctoral projects under his supervision should pass from the specific networks of their bearers to land in the STS network, where they

would evolve successfully and be defended finally as a good piece of anthropological work. My reference to OPP does not mean that my supervisor had imposed his choice on all his students. Some of his doctoral students provided sound and sufficient reasons for not being able to take part in these sessions, and my supervisor accepted this. The choice was free and personal. Rather, I am stating that my consensual passage from my early climate change-oriented network to technology study among pastoralists resulted from an enrollment process implemented by my scientific guide.

Our Monday seminars offered even more evidence of my supervisor's enrollment politics. During one of the meetings, he brought the Anniversary Edition of Bijker, Hughes, and Pinch (2012): *"The social construction of technological systems: New directions in the sociology and history of technology",* in which he showed us a picture the authors had put in their preface (cf. p. XV). This recalled a humorous side of their first workshop held 25 years earlier on the new developments in social and historical studies of technology. This was the famous workshop that led to the first edition of this volume, which opened up the way for the constructivist and co-constructivist perspectives included in STS. Thus, we were motivated to mobilize and team up with our professor to also make substantial contributions to this STS approach, which had become his favorite theoretical orientation. This book – which we passed around to each other, all eager to discover the wonderfully commented photo – contributed to detaching each one of us from his or her personal theoretical background to become STS-oriented.

The enrollment process here should not be considered simply related to the "good" comments through which my supervisor described to us the wonders of STS and its relevance to our respective studies. It was not limited to the scenic performances of each of us doctoral candidates to reassure our supervisor that "his" STS was interesting for us by providing practical examples of aspects where we planned to use it in our research. The demonstrations of enrollment went well beyond this. On 11 July 2013, my supervisor sent to the mailing list of his team a copy of an article he was preparing to publish, with the following message: *"Dear all. For those of you who are interested I send you a draft version of a paper entitled "Relatively clever: the social nature of environmental knowledge among the nomadic Wodaabe of Niger" where I try to make use of STS perspectives and conversation analysis in the study of the pastoral nomads whom you know so well. Best"* (SUPERVISOR, 11/07/13).

As reflected in this email, the "Relatively clever" paper was intended to convince "those who are interested" – myself included – to understand that the STS approach was already being applied to pastoralism, as our professor had already set a good example. On 20 November 2013, my supervisor forwarded to all of us an email he received from the STS-Africa network with the subject line: *"Working Paper Series on Actor-Network Theory for Development",* accompanied with his message: *"Maybe of interest for us. Best wishes"* (SUPERVISOR, 20/11/13). Using "us", my supervisor thereby translated his interest in STS into a collective interest, for which he became the spokesperson, a position that suited him perfectly, as he had already set an example through his drafted paper sent to us earlier. This power position was confirmed when, a few months later, the "Relatively clever" paper was published. The announcement of this good news was also made in an "STS language", as shown in the email sent to 18 people, including myself: *"Dear colleagues, I would like to point to this just published paper on nomadic laboratory life: [Reference of the article]. Best wishes"* (SUPERVISOR, 09/12/14).

Referring to Latour and Woolgar (1986), the "laboratory life" that he led among Wodaabe nomads should be shared by all of us, especially me. Since I was conducting research in the favorite area of my supervisor, pastoralism, I should also provide evidence of my laboratory life among Fulani pastoralists in northern Benin. The subject of this email *"Article on STS, local knowledge and nomads"*, although informative first, was also self-advertising, as this was also posted on a special page on his website, where visitors were given opportunity to share through nine different types of social media. My supervisor's website, whose link is not provided in this article, also offered us, in terms of socialization, the opportunity to make ourselves known in the world, beyond GISCA. This became the most important platform where I could display my profile and achievements, as his team member.

My supervisor's enrollment strategy also used foreign STS experts, whose function was to better equip and prepare his team members. Andrew Barry was invited to GISCA, where he delivered an oral communication on 18 June 2013. Although I could not understand the entire abundant specific jargon used on this occasion, I was delighted to have seen physically and heard another STS celebrity. The day after Andrew Barry's seminar, our supervisor invited us to meet and discuss in a smaller group with the STS expert. During this meeting, our supervisor initiated a round-table so that each of us could tell the renowned scientist how useful STS was for him or her and what his expectations from the discussion were. Some of my colleagues were well prepared – even with a nicely designed PowerPoint as support – with a set of questions and concepts to be clarified by the expert, but I could only share my idea on communication technologies such as mobile phones, which I had identified earlier among Fulani pastoralists, as a way to also take advantage of this meeting. During the round facilitated by our supervisor, I was one of the participants who were seeking what to say, while some of my colleagues, who displayed several concepts such as "Resource", "Market", "Network", "Assemblage", "Apparatus", "Dispositif", "Political framing", and "Technological zone", controlled the proceedings. It was obvious that I had become fully enrolled in this scientific assemblage, yet I still had limited knowledge of my pastoral field, which was still thousands of miles away in northern Benin.

After the talks in a classroom with Andrew Barry and Andrea Behrends, another STS scholar invited for the occasion, we were all invited to a café for further discussion. Thus, the STS discussion was finally taken from boardroom and classroom to a restaurant. At the table, with my colleagues, our supervisor, and our guests, each of us with his or her favorite meal or beverage, we continued to discuss STS and everyone was well seasoned to be STS-motivated, as dearly desired by our STS mentor. After this intensive preparation, we finally had to travel to the field to see the degree to which the approach could be applied to the local realities we were interested in. Unluckily, my research project did not receive funding from any specific research program or institution providing small grants to doctoral students. I therefore had to cover all costs related to equipment acquisition and fieldwork. My supervisor kindly supported a list of equipment (digital camera, GPS, tracking sticks, voice recorder, and external hard drive), while offering me a lump sum to cover the costs of my interpreter and other small expenses to achieve my research objectives. Providing field materials and giving research funding were additional means of enrollment, as they ensured that I aligned well – like all my other colleagues funded through various research programs – with the STS theoretical guidance.

Thus, my enrollment into my supervisor's STS network was a socio-technologically implemented process. The many components – email, work plan, personal unpublished and published articles, book and paper sharing, lecture by foreign experts, seminar in smaller group, comments on STS scholars' achievements during seminars, table rounds, celebrities' photo sharing, snack and discussion in restaurant, equipment supply, fieldwork funding, etc. – all served as powerful media to ensure the success of this process.

Enrollment During Fieldwork in Benin

The enrollment process did not just stop when I left GISCA in Göttingen; it continued in the field. After I had been taught STS in seminars and in various other forms outlined above and had been given the necessary resources for fieldwork, my supervisor tried to see me at work in the field in order to make any necessary adjustments that would enable me to become a good anthropologist and a good STS disciple. During his visit to northern Benin on 19–24 March 2014, we conducted several activities through which he continued to recruit me in his STS-oriented anthropological network. I mention here only a few.

Enrollment in doing good participant observation

We visited the autonomous livestock market of Gogounou District, where I planned to carry out participant observation in order to understand the technological innovations in livestock marketing.

In this pastoral "laboratory", my supervisor took the lead, becoming the main focus of all the market visitors. Although the fact that he is a "White man" can be considered as the first factor to justify this state of affairs, it appeared that his ability to speak the *Fulfulde* language was a major driver for everyone eagerly wanting a word with him. While I could not do anything in this cattle market without help from my research assistant who served as interpreter, I clearly received the message that a good anthropologist or anyone who aspires to a true laboratory life (STS language) among pastoralists should be able to speak their language without having to resort to intermediaries. Language proficiency and showcase of fieldwork capacity were significant binding agents used by my supervisor to enroll me in his way of doing anthropology. He also managed to provide me with some tips during our discussions as we observed the commerce of livestock: *"You cannot stand too long, the whole day for observation"*; *"You can sit down sometimes. You have to find a seat on the other side where you can relax while having a look at what happens between actors"*; *"When you sit down, you must not be distracted from what is happening there"*; *"You sit down a bit, you stand up a while, you go around and you talk a bit with the people. This is how you will manage your observations"* (personal notes, March 2014).

Through this advice and other aspects to which he often drew my attention, I had no choice but to be excited to totally devote myself to fieldwork for a market-oriented anthropology of technology. He recalled some big names such as Michel Callon and Andrew Barry, who had used the STS approach to make market studies. After my supervisor's visit, whenever I went to this livestock market for participant observation or interviews, most of the Fulani pastoralists asked about my "nice professor", highlighting his talent to speak Fulfulde, a skill I did not have as his apprentice. I sometimes shamefully had to admit my linguistic weakness to my interlocutors and thereby assumed that I was only a "half-anthropologist", as the ability to speak the native language of the community being studied is an important factor of immersion and a credible way of "going native" (Bernard, 2006, pp. 344-349). This had been skillfully demonstrated by my supervisor. In this way, I learned that linguistic incompetence of the ethnological fieldworker and dependence on a third party to translate could be a hindrance to a better understanding of socio-cultural realities (Borchgrevink, 2003).

Tour in a milk-processing plant

A closed-down mini-dairy was one of the "dressed windows" through which the pastoralist association leaders in northern Benin did their development brokerage (Djohy, 2017). This technology was often showcased to donors on tour and various visitors to win their generosity to raise funds for its re-launch. The anthropologist from Göttingen and his doctoral student did not escape this demonstration. As the manager of this cooperative pastoralist company staged the potential of this technology, to which we were offered a guided tour, my supervisor became very interested in my carrying out in-depth investigations into the factors that led to the closure of the SOCOLAIG mini-dairy (*Société Coopérative Laitière de Gogounou*). The profound transformations that induced the presence of semi-modern milk-processing units among Benin Fulani pastoralists should be studied in the light of the technological systems as conceptualized by Thomas Hughes, who was named regularly by my supervisor after our visit in this plant. Therefore, I was encouraged to take advantage of the scientific analysis of this author on the invention of the electric light by Thomas Edison in order to highlight the "seamless web" (Hughes, 1986), revealing how various economic, socio-cultural and technological factors acted together to defeat the harmonious process through which cow milk was to be successfully collected, processed, and marketed to generate added value for the Fulani pastoralist economy. Thus, as a result of this visit with my supervisor, the SOCOLAIG mini-dairy became an important case study in my research, which I had already identified earlier during my exploratory research as potentially promising. The flexibility in guidelines and choices fosters a good PhD student-supervisor relationship and makes it more mutually beneficial to both actors (Gill & Burnard, 2008, p. 669; Frenay & Romainville, 2013, p. 202). This collaboration with my supervisor is a case in point.

Family visit in Benin

After our last discussion during which my supervisor gave me tips and further instructions for the success of my research, he asked to visit my family, to see my wife and especially my newborn daughter. This visit was definitely another highlight of the enrollment dynamics of my supervisor. Through this visit, he showed my relatives and in-laws that I was in good hands in Germany, and that my future was safely mapped out. My mother in-law, who was amazed at the visit of a German professor to her son-in-law, could not help but offer my supervisor a souvenir. Moreover, she never stopped asking about him during the last two years I spent in Germany after my return from the field. I still remember those fine words she used whenever she called on phone: *"I know you are in good hands, I do not fear that everything will be alright"*; *"My warmest regards to your kind professor"* (telephone notes, 2015–2016). In short, my supervisor succeeded in being awarded the label of nice/kind professor who would take great care that I would reach my goal of gaining a doctorate degree. If the outcome of my anthropological research, whether oriented towards climate change or technological innovation, was to contribute to improving the well-being of Fulani pastoralists in their society, the esteem that my supervisor showed to me and my family was one of the most compelling ways through which I felt obliged to do anthropology in the way he wanted. Using the STS approach and doing good-quality work became the only way for me to be grateful and to honor him, as a good student is a source of pride for a teacher (Gérard, 2013, p. 166).

Enrollment in the Writing of my Dissertation

After I returned from the field and had the first discussions with my supervisor on the data I had collected, I suggested writing a cumulative dissertation, i.e., a thesis that is compiled out of an introduction, some peer-reviewed articles (preferably published) and a conclusion. My supervisor opposed this option, because he dislikes scientific knowledge being "commoditized". For him, an anthropologist first writes a monograph with as many details as possible and, after the publication of this book, invests additional time to make scientific contributions for publication in refereed and influential anthropological journals. "Commoditization" is yet another STS concept, especially dear to market anthropologists: I was expected to engage with the enterprise of paper publication only after having written a book in due form, as is the tradition in anthropology. Although my professor found a second and highly convincing argument, linked to the short duration of my scholarship that could not afford to face the vicissitudes related to the publication of articles in the allotted time, as various difficulties and risks were often associated with this option, he still seemed to be more attached to the traditional monograph publication in anthropology. The last element that had remained "agronomic" in me was thereby nibbled away. Thus, the agronomic study standards that guided my ambitions and my actions, especially in the framework of my doctoral project, were gradually but completely eroded to allow me to integrate into my supervisor's network of "pure" and "authentic" anthropology, which has values to preserve. My supervisor gave me many opportunities (five) to present my work to my colleagues in smaller groups in order to obtain their feedback so that I could improve my analysis and the quality of my writing, as peer interactions strongly contribute to the socialization of a doctoral student (Gardner, 2010a; Gemme & Gingras, 2006; Gérard, 2013; Lovitts, 2001; Romainville, 2011).

Anthropology is done not only in the field and within the walls of a university office; it also requires that the research findings are shared in due time with peers. Towards this end, my supervisor paid for my participation in ECAS 2015 (European Conference on African Studies), which is one of the most important meetings of European social scientists. By covering my travel, attendance fees, and accommodation in Paris, he gave me the opportunity to present my findings to a larger audience in order to showcase to the anthropologist community that STS had started doing wonders in Göttingen. It was on this occasion that I exchanged with my peers the visiting cards that my supervisor ordered for me at his own expense, to build relationships in the field and during international scientific meetings, and to make myself better known in the anthropologist networks. Professional networking is a driver of professional socialization for PhD students (Gemme & Gingras, 2006; Gérard,

2013; Lovitts, 2001). It was also during this conference that we discussed STS in a smaller group of scientists from Göttingen, as my supervisor sought to better understand some statements I made in a paper I presented a few weeks earlier at the GDN (Global Development Network) conference 2015 in Morocco. My supervisor thereby expressed his satisfaction with my study, which – as he repeatedly mentioned – offered great prospects for STS analysis. This was one of the ways in which he showed interest in my work, appreciated my efforts and thus ensured I was fully enrolled in his STS network.

I repeated the public communication experience of my research findings in-house in Göttingen. On 3 December 2015, I presented – as is the tradition for all GISCA PhD students – an oral communication in which I used the STS approach to analyze how pastoralist association leaders in Benin implement their identity politics and development brokerage for ensuring better socio-economic and political inclusion for their constituencies (Djohy, 2017). Satisfied with my analysis, my supervisor (who was the master of ceremony that day) took the floor to congratulate me for my efforts and took advantage of the occasion to reveal his pride to the audience that the STS seminar he had held a few years earlier has definitely turned out to be positive and beneficial for his students, myself included. Thus, my success with STS was also attributed to my supervisor. Authors have shown that supervisors love their doctoral students to honor them through their research work and their public communications. Some supervisors may even punish their PhD students who failed on these points (Gérard, 2013, p. 166). Although the rich data I collected from the field could not all be used in my thesis, I could rejoice for having passed this "initiatory ritual" (Dardy, Ducard, & Maingueneau, 2002) or "rite of passage" (Bégin & Gérard, 2013; Delamont, Atkinson, & Parry, 1997; Gérard & Simonian, 2014), which allowed me to reconcile the scientific guidance of my supervisor and my personal aspiration of becoming an anthropologist of West African pastoralism. My success in passing my doctoral examination in October 2016, and all the other scientific plans that I made with my supervisor for the future, appear to be the result of a successful enrollment process.

Enrollment in Postdoctoral Career Paths

A few months before I submitted my thesis and passed my doctoral examination, I agreed with my supervisor to apply for a postdoctoral fellowship. I was then invited to design a research proposal, without receiving any prior instruction from my supervisor asking me to include the STS approach. When I submitted the first draft of my postdoctoral proposal to him, he invited me to a further discussion in his office, where he commended the originality and relevance of the topic while raising, more covertly, specific issues about having STS more developed as a theoretical perspective. Concerned that some essential elements of my new field of expertise were missing in this first draft, my supervisor remarked: *"AUTHOR, your research questions are good, but I still find them a bit vague. It lacks a central concept around which the issues you are raising should be more articulated. You can, for example, hang on concept such as technology and then restructure your specific research questions in fitting them into the gender, empowerment and development theoretical perspective that you are now proposing"* (personal notes, 16/03/16). After three years of technology studies, I apparently sinned in my first postdoctoral project, which did not give sufficient attention of STS, although traces of STS were not totally absent. This remark revealed that my supervisor did not want me to stop using the STS approach in which I had been enrolled over the past three years. STS should now be the microscope through which I should observe the world around me, do research on pastoralism and make myself a name in social anthropology.

This understanding I had of his comments proved especially true when my supervisor was not allowed to be my host institutional partner by the structure that issued the call for proposals, as conflict of interest might appear from his position. He could only be one of my two mentors with responsibilities to help me gain scientific experience and integrate broader research networks. My supervisor used his social network to help me find another German institutional partner, who was an expert not only in gender issues, on which I planned to do my postdoctoral research, but also had recently become engaged with STS. I realized that my postdoctoral project, which was planned to be framed within gender, development, and identity transformation in Africa, was thereby drawn back

into the STS network set up by my supervisor and allies. With remarks on my postdoctoral proposal and proposition of partnership with another STS scientist, he further enrolled me in his anthropological STS network by nibbling away at my "anti-programs" (Latour, 1990), which either consciously or unconsciously tended to move me away from his STS program.

I met my supervisor on 3 May 2016 in his office, where we discussed matters related to the submission of my doctoral thesis and the likely date of my oral examination. The purpose of the meeting was to arrange my final five months of staying in Germany, as the DAAD schedule foresaw 30 September 2016 as the end of my doctoral award. My supervisor, after expressing his satisfaction with my work and after inquiring about my future career plans, complimented: *"AUTHOR, you are a good student of mine. I would not let you disappear in the nature like this. Before you are pre-selected for your postdoctoral candidacy – I hope your project will convince the international selection committee! – and before your fellowship starts in January 2017, let me see if I can offer you a short contract"* (personal notes, 03/05/16). Thus, I was pleased to receive a four-month Research Associate (*wissenschaftlicher Mitarbeiter*) contract, confirmed in the email I received from my supervisor a few minutes after our meeting that same day: *"Dear AUTHOR. We are preparing a contract for you that will run from 1 October 2016 until 31 January, i.e. 4 months. We will talk about it when I am back in Göttingen. Regards"* (SUPERVISOR, 03/05/16). Through his compliments, which depicted me as a good worker and through this "wissenschaftliche Mitarbeiter" contract, my supervisor managed to enroll me fully for stepping up within his STS network as part of a long-term collaboration. Therefore, I could stay on in Germany and work as a research associate until January 2017, before returning to my home country, Benin. My trajectory with my supervisor in his support during and after the doctoral thesis confirmed the great investment mentioned by Frenay and Romainville (2013, p. 203), when the work of a student has close links with that of the supervisor.

DISCUSSION

My case presentation was meant to highlight the socio-political and technological processes that underlie the socialization of a doctoral student. It appears that enrollment occurred in several ways throughout all the main stages of the doctoral education. The enrollment used a rich set of human and non-human allies. Thus, elements such as email, practical example, publication, financing, equipment, working contract, and many others reported in this article were non-human intermediaries which worked together to integrate me into my supervisor's actor-network and consolidate the links. Foreign experts, peers (colleagues, other GISCA scientists, and international conference participants), family members, and research target groups, among others, participated in this program as human agents by whom I was attracted and became increasingly convinced to become part of my supervisor's program to create a good anthropologist.

Seeking to form a specific type of anthropologist engaged with STS, my supervisor mapped and transformed strategically my interests, so as to establish a new order in the doctoral supervision arena, which could be regarded here as part of the "social world" evoked by Callon and Law (1982, p. 622). Without being forced to do so, I gradually abandoned my "insecure" former tracks, to embrace the path of my supervisor, which appeared more suitable and secure for becoming successful in my new scientific discipline. The enrollment concept enabled me to deeply decrypt these supervisory politics, by attracting attention to all border-tracing activities in a prospective actor-network (Allen, 2004, p. 181). By scrutinizing the micro-politics that took place in my doctoral process and the different resources for negotiation and persuasion mobilized by my supervisor, I realize that doctoral supervision also involves strong power play. In this context, only the actor mobilizing more resources during the process could enroll his or her *vis-à-vis* to a satisfactory outcome for both.

Enrollment strategies play a key role in how doctoral students start, progress and complete their doctoral projects. My case was a success and I can rejoice to have completed my thesis in three years with the support of my supervisor, who provided me with the necessary resources, even though I have analyzed them in this paper as "enrolling allies". Otherwise, the process might have resulted in mutual and permanent dissatisfaction (Gemme & Gingras, 2006), and we would probably have lost time in

trying to resolve the situation, or one of us would have eventually resigned. Despite his predominantly non-directive supervisory approach (Gérard, 2013; Romainville, 2011), my supervisor succeeded in making me achieve what seemed necessary to me to be well socialized in anthropology. Throughout the doctoral process, including formulating a research topic, writing a proposal, choosing a theoretical orientation, implementing fieldwork and choosing case studies, communicating findings internally and externally, writing the thesis, and pursuing a postdoctoral plan, the enrollment-based supervisory approach had great impact: I was integrated into my supervisor's network and won his esteem as a "good student" for him, as he stated at the end of my doctoral journey. As the hotelkeeper who must succeed in discouraging his customers from their anti-programs so that they definitely fall into his program to leave their keys at the counter (Latour, 1990), my supervisor was able to mobilize and articulate as many "actants" as possible that led me to learn doing anthropology in the way he perceives and carries it out at Göttingen University. This involved continued persuasion, as in my case – whether consciously or unconsciously – I had often departed from the path outlined by my mentor.

Another interesting aspect of my doctoral experience is how I myself took part in the implementation of all the practices and processes of my own socialization. As I mobilized various allies to make me accepted as a doctoral student, I also managed to detect and take into account the scientific interests of my supervisor to redesign my proposal and succeed in registering as doctoral student. My supervisor was excited about STS and had professional ambitions to set up a large team that uses this approach to contribute to various areas of anthropology. He never openly shared such a program with me as his doctoral student and also never imposed anything on me; each of his students chose freely and consciously the theoretical and methodological options most relevant to answering their individually framed research questions. However, the advice and devices provided during the process interested me, disconnected me from my own plans and facilitated my enrollment. This is where the political dimension of the supervisory approach lies. Many supervisors generally have expectations from their students, but do not always succeed in mobilizing the resources needed to disconnect them gently and willingly from their old networks. In the same way, many students also put themselves in a rigid or blocked posture and fail to consider the interests of and enroll their supervisors. Doctoral relationships, like any other educational and socio-technological relationship, require attention and flexibility to transform the heterogeneity of actors and resources into a successful network (Fenwick & Edwards, 2012; Zangana, 2017).

Enrollment is not the assertion of one's own aspirations on others; it is rather using every possible means to get them adopted, integrated and pursued by others as their own aspirations (Callon, 1986). I was convinced at each stage of my doctoral education to pursue, sometimes in a modified form, the advice of my supervisor. This was not a tagging-along attitude or a blind consent. One might wonder why I detached myself from my former references without engaging in a showdown to achieve my aspirations. It was simply because I often received his ideas and suggestions as also offering the opportunity to engage in another interdisciplinary approach, which – although different from what I initially envisioned – could also add value to what I wanted to study for my thesis. It was not blindly that I reformulated my thesis topic by striking a balance between my own and my supervisor's aspirations. In my logic of learning and discovery, I was also open to exploring new horizons without holding firm to my own lines of action, and, in this way, I was impressed by the analyses and literature on innovations and technologies in pastoralist and nomadic contexts. I was interested and saw the value of making the most of the experience and resources available from my supervisor. It was the same dynamic that prevailed when I had to decide on my theoretical framework, case studies and postdoctoral adventure. I always had words, examples and resources to hang on to while moving forward and discovering new ways to build my scientific culture and identity.

I had never done market ethnography, and learning directly from my supervisor's example in a livestock market was a good deal. Learning, trying, and improving was the essence of the market scene in Benin, where my supervisor's criticisms and advice were only aimed at empowering my scientific research and analysis capacity. His words at the Göttingen in-house seminar should also not be seen

as self-satisfaction or self-praise, but rather as a reflection of a supervisory strategy that offers room for choice, decision, and guidance towards promising theoretical and disciplinary (sub)fields. This fascinating doctoral process, full of intrigues and controversies strategically well managed by both of us, gave me the opportunity to learn without obstruction, to obtain my degree and to be integrated into a long-term scientific partnership. By visiting the different stages and practices of enrollment, I personally learned that doctoral socialization is the result of game plays of actors involved in power-based processes of continual negotiation and renegotiation throughout the doctoral education. The ability of some to pass on their ambitions to others, and the openness of others to embrace new postures, are the essential keys to the success of these processes.

CONCLUSION

This paper has looked at how socialization is constantly (re-)negotiated in supervisor-supervisee interactions during doctoral education. I used the enrollment approach as offered in Actor-Network Theory to highlight the incremental processes of negotiation and persuasion through which actors within a context of imbalanced power relations are able to align their interests to achieve common goals. In a more or less informal language inspired by an autoethnography that self-reflected on all the stages of my doctoral graduation, I have presented how I was enrolled by my supervisor, who deployed several resources to attract and convince me to adopt various scientific postures and orientations needed for my successful socialization. Email exchanges, face-to-face discussions, participant observation, and various diary notes from March 2012 to October 2016 offered qualitative materials that were analyzed in a very personalized and introspective way. This approach, which challenges the traditional scientific tenets, is criticized for not being methodologically rigorous and emphasizing a single case/story, but offers a fairly authentic and personal perspective. Learning and self-discovery during the doctoral process is one of the greatest benefits offered to students to express their voice, feelings, and thoughts.

My autoethnography reveals that doctoral socialization is not the result of something we might call context; it is rather the result of a continual socio-technological enrollment that mobilizes resources and allies of various origins and backgrounds, which cooperate towards aligning the student's and the supervisor's interests and projects during the doctoral education. Even if the individual parameters and contextual factors played a role in our interactions, these must have been minimal. Enrollment is continuous and takes place throughout the doctoral process, since the divergence of stakeholder interests from the outset and the imbalance of power relations existing between the two main actors do not predispose them to agree on common lines. A permanent (re-)negotiation leads to the graduation and may go further in the professional career, or fail earlier. In my case, the supervisory politics appear to have been a success in that I could improve my scientific skills and socialize with a new discipline (anthropology) and adopt a new theoretical orientation (STS approach). I have a very good relationship with my supervisor, and we were able to consider new research perspectives for the future. My attainment of a PhD was the outcome of an expert socio-technological enrollment by a professor who wants to have followers who engage in anthropology with great determination and meticulousness, without being led by "blamable practices" that characterize the world of research in other places or in other disciplines. He wanted me to have a personal identity in the scientific world and my name to be known in my area of expertise (as also underlined by Ntebutse, Jutras, & Joly, 2013, p. 191; Weidman et al., 2001, p. 49), by being always relevant in my analysis and scientific outputs.

I argue that successful enrollment is a major driver of positive interactions between PhD students and their supervisors. The socialization as I experienced with my supervisor was unique. Positive experiences of this kind could happen elsewhere in the world, but few students give them meaning, apart from some ritualized sentences slipped into the acknowledgements page of their thesis. The negative cases, resulting in distrust and resignation by either partner, should inform about where enrollment failed. I aspire to be inspiring for students, so that PhD student-supervisor relationships

also become laboratories for valuable anthropological or other science-based analysis. This study offers the opportunity to go beyond the deterministic approaches of doctoral socialization to explore new, more flexible avenues for discovering stakeholder game plays and related politics. Instead of focusing on contextual, cultural, racial, institutional, and other elements driving socialization in doctoral setting, it might be enlightening to research how students and supervisors manage their doctoral relationships through enrollment. My case is a student perspective that other PhD students could build on through their own cases and further research, but supervisors can also share studies on how they enroll or are enrolled by their students. I suggest that future studies focus on cases of enrollment failure that have led to clash, attrition, or dropout. I also suggest to the actors involved in doctoral education to follow the process of doctoral socialization with a greater flexibility without trying steadfastly to establish causal connections, but to understand in the smallest detail the interactions between supervisors and supervisees, and especially all the human and non-human allies that participate in this process, so that the interests of everyone are aligned, and that consents are constantly renewed for a successful end.

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