RESEARCH ARTICLE

DIGITAL DEVICES IN THE COMMUNICATIONAL TRANSFORMATION OF THE REGIONAL ACADEMY OF MARINE SCIENCE AND TECHNOLOGY (ARSTM) IN CÔTE D'IVOIRE

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ABSTRACT

This study focuses on 'digital devices in the communicational transformation of the Regional Academy of Marine Sciences and Techniques (ARSTM) in Côte d'Ivoire'. The aim is to report on the use of digital information and communication tools at ARSTM and to describe the contribution of digital technology to the communicational transformation of this sub-regional training structure. This article is motivated by observations over the last five years of the increased integration of digital technologies into the professional practices of agents. To achieve our research objectives, we opted for a qualitative study following a literature search. The results of our research lead us to identify digital technology as a space conducive to the emergence of new communication and managerial practices at ARSTM.

INTRODUCTION

The rise of Information and Communication Technologies (ICTs) in both developed and developing countries is well established. According to Vedel (2003), the integration of these tools into African organisations has reconfigured and even governed human practices and organisations, reducing distances and breaking down barriers between individuals. In short, these technologies have transformed the world into a global village, and to deny this would be clumsy. The majority of both the economically well-off and the so-called poor have these digital technologies. According to figures published jointly by *Hootsuite & We are social* in their 'Digital Report' for 2021, over 60% of the world's population has at least access to an internet connection; just over 67% use a mobile phone and, at home, 57% of households have access to a computer. A little further on, these bodies reveal that in French-speaking sub-Saharan Africa, 8.6% of the population have Internet access; mobile telephony records 45% of subscribers·e·s; 26% of individuals connect to the Internet from their mobile phone; 14.3% of households have a computer at home and 17% of users are subscribed·e·s to social media. This continuum of devices (T.I.C) is nowadays firmly rooted in almost all the practices of people and structures in the tropics. In Côte d'Ivoire, the constant evolution of the digital world has led to marked changes in modes of communication and behaviour in organisations in both the private and public sectors. The Académie Régionale des Sciences et Techniques de la Mer (ARSTM), the subject of our study, is an academic structure operating in the education and training sector. In this academic establishment, ways of working and communicating have undergone significant changes in the digital age in recent years.

Owning a digital communication device is no guarantee that it will be appropriated and integrated smoothly and appropriately into the daily lives, practices and activities of the individuals, organisations or structures that use it. At ARSTM, things seem to be different. The aim of our research is to highlight, in a general way, the effects of digital devices in the communicational architecture of this higher education establishment, which welcomes students from several nationalities and is based in Côte d'Ivoire. The crucial research question guiding this study is as follows: What are the contributions of digital technology to the communicational transformation observed at ARSTM?. Specifically, the objectives of this study are twofold. Firstly, it seeks to report on the main digital information and communication devices used at ARSTM; secondly, to describe the contributions of digital technology to the communicational transformation of this sub-regional training structure. To achieve these research objectives, we used a qualitative method to confirm or refute the hypothesis that the introduction of digital devices in recent years in the institutional functioning of ARSTM has led to the emergence of new communication and management practices. In what follows, we will set out the methodological and theoretical framework of the study, then present the results. Finally, we will discuss these results in the light of other studies on the use of ICTs in organisations.

THEORETICAL AND METHODOLOGICAL FRAME OF REFERENCE

Theoretical references: the socio-technical theory and the theory of appropriation of Internet technologies: This study uses the socio-technical theory and the appropriation theory of

Internet technologies. Socio-technical analysis (Trist and Bamforth, 1951; Emery and Trist, 1980) explains the interdependence between technical systems (technologies, digital infrastructures) and social systems (practices, human behaviour). In other words, it postulates the argument that an organisation's performance depends not only on social dynamics but also on the technology it has adopted. Socio-technical analysis suggests a joint optimisation of the technical and social aspects to achieve a beneficial balance, a positive change. In the context of ARSTM, this theory enables us to understand how the introduction of digital devices (management tools, professional exchange platforms, e-mailing) modifies the internal and external communication practices of this higher education institute, which was previously reluctant or hesitant to use ICT to revitalise its communication process. Thus, it enables us to explain the transformation of communication processes as observed in recent years at ARSTM.

The digital devices integrated into the professional practices of the establishment's staff are redefining the channels for transmitting information, making exchanges faster, more structured and often less hierarchical. In terms of social interaction, digital tools are influencing relationships between teachers, students·e·s and administrative staff, encouraging greater collaboration while imposing new digital skills. The introduction, for example, of WhatsApp instant exchange digital platform between teacher·e·s and administration seems to have profound repercussions on the modes of collaboration between these main actors of ARSTM. As for the theory of appropriation of technology, In fact, Proulx relates uses and appropriation of technology and the Internet. This appropriation, which Josiane Jouët (2000, p. 502) sees as 'a process [...], the act of constituting a self', is as much community or social in nature as it is individual, on the understanding that the effects of individual appropriation are felt by society and even the organisation. In the theory of appropriation of Internet technologies, appropriation is understood by Proulx (1988, p. 151) as 'the acquisition by individuals and groups of a necessary and sufficient minimum of technical, theoretical and critical knowledge, and know-how enabling them to have relative control over the use of computer technologies that are established in their immediate social environment', as is the case here with ARSTM. In this study, the two theories will be used to analyse, on the one hand, the specific use of digital devices at ARSTM and, on the other hand, the communicational changes brought about by these uses between the key players in this higher education structure.

METHODS

In general terms, we will set out here the survey method and techniques used in this research. The Regional Academy of Marine Sciences and Techniques (ARSTM) was the setting for the study, which was based on a qualitative approach. The investigative techniques used included documentary research, non-participant observation and semi-structured interviews with a range of key players at the Academy. Firstly, we carefully reviewed and examined the documents addressing the issue of the use of digital technology in organisations and the humanities, and in vivo, non-participant observation enabled us to gain a holistic understanding of the issue. The documents consulted were analysed using a grid structured around the themes of digital equipment or devices in organisations, technology as a means of communication, the use of digital technologies and assessments. Next, semi-directive interviews with teachers·e·s, students·e·s and members of the ARSTM administration to take stock of the use of digital tools in the daily activities of the ARSTM and the transformations or changes induced·e·s by the use of ICTs in the institution. The interview guide used for this purpose addressed the themes of identification of the interviewee·e, digital equipment or devices present in the higher education institution, management

of ARSTM, technology as a means of communication, the use of digital technologies and the interviewee·s assessments of the general aspect of ARSTM's communication process over recent years. In concrete terms, focus groups were organised with around fifteen lecturers·e·s and members of the administration, around ten students·e·s and an individual interview with the head of the institution's Communication & Marketing Department. It should be noted that this convenience sample is corollary to the consent provided by the stakeholder to participate in this study and their availability. The information gathered using the interview grid was carefully processed by manual content analysis (Bardin, 2013). This analysis technique allowed us to capture the true richness and depth of the valuable statements or answers provided by the respondents.

RESULTS

This section presents the final results of the study. We will set out, in turn, the digital devices available to ARSTM; the place accorded to these digital tools in the management of the establishment; and the resulting use of, or reliance on, these digital devices.

Digital devices at ARSTM: The non-participant observation carried out at ARSTM revealed that the institution has a wide range of digital devices. These include mobile phones, computers, printers, projectors, tablets and smartphones. This observation was corroborated by the teachers·e·s, members of the administration, students·e·s and the head of the school's Communication & Markéting department. The vast majority of them claim that ' *at school here, we have mobile phones, projectors, computers, smartphones, tablets and printers* '. All the staff we met at the Academy said that they use these digital technologies ' *on a daily basis* " in order to " *get in touch and stay in touch with friends and family* ", " *communicate with their colleagues·trice·s* ", " *for instant meetings and sharing* ', ' *for quick updates* " and " *to keep up with national and international news*'.

For the head of the communications and marketing department, the main reason why ARSTM uses digital technology is to ' *get the job done quickly and to keep up with technological developments* '. This is why, she continues, ' *communication technologies are used by the establishment's senior authorities as well as its collaborators·trice·s* '. As a result, ' *digital devices have changed the organisation of working time, the communication process in general at ARSTM* ' dixit the head. What's more, according to the head of the communications & marketing department, the benefits that the organisation derives from the digital devices implemented there can be summed up as a ' *fluidity of communication* " within the organisation, " *communication is less costly* ", digital tools give the " *possibility of working remotely* " and " *using group and instant messaging* '. These advantages are also perceived by teachers·e·s like SORO M., a law teacher, maintaining that ' *the real advantage perceived is the dematerialisation of the communication process between the administration and teachers·e·s. On the WhatsApp group created for this purpose resembling the teaching staff and administrative officials are posted there information in real time to the members* '. As for the students·e·s, as a whole, they say they agree with the other respondents·e·s. ATSIN B., a student in Licence Professionnelle 3 Transport Multimodal A (LP3TM/A) believes that ' *the advantage of these devices can be seen in the improved fluidity in the transmission of messages or information between them and the administration on the one hand and the teachers·e·s on the other. Before, we regularly travelled to the school heads' office for information and we had to consult the notice board just as frequently. With these devices, there is less need to travel and the information reaches us on our mobile phones via the WhatsApp group* '. In short, for all those surveyed·e·s, these tools

offer ' *time savings in work* ", " *less travel* " and " *improve the transmission of information or messages to ARSTM on a daily basis* '. Faced with so many advantages, ' *a greater emphasis is being placed on the use of digital devices in interactions generally at ARSTM than in the past* ' maintains the head of the communications & marketing department. Overall, the digital tools used by the players in this system to boost communication can be summed up as digital portals for schedules and assessment results; institutional messaging (professional e-mail); collaborative applications (Zoom); internal social networks (WhatsApp groups).

Technology as a communication tool at ARSTM: The head of the communications and marketing department stated that ARSTM has had ' *a website* for the past few years *to promote the organisation's image, services and products* '.
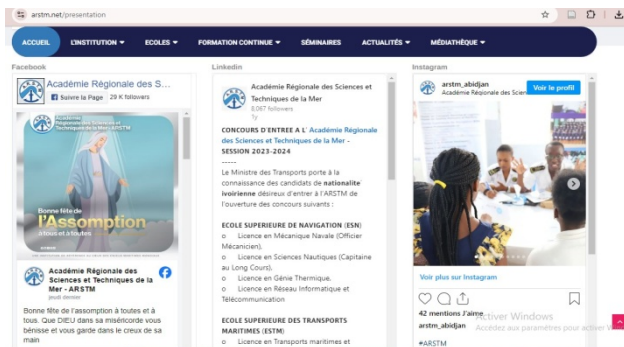
Source: Our study, 2024

Figure 1. An overview of the ARSTM website
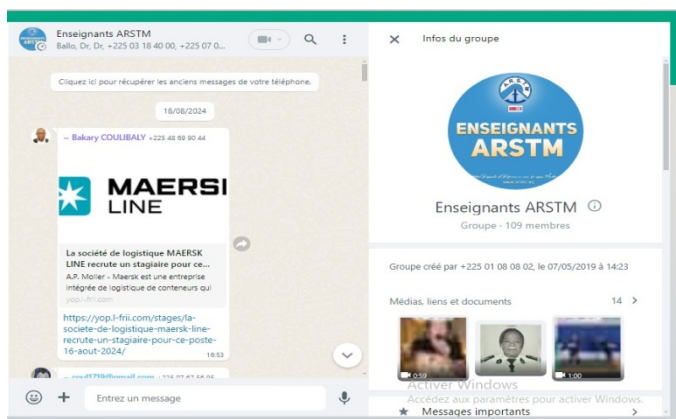
Source: Our study, 2024

Figure 2. WhatsApp platform called ARSTM Teachers

This claim is endorsed by ARSTM's teachers·e·s, students·e·s and administrative staff. Figure 1 below provides an overview. At ARSTM, the types of technology favoured by the institution's key players in the communication process are ' *wired and wireless telephones and computers* ', says the head of ARSTM. This information was verified by us. Whenever we visited this higher education establishment, it was not uncommon to see staff at their desks and/or on the premises interacting via the computer, the cordless telephone (the mobile) and the corded telephone (the landline). Furthermore, our interviewee maintains that, as part of the activities at ARTSM, '*social applications are used to exchange with colleagues and collaborators·trice·s* '. In doing so, the main social application that she and all the actors in the system use as part of their professions is '*WhatsApp*'. From the observation made, there are indeed WhatsApp platforms to, she believes, '*ensure fluid and instantaneous interactions between actors* '. The various entities at ARSTM have a WhatsApp platform bearing the name of the entity. The creation of these platforms is in line with the desire of ARSTM's management to revitalise relations between staff at all levels. By way of example,

the head asserts that *"to facilitate exchanges with ARSTM teachers·e·s, we have set up a WhatsApp platform called Enseignants ARSTM* '. One teacher, speaking on condition of anonymity, told us that ' *in the past, communication and transmission of information to ARSTM was most often done via the memos posted on the various school notice boards. To find out what was happening with individuals, we would call them or visit their offices. Today, with these digital devices, things are very different.*

As mentioned in the photo, this group was created 'on 07/05/2019 at 14:23' by the head of the ARSTM communications & marketing department. As a part-time teacher and lecturer at the Academy, we note that this platform offers the advantage of being able to exchange with all teacher members and central and school administrators·trice·s instantly or mediately via written messages, voice messages, images and calls in audio and video modes. Following the example of the WhatsApp platform 'Enseignants ARSTM', others have been created, in the aforementioned period. Thus, we have WhatsApp groups named 'Staff', 'Management Committee', 'Quality Committee', 'ESTM Group', 'ESN Group', 'ISMI Group', 'Online Course Group', etc. to lighten, facilitate and make relations and exchanges at the Academy fluid. The students·e·s, administrative staff and teachers·e·s met·e·s supported by the affirmative that there are all its platforms. ' *From these platforms, we receive information about our services; we exchange or debate current issues affecting the corporation; we show our closeness to members who are experiencing moments of joy and/or misfortune,*' confides SORO, an English teacher. If you look closely, the relationship between the administration, teachers and administrative staff is an essential pillar of institutional effectiveness in any organisation. Digital devices play a key role in facilitating clear, rapid and effective communication. This fluidity of communication reduces misunderstandings, optimises decision-making processes and contributes to greater job satisfaction.

The use of digital technologies and the performance of ARSTM: For the head of the communications & marketing department, the use of digital technologies or devices at ARSTM '*improves communication within ARSTM and between staff·trice·s* '. Also, she continues, ' *Without replacing physical meetings, digital tools help to hold virtual meetings in situations of extreme urgency preventing staff from travelling, as was the case during the outbreak of the coronavirus disease in Côte d'Ivoire in 2019, and/or the physical absence of certain colleagues whose presence is essential for the proper management of ARSTM* '. She argues, before closing her remarks on this issue, that '*the use of digital technologies has really changed her relationships with her colleagues and collaborators·trice·s at ARSTM'*. For teachers·e·s and administrative staff, there have been notable communicational transformations at ARSTM in recent years. SORO M., a law teacher, confides that:

'*Of course, the introduction of digital tools has contributed considerably to improving ARSTM's internal and external communication. This can be explained by the fact that, internally, communication via WhatsApp and memos is more effective insofar as those concerned are constantly connected to social networks, and their actual presence within the institution means that they are aware of the information conveyed through the posting of memos. Externally, this communication process is reinforced through Facebook, which is attracting more and more people to the web* '. This opinion is shared by others. The students·e·s and auditors·trice·s met·e·s as part of this study at ARSTM are in line with this trend of ideas. ' *These technologies played an important role in my joining the Academy. Before, I didn't have any information about the courses and opportunities offered by ARSTM. You had to travel to get it. But these days, thanks to the dynamic communications drive by the structure's managers,*

information is distributed via digital devices: Facebook, WhatsApp, etc. and received instantly by Internet users ', recalls DIABY M., a student on a Professional Master 2 in Logistics and Transport (M2LT) and waiting to defend her dissertation. In practice, according to the manager, '*forums are organised via ICT to publicise the school's activities to different audiences. This was not possible in the recent past* '. Clearly, ARSTM has equipped itself with digital devices in order to ' *improve the communication process and day-to-day relations in this space* ", " *compete with other organisations operating in the field of education* " and " *make the establishment visible* '. With this in mind, the head of the communications and marketing department is adamant that 'with the right use of digital technologies at ARSTM, they have transformed the structure and changed the way work is organised there'. Because, with these devices, 'in one click, we get in touch with customers·e·s and partners', she concludes.

DISCUSSION

As a reminder, the objectives of this study are twofold. Firstly, to report on the main digital information and communication systems used at ARSTM. Secondly, to show the contribution of digital technology to the communicational transformation of this sub-regional teaching structure. To do this, this section will be divided into three (3) sub-sections : ARSTM's ownership of digital tools, the uses to which they are put and the contribution of digital technology to the transformation of this institution.

Ownership of digital tools: According to Perriault (2008), a digital device refers to a set of technologies, tools and practices that are used to create, distribute and interact with digital content. In other words, these devices include hardware such as mobile phones, smartphones, tablets, computers, printers and video projectors, as well as software such as applications, operating systems and internet and intranet networks. In the way they operate, these digital tools are capable of transforming social, professional and organisational practices by integrating digital technologies into processes and interactions. The survey we carried out at ARSTM revealed that all administrative and teaching staff have digital tools in their offices and on a personal basis, including mobile phones, computers (desktop and laptop), smartphones, tablets, video projectors and printers. These devices, which could be described as socio-technical communication tools, are perceived by these individuals as, firstly, a means of communication and, secondly, as work tools. When properly observed, these digital devices enjoy, among all the participants·e·s in the study, a very strong representation charged with the values of wealth, connectivity or social connection and development. Succinctly, for ARSTM staff, these devices are seen as a means, a tool capable of ensuring social, family and professional proximity. Thus, the digital transformation observed in the school is largely due to the ability of staff (administrative, teaching and technical) to appropriate digital tools and integrate them into their daily practices with a view to bringing about change. This idea is shared by Chaanoon, Rahmouni & Alaoui (2023 b). As a result, with their help, digital information and communication devices are being used in almost every department of the school. In his study, Maidakouale corroborates the idea of the intrusion of digital tools into Nigerien organisations or administrations. He states:

These tools have become ubiquitous in all companies and businesses wishing to forge a reputation. Although they have existed for a long time, today's tools are not like those of yesteryear, both in terms of their form and their organisational contributions. But from the 1970s to the present day, socio-technical devices - mainly telephones, computers and the Internet - have taken over and become a key and determining factor in the strategy of states and companies (2021: 173). Clearly, today, digital devices are embedded in the practices of individuals and

the strategies of contemporary societies. The adaptation of these tools to their contextual reality by ARSTM staff has led to a transformation or change in communication and interaction between the men and women working in this academic space.

Use of digital devices at ARSTM: At ARSTM, digital tools are an integral part of both teaching and administrative practices. As an institution specialising in maritime and port training, ARSTM has set up online training platforms in recent years. Called online courses, this platform offers students·e·s and auditors·trice·s educational resources, training and the opportunity to participate in online discussions. In the same vein, digital or virtual simulators are used to simulate realistic maritime situations so as to allow students·e·s and auditors·trice·s to practice in a controlled environment before they are confronted·e·s with actual shipping practice. In addition, administrative management is not spared by digital at ARSTM. In concrete terms, the institution no longer manually manages the files of students·e·s and auditeur·trice·s. It uses software to manage enrolments, academic results, and student·e·s and auditeur·trice·s files. Both internal and external communication are also taking the digital route. The dissemination of information via intranet portals and social networks has become increasingly popular with the establishment in recent years. Digital devices such as computers, mobile phones, tablets and smartphones are being used to send out circulars and manage emails. This is proof that migration to digital 'is bringing about profound changes in the way companies operate and in collaborative working methods' (Dudézert, 2018: 78).

Finally, in conducting meetings, digital social networks (DSNs), applications and software such as Zoom, Google meet integrated into mobile phones and computers whose video projector projects a life-size screen are used by Academy staff. Connected printers and photocopiers enable ideas and documents conceived·e·s using digital technology to be materialised in written form. In fine, these uses prove the strong integration of digital devices in educational activities, institutional management at ARSTM with a view to meeting the ever-increasing demands of the modern maritime and port sector. The various studies reported as part of this work bear witness to the fact that digital devices serve as catalysts capable, in this day and age, of bringing about significant transformations in African societies. The conclusions reached by Autissier, Vandangeon-Derumez & Vas (2018) are consistent with our study. These authors support the idea that digital tools constitute rapid solutions for deploying, on the African continent, new working methods, management systems, or communication platforms on the scale of the given organisation.

The contribution of digital technology to change at ARSTM: At ARSTM, digital devices have had a profound impact on two fundamental aspects, namely the fluidity of communication and the sense of belonging of the institution's players. The speed and accessibility of exchanges are the consequence of the adoption of digital tools in the Academy's communication architecture. In concrete terms, the use of platforms (WhatsApp, Zoom), instant messaging and intranets encourage real-time communication within the institute. These tools remove physical and temporal barriers, enabling rapid exchanges between teachers, students and the administration. In turn, there is increased flexibility in the transmission of information, which is essential in this academic environment with diversified stakeholders. Autissier et al (2018) came to the same conclusion. According to them, collaborative platforms, pages created by the organisation or company on social networks and instant messaging systems facilitate the rapid dissemination of information, encourage more horizontal communication, reduce resistance to change and lead staff to become more involved in the management of the structure. Castells (2010) argues that ' *digital space redefines the dynamics of time and distance, offering global immediacy and connectivity*'. Secondly, digital devices provide uniform access to information. Institutional emails enable exchanges to be formalised and traced,

reinforcing the responsibility of each player. Online forums and discussion groups provide collective answers to common questions. This was not possible in the institution ten years ago. This leads us to agree with Lévy (1997) that the use of digital communication tools ensures a transparent flow of information, a major lever for collective intelligence. As for the fact that digital devices in the organisation reinforce the feeling of belonging, this is to be sought in the very idea of creating a virtual community and its concrete realisation. ARSTM has set up digital platforms for communicating with the various parts of the organisation. By creating these virtual community spaces, physical boundaries are transcended. In these spaces, social ties are strengthened between members (teaching staff, administrative staff, administrators and students). Bringing these different players together online around academic, professional and socio-cultural themes is likely to foster a sense of unity. This idea is supported by Boyd and Ellison (2007) when they state that ' *digital social networks are not simply communication tools, but spaces where collective identities and belonging are constructed* '. Through the digital tools adopted by the Academy, the initiators value the individual and collective contributions of its members. Such a mechanism generates an environment where each player feels valued and integrated. This analysis is corroborated by Gee (2004) in his work. In essence, he states that ' *digital recognition plays a key role in strengthening commitment and motivation within online communities* '.

In short, these tools enable fluid and transparent exchanges at ARSTM, while enhancing the participation of each player. In addition, by integrating digital tools into its relations with the various staff, ARSTM is automating the flow of information, which can be seen in the reduced time between a request from a teacher or administrative staff and the response from administrators. Clearly, members are given the opportunity to send their requests directly and automatically to the manager or department concerned, with notification of processing or reading sent in real time. Finally, the perceptions that the various players in the system have of the impact of the integration of digital devices in the new way of communicating in recent years in the institution rhyme with satisfaction. Teachers, for their part, measure the impact of digital tools in terms of the time they save by making information flows more autonomous, the horizontal nature of communication between all players and the ever-increasing professionalism of processes. For the administration, these tools have the advantage of positively changing relations with all the institution's staff, thanks to transparent processes for communicating information, valuing contributions, etc. From the above, we can say that the integration of digital devices at ARSTM has introduced positive correlations between communication fluidity, transparency and stakeholder satisfaction.

CONCLUSION

The communicational transformation facilitated by the integration of digital devices within the Regional Academy of Marine Sciences and Techniques (ARSTM) in Côte d'Ivoire bears witness to the fact that technology is redefining organisational and educational practices in Africa. Numerous digital tools including mobile phones, computers, smartphones, tablets, video projectors and printers are used and manipulated on a daily basis by administrative, teaching and technical staff and students·e·s as part of their activities. By integrating these tools, ARSTM has modernised its internal and external communication processes through a restructuring of its communication systems with the corollary of a better flow of information and more effective decision-making. Relations between the institution's various stakeholders, both internally and externally, have been transformed as a result, with more fluid and interactive communication. Digital transformation has also strengthened the institution's ability to anticipate and respond to changes and

requirements in the maritime and port sector. Ultimately, digital devices are not just changing communication practices within ARSTM ; they are reinventing the very foundations of the organisation by making it more agile, more responsive, and better connected to its environments (local and international). As a result, digital technologies have become essential levers, nowadays, for achieving in-depth organisational transformation (Autissier et al, 2018).

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