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Editorial

This Maiden Edition of Multilingual African Digital Semiotics and E-lit Journal (MADSEJ) is dedicated to selected peer-reviewed articles harvested from the second annual conference African Electronic Literature Alliance International Workshop Conference (AELAIWC2022) titled *E-Literary Procedural Creativity on Digital platforms and Metaverse/création numérique procédurale de la Littérature métaverselle et littérature dispositive*, virtually anchored from the Centre for Digital Humanities University of Lagos (CEDHUL).

This issue generally introduces the art of writing electronic literature, the theories that support its practice and the role of Africa in the 21st century digitality. This objective is premised on the social reality that digital media is decentralising digital universe called metaverse, transforming exponentially our worldview and society today by tilting towards e-literary fusion with non-literary, humans and Artificial Intelligence to produce an e-literary utopia.

This edition opens with the discourse of literary procedural creativity, meta-creative writing or distant writing, critiquing, reading and analysis employing theories and methods in Electronic Literature. Noticeably, in the Nick Montfort's article, he explains the theories of computer-generated novel whereby authors use computer to practice the art of distributive writing under the aegis of programming languages. In this regard, authors play the role of a writer and a computer programmer in the same vein combining their writing techniques with computational techniques, emerging innovative new ways of producing narrative designs and prose to make work of arts set a utopia of human and machine interaction.

As for Philipe Bootz, the veteran theorist in the Electronic Literature, in his piece, he presented the theory called "Procedural model" and its praxis in the work of arts in four-dimensional aspects and the social situation based on a concept of a computer system. With illustrations and examples, he technically reports "procedural model" application and compares it with various pre-existing theories in the field of electronic literature to expose their limitations. The article elaborates the semiotic dimension of Bootz's theory and points out that the text of computer-generated productions is multidimensional and distributable. And at the end, Bootz redefines the electronic literature basing his facts on the Spinozist conception of the ontology of art works.

Davin Heckman's article deviated from the theories and praxis of the digital literature, poetics of generative text and Artificial Intelligence to open a discussion on the future of digitality in Africa against the Western world's socio-political antihuman interests. The article establishes the facts that Africa should benefit from the clashes of the world powers with Russia and China by focusing on developing its local digital infrastructures to free itself from the grips of the world powers. He iterates that African digital autonomy is capable of shaping the 21st century.

Ajah's article contributes to the arguments that digital infrastructures are seriously needed in Africa to avoid obsolescence of African digital heritages and electronic literatures on the virtual world, equally signalling the need to classify the genres of the African e-lit in other to properly document it for the future. Ajah invokes new argument on the critical attention and exploring

African electronic literature broadly. Based on these facts, the article attempted describing and exploring the emergent African electronic literature and its subgenres with their evolutions over the time. Then, it concludes with lamentations similar to those of Heckman by highlighting the potentials of the African digital autonomy in shaping the global culture. Whilst, Charles Berebon argues in his philosophical article that another problem facing Africa is digital divide. This causes social injustices and inequality. Hence, such issues could be solved through philosophical and ethical analyses.

Moreover, Alan Bigelow provides a short guide for African artists on how to create digital literature using HTML5, JavaScript, React and CSS.

These articles cover all needed skills, theories with applications, techniques of creating African electronic literature and they call for the attention of the African policymakers towards building lasting digital infrastructures that will influence the global community, and an African society free of digital divide.

We appreciate all our authors who have taken pains and pens to contribute to this maiden edition of the Multilingual African Digital Semiotics and E-lit Journal (MADSEJ).

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The Computer Generation of Novels: Theory and Practice

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Abstract

How do authors use computers, not to write novels with word processors, but to generate novels with computer programs? For those interested in this practice, how to join those who are now working as author/programmers, combining writing techniques with computational techniques, developing innovative new ways of producing plots and prose? There are plenty of exciting opportunities for innovation in the area of computer-generated novels. To look ahead, it's first appropriate to look back and discover a bit about the history of computer-generated writing. Some discussion of the novel is important, too. Understanding more about this allows us to see how we can now elaborate, question, and combine past work — using new computational methods.

Keywords: Novel, Computer Generation, Theory, Generative Novel, Electronic Literature

Résumé

Comment les auteurs utilisent-ils les ordinateurs, non pas pour écrire des romans avec des logiciels de traitement de texte, mais pour générer des romans avec des programmes informatiques ? Pour ceux intéressés par cette pratique, comment se joindre à ceux qui travaillent désormais en tant qu'auteur-programmeur, combinant des techniques d'écriture avec des techniques informatiques, développant de nouvelles méthodes innovantes pour créer des intrigues et de la prose ? Il existe de nombreuses opportunités passionnantes d'innovation dans le domaine des romans générés par ordinateur. Pour anticiper l'avenir, il est d'abord approprié de regarder en arrière et de découvrir un peu l'histoire de l'écriture générée par ordinateur. Une certaine discussion sur le roman est également importante. En comprendre davantage à ce sujet nous permet de voir comment nous pouvons désormais élaborer, remettre en question et combiner le travail passé en utilisant de nouvelles méthodes informatiques.

Mots-clés : Roman, génération du texte assistée par informatique, théorie, roman générative, littérature numérique

1.0. The Early History of Creative Text Generation

For more than seventy years, people have been using computers to produce creative text of different sorts. For instance, in 1952, Christopher Strachey wrote a program on the Manchester Mark I to automatically generate love letters. Although this text generator seemed to be more of a joke at first, he later wrote an article in an art magazine explaining how the program worked (Strachey 1954) — suggesting it was a project of artistic merit.

There are many other early examples of computer-generated creative writing from the "batch" or punched-card era of computing, a time before people could sit and type programs at a terminal (Montfort 2016). Early author/programmers had to write programs — often writing then by hand and having a keypunch operator encode them on punched cards — then submit those cards to a computer center and wait for the result. There might be a minor error which caused the program to loop endlessly or to not run at all, in which case the author/programmer would have to correct the program and repeat the whole process, probably not getting the next result until the next day. Despite these challenges, several remarkable early projects were developed even before people were able to program interactively on minicomputer or had their own microcomputers.

In Germany in 1959, Theo Lutz wrote a generator of lines that introduced what sounded like logical propositions, with language taken from Franz Kafka's *The Castle.* Lutz published a scientific paper about his project. Similarly, Victor H. Yngve, working at MIT in 1961, developed a generator of random sentences in the course of his academic work in machine translation. Although it was based on simple language at the beginning of a children's book, it could recursively build phrases within phrases and produce uncanny results. Brion Gysin, working with Ian Sommerville, automated a process he originally had been undertaking by hand and began to produce computer-generated permutation poems in the 1960s in England. In South Africa in the early 1960s, J. M. Coetzee, the author who would later win the Nobel Prize for Literature, was working at IBM and wrote a program to generate random five-word lines. One of the most remarkable early computer-generated poems was the 1967 "A House of Dust" by Alison Knowles & James Tenney, which balanced repetition and variation, had a distinctive stanza form, and was issued as a printed set of unique outputs. I have re-implemented these historical text generators so that (although they are materially and visually different from the originals) they function, as best I can tell, as the original programs did. They are available in JavaScript and Python versions (Montfort 2014–2018). The first computer-generated novel is not easy to pin down. Sheldon Klein was working on an "Automatic Novel Writing" project and issued a report about the work (co-authored by eight others!) in the 1970s (Klein et al. 1973). The project is remembered as the first major effort at a novel-writing system, but it did not bear fruit in the form of one or more computer-generated novels.

There are other relevant academic projects, but when it comes to published books, many points to *The Policeman's Beard is Half-Constructed,* attributed to the computer program Racter (Racter 1984). This book is a provocative one and led some early critics to denounce it as not really being computer-generated. These early critics were misguided — the text is the output of a computer program — but at the same time, the book is obviously not a novel in any strict sense. Its pages include prose text, poems, and human-created illustrations.

Author/programmers have produced something like novels, and persistent work in creative text generation and in computer storytelling (Sharples & Pérez y Pérez 2022). To begin to consider what these are, we should think about computer-generated book that engage with the novel tradition. *The Policeman's Beard* is an innovative and interesting book, but it does not present itself as a novel or connect to the tradition of this genre. There are, however, other computer-generated books worth considering as novels. These are of quite varied sorts, some online, some in print. Many of them are much harder to read and appreciate in traditional ways than is *The Policeman's Beard.* The discussion will proceed to some of these. First, however, it's worthwhile to consider what some prominent examples of (human-written) novels are, and how different these can be.

2.0. Novels of Many Different Sorts

Consider just a few of the major differences between Chinua Achebe's *Things Fall Apart* (1992) and Amos Tutuola's *The Palm-Wine Drinkard* (1953). Achebe's novel is about the initially traditional life of an Igbo man, Okonkwo, who is a successful (if flawed) figure at the beginning of the book. He has a personal downfall, goes into exile, and returns to find his village transformed by colonialism. Tutuola's novel, in contrast, has as its full title *The Palm-Wine Drinkard and His Dead Palm-Wine Tapster in the Dead's Town.* It tells the story of a man who consumes copious amounts of palm wine. When he cannot replace his skilled supplier of this wine, who died in a fall from a tree, he goes on a fantastical quest to find him in the land of the dead, one blending many elements of Yoruba folklore. During an early encounter, he declares himself "Father of gods who could do everything in this world." While Achebe used a phrase from a William Butler Yeats poem as the title of his novel and wrote in a way that seemed more conventional to Western readers, Tutuola invented the word *drinkard* and wrote in a very different and distinctive style. Yet these are not from radically different times, places, or language communities: They are two English-language novels from Nigeria, originally published in the same decade, Achebe's in 1958, Tutuola's in 1952.

Of course, this sort of novelistic variety is not specific to English. Albert Camus, born in Algeria when it was part of France, wrote one very influential French novel of the 20th Century, the spare, direct, and brief *L'Etranger* (1978). Marcel Proust's *À la recherche du temps perdu* (1987) seems to be different along every dimension, although the two novels are not from radically different times. Proust's was published during 1913–1927; Camus's came out in 1942.We can even find cases in which the same author has written radically different novels, as a brief excerpt makes clear. Here are the first sentences of James Joyce's first novel, originally published in 1916, *A Portrait of the Artist as a Young Man* (1928).

The wide playgrounds were swarming with boys. All were shouting and the prefects urged them on with strong cries. The evening air was pale and chilly and after every charge and thud of the footballers the greasy leather orb flew like a heavy bird through the grey light. He kept on the fringe of his line, out of sight of his prefect, out of the reach of the rude feet, feigning to run now and then. He felt his body small and weak amid the throng of the players and his eyes were weak and watery. Rody Kickham was not like that: he would be captain of the third line all the fellows said. This is what we find at the top of page 1 of Joyce's last novel, from 1939, *Finnegans Wake* (2010):

> Riverrun, past Eve and Adam's, from swerve of shore to bend of bay, brings us by a commodius vicus of recirculation back to Howth Castle and Environs. Sir Tristram, violer d'amores, fr'over the short sea, had passencore rearrived from North Armorica on this side the scraggy isthmus of Europe Minor to wielderfight his penisolate war: nor had topsawyer's rocks by the stream Oconee exaggerated themselse to Laurens County's gorgios while they went doublin their mumper all the time: nor avoice from afire bellowsed mishe mishe to tauftauf thuartpeatrick:

Finnegans Wake, abundant with neologisms and with references that run down to the morphological and etymological levels, asks for entirely different reading strategies than does Joyce's first novel. It is, indeed, an entirely different kind of book, one that questions the boundaries of the novel and of the English language.

3.0. Novel Writing and Novel Generation Goals

Since there is no one kind of novel, we should not expect there to be only one kind of computer-generated novel. Just as writers have different purposes, author/programmers do, too.

So, what reasons? It's impossible to enumerate them, but some of the motivations include:

1. Producing a bestseller and making money
2. Embodying cultural ideas
3. Expressing personal experience
4. Exploring narrative possibilities
5. Exploring language

My own background, expertise, and motivations do not include (1) — I would have no idea how to go about writing a blockbuster thriller or other massively popular book. I also don't know of many author/programmers who are really aiming to do this, although some of them seek certainly publicity and try to gain wider interest in their work.

My creative writing (whether it is computational or not) is also not about (3), the expression of personal experience. It may be that computer-generated literature is simply not suitable for such expression, when compared to traditional novel writing. Or, it may be differently suited to the task. But I will have to leave it to others to discuss this from a practical standpoint.

My goals as an author/programmer are focused on (4), the exploration of narrative possibilities and (5), working with and through language itself to make discoveries. Among novelists, writers of metafiction are some who have investigated narrative extensively. Joyce, in *Finnegans Wake,* is an explorer of language, as is Gertrude Stein in her *Making of the Americans,* which has a much smaller vocabulary but develops new types of syntax and works on our reception through repetition and variation.

While I seldom start a project with goal of (2) embodying cultural ideas, as Achebe and Tutuola accomplished in dramatically different ways, I seek to explore and uncover aspects of culture *through* my engagement with narrative and language.

Now I can offer a revision of this list, from the perspective of my own authorial and computational practice, with one elaboration, to consider another possible reason to specifically *generate* a novel:

1. ~~Producing a bestseller and making money~~
2. ((((Embodying cultural ideas))))
3. ~~Expressing personal experience~~
4. Exploring narrative possibilities
5. Exploring language
6. Exploring computation

Just as my own novel-generation processes involve the exploration of language, it is also important that I explore computing and its potential for engagement with language, literature, and culture. Computer generating a novel is not only *writing;* it is a process of creating software art, *computational art.*

4.0. What Do Computers Do Well?

Because I want to explore language and computation, I don't want to do violence to either one. I want to use the capabilities of the computer as a textual system. I don't want to go against the grain. That leads me to ask, what are computers good at doing?

Are they good at (computationally, programmatically) expressing personal experience? Of course, an online system such as a social network can foster personal expression and storytelling. But in my experience, it is harder for a computer program to be as personally expressive as a traditional text — a novel, a memoir, an essay. To the extent that one is expressive, it is usually because of the *data* involved, not the computational processes. The computer generation of novels does not, at this point, seem inclined toward the expression of personal experience.

What about working through historical, cultural, and mythical intricacies? There are certainly special cases where computational techniques, like non-computational techniques for experimental

writing, can be applied so as to shed light on such topics. But even in these cases, it is through working with and understanding these techniques (which involve the exploration of narrative, language, and computation) that cultural engagement is possible. So, I don't find this to be among the most obvious capabilities of the computer.

What are the obvious ones?

- Regularity
- Repetition
- Randomness

Computers are formal and can produce language regularly, by permutation, by combination, by recursively including sentences as phrases within sentences, by appending more, bit by bit. A program can of course repeat language at any level, such as by letter, by word, by phrase, by sentence, by paragraph. And the computer has the ability to choose from a distribution of language at random — "pseudorandomly," if we want to be precise, but this approximation is certainly good enough for artistic purposes. Each of these can be done with at most a few lines of code. The development of personal expression and the modeling of cultural phenomena are much grander goals that would take much more work to attain.

5.0. Novels Aren't New

With this in mind, what are easy but substantial things for a computer-generated novel to be *about*? It seems clear to me that (just as Tutuola conflated existing Yoruba folktales in his first novel) they can be about earlier stories and earlier novels. By connecting to such previous literary work (and orature), computer-generated novels can be significant and can question and extend this work in important ways.

It's not just computer-generated novels that have this sort of work, and not just *The Palm-Wine Drinkard.* James Joyce's *Ulysses* (1990) could not exist without *The Odyssey.* In the literature of the United States, Cormac McCarthy's *Blood Meridian* (1986) is a conflation of Samuel Chamberlain's *My Confession: Recollections of a Rogue* (a memoir), *Moby-Dick,* and *Paradise Lost.* One of the foremost early works of hypertext fiction, Shelley Jackson's *Patchwork Girl* (1995), draws on Mary Shelley's *Frankenstein* and L. Frank Baum's *The Patchwork Girl of Oz.*

It seems ironic, because the word *novel* literally means "new." But to make a "new" novel, a powerful way is to find existing writing and make it new by combining, elaborating, and questioning. Doing so can allow an author to drive forward into new possibilities for narrative and language. In the case of an author/programmer, there will be new computational possibilities to discover, too.

One example from my own work is the writing/programming of *Megawatt* (Montfort 2014). This book is based on Samuel Beckett's second novel, *Watt* (1970), which includes several very unusual passages that are permutations of language. Those parts of *Watt* seem as if they were computer-generated, although Beckett wrote the book before digital, general-purpose computing existed, when he was working for the French resistance in World War II. In developing *Megawatt,* I decided to take these bizarre passages and, first, write code that would actually generate them computationally — it would do the permuting, automatically, that Beckett did by hand. Having done that, I went on to extend these passages and make them even more absurd and unreadable. Why would I bother with this? For me, writing the code, producing the generating program, was a way of reading *Watt* in more detail. It helped me understand exactly what Beckett had done as a writer. The publication of my *Megawatt* provided both a bizarre text and all of the code that generated it, so that readers who wanted to deeply explore *Watt* in the same way I did could see my methods all laid out.

I am hardly alone in using earlier novels as the basis for new computer-generated work. Consider Milton Laufer's *A Noise Such As a Man Might Make* (2018), published by Counterpath Press in the Using Electricity series (which I edit). The text generation is done by a simple Markov chain process, with two pages of code in the back of the book revealing the details of how it was done. The

book conflates two famous American novels in a fragmentary and confused way, taking advantage of how proper names almost never appear in either book and how both books have an old man and a boy as their main characters. By bringing together two stories of struggles against nature and challenges to traditional notions of masculinity in this provocative framework, the novel builds something new and compelling.

Another printed novel is *1 the Road* by Ross Goodwin (2018). This one is hard to read in a different way, with text tagged with different times of generation, produced based on camera images, GPS data, and in-car conversations during a road trip. The specific AI generation method used was a long short-term memory (LSTM) recurrent neural network. This book refers in its title, subject matter, and to some extent its process to Jack Kerouac's *On the Road,* a chronicle of a road trip typed on a long scroll of paper.

Sofian Audry's *for the sleepers in that quiet earth.* is a set of 33 unique books (2017–2019), each of which was generated using the same process and had only Emily Brontë's novel *Wuthering Heights* as data. As with *1 the Road,* an LSTM was used. Each epoch of learning is represented in each book, so each of the books progressively shows an increasing "understanding" of the text. The texts were generated in 2017 and the printed book published in early 2019 by my micropress, Bad Quarto.

World Clock (Montfort 2013) came about in the context of Darius Kazemi's NaNoGenMo (National Novel Generation Month), an annual activity that happens each November. NaNoGenMo is not actually national (anyone around the world can participate) and most of the computer-generated books developed are not novels; many of them, including excellent ones, are more in poetic traditions. My *World Clock,* programmed for the first NaNoGenMo, is not directly based on an earlier novel, but it draws on two experiment writing works, "The Chronogram for 1998" by Harry Mathews and the "One Human Minute" by Stanislaw Lem, which is a review of a non-existent book and, in English translation, appears in Lem's book of the same name. My program in this case narrates 1440 different episodes, different ways that people read all throughout the world at different times — at each different minute — in a single day.

Another NaNoGenMo production is Robin Camille Davis's *If on a winter's night a library cardholder* (2016), inspired conceptually and formally by Italo Calvino's novel *Se una notte d'inverno un viaggiatore* (*If on a winter's night a traveler).* The original novel has a frame story about a reader referred to as "you" who is seeking a complete edition of a book that is off to a very compelling start. Each time "you" think you have found the book, a new chapter in a completely different genre is presented instead. Camille's computer-generated novel takes "you" to every public library in New York City, where, flipping through a random book, a random passage is presented to you.

A very recent publication that can be approached as a novel is Arwa Michele Mboya's *Wash Day* (2023, also in my Using Electricity series from Counterpath). Her book is not directly based on a novel; it draws its text from a different source. The language it uses comes from transcripts of YouTube videos and braids together discussion of hair care rituals from Black women. Computation collages this together to provide a new sort of reading experience and an intimate perspective on the many stages and details of caring for curly hair. Mboya is from Nairobi and now lives and works in Los Angeles.

6.0. Getting Started

While it's possible to start a novel generation project with a grand plan, an author/programmer can also work in a *bottom-up* fashion by modifying and elaborating a simple program. I created an untitled program specifically so that participants in AELAIWC2022 can study the code and use it for any purpose, including as the basis for an artistic project. It is available here and will run automatically when one visits this link: https://nickm.com/if/aelaiwc22.html

The "View Page Source" option will reveal the code. To facilitate study, I am including the entire short program below. The JavaScript program at the core of this generator is embedded in a Web page, written in HTML. The actual program is found between <script> and </script>.

```
<!DOCTYPE html>
<html>

<head>
   <meta charset='utf-8'>

   <title>For AELAIWC2022 (by Nick Montfort)</title>
   <style>
      body {
         margin: 10vw;
         font-size: 4vh;
      }
   </style>
   <script>
      const templates = [
         'so OPPONENT-1 MEETS OPPONENT-2 . OPPONENT-2 FIGHTS OPPONENT-1 . OPPONENT-1 FIGHTS OPPONENT-2 . OPPONENT-2 FIGHTS OPPONENT-1 . OPPONENT-2 TIRES . OPPONENT-1 TIRES . There is peace',
         'now OPPONENT-1 MEETS OPPONENT-2 . OPPONENT-2 MEETS OPPONENT-1 . OPPONENT-1 FIGHTS OPPONENT-2 . OPPONENT-2 FIGHTS OPPONENT-1 . MEDIATOR RESOLVES . There is peace',
         'OPPONENT-1 MEETS OPPONENT-2 . MEDIATOR MEETS OPPONENT-1 . There is peace',
      ];

      const opponents = ['the soldier', 'the bureaucrat', 'the engineer', 'the businessman', ];

      const mediators = ['the elder', 'the child', 'the scholar', ];

      const meets = ['notices', 'sees', 'observes', 'hears', 'meets', ];

      const fights = ['argues with', 'strikes', 'punishes', 'insults', 'decries', ];

      const tires = ['tires', 'becomes weary', 'has enough', ];

      const resolves = ['chastises them', 'shows them how to behave', 'shames them', ];

      function choose(array) {
         return array[Math.floor(Math.random() * array.length)];
      }

      function typeset(sentences) {
         let text = '<p>\n';
         for (sentence of sentences) {
            text += ' ' + sentence.charAt(0).toUpperCase() + sentence.slice(1) + '. ';
         }
         text += '\n<\p>\n<hr />\n';
         text = text.slice(0, -7);
         return text;
      }

      function generate() {
         let text = choose(templates);
         let opponent_1 = choose(opponents);
         let opponent_2 = choose(opponents);
         if (opponent_1 == opponent_2) {
```

```
            opponent_2 = "the other " + opponent_2.split(' ')[1];
        }
        let mediator = choose(mediators);
        text = text.replace(/OPPONENT-1/g, opponent_1);
        text = text.replace(/OPPONENT-2/g, opponent_2);
        for (i = 0; i < 4; i++) {
            text = text.replace('MEDIATOR', choose(mediators));
            text = text.replace('MEETS', choose(meets));
            text = text.replace('FIGHTS', choose(fights));
            text = text.replace('TIRES', choose(tires));
            text = text.replace('RESOLVES', choose(resolves));
        }
        x.innerHTML += typeset(text.split(' . '));
    }
  </script>

</head>

<body onload='for (let n=0;n<1000;n++) {generate();}'>
  <div id=x />
</body>

</html>
```

Here is a brief excerpt of sample output — the system produces a much more extensive list of paragraphs:

> So the bureaucrat notices the soldier. The soldier punishes the bureaucrat. The bureaucrat argues with the soldier. The soldier strikes the bureaucrat. The soldier tires. The bureaucrat tires. There is peace.
>
> Now the soldier meets the other soldier. The other soldier hears the soldier. The soldier insults the other soldier. The other soldier strikes the soldier. The elder chastises them. There is peace.
>
> So the businessman observes the engineer. The engineer punishes the businessman. The businessman strikes the engineer. The engineer decries the businessman. The engineer has enough. The businessman has enough. There is peace.

As written, this program is repetitive and limited, but it is not meant to be a compelling text generator in its current state. Instead, it is an invitation. You are welcome to modify the words and phrases, and you can do so even if you have no background in programming. Simply save the Web page to your own computer (for instance, your Desktop) and open it in a text editor. After you change elements of it and save the changes, open the page in a Web browser to see what new sorts of text will be generated.

What if you are someone without programming background, and as you are editing the program, you make some horrible mistake and break some of the code, so the program no longer works? Just download the Web page again; it will still be there, online. By making small changes a bit a time and checking your results, you will be able to "undo" any edits that break the program while developing your own creative voice. In doing so, you'll not only develop a creative project. You will also learn more about what is code, what is data, and how computing and language can work together.

Good luck with your story generation and with developing your own computer-generated novel!

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Short Bio

As a poet and artist, Nick Montfort uses computation as his medium. His computer-generated books include *#!* and *Golem.* His digital projects include the collaborations *The Deletionist* and *Sea and Spar Between.* Montfort is a scholar, researcher, and educator. His MIT Press publications include *The New Media Reader* (which he co-edited) and *Twisty Little Passages, The Future,* and *Exploratory Programming for the Arts and Humanities.* He is professor of digital media at MIT and principal investigator in the Center for Digital Narrative at the University of Bergen. He directs a lab/studio, The Trope Tank, and lives in New York City.

Praxis du modèle procédural dans le champ des littératures numériques

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Résumé

L'article décrit dans un premier temps le modèle procédural. Il s'agit d'un modèle qui décrit, en 4 dimensions, les œuvres numériques et, plus généralement, toute situation sociale à partir d'un concept de dispositif. Ce modèle est alors appliqué à différentes théories préexistantes dans le champ de la littérature numérique pour en pointer les limites. L'article développe ensuite plus particulièrement la dimension sémiotique du modèle et montre que le texte des productions numériques programmées est multidimensionnel et distribué. Il se penche finalement sur quelques problématiques fondamentales dans le champ de la littérature numérique en réfutant les définitions usuelles de cette littérature et en proposant des orientations pour la monstration et la préservation fondées sur une conception spinoziste de l'ontologie des œuvres.

Mots-clés *: Modèle procédural, lecture double, labilité, lecture étroite, littérature numérique,*

Abstract

The article first describes the procedural model. It is a model that describes, in four dimensions, digital works, and more generally, any social situation based on a concept of a system. This model is then applied to various pre-existing theories in the field of digital literature to highlight their limitations. The article then specifically develops the semiotic dimension of the model and shows that the text of programmed digital productions is multidimensional and distributed. Finally, it examines some fundamental issues in the field of digital literature by refuting the usual definitions of this literature and proposing directions for presentation and preservation based on a Spinozist conception of the ontology of works.

Keywords: Procedural model, double reading, lability, narrow reading, electronic literature

1 Introduction

1. 1 La genèse du modèle procédural

Le modèle procédural est désormais un modèle général de communication (Bootz, « une approche modélisée de la communication… »), mais son vocabulaire est lié à ses origines relatives aux œuvres littéraires numériques. Lors d'un colloque en 1993 sur la littérature numérique, j'avais ressenti l'absence d'un cadre commun qui permettrait de comparer les différentes approches théoriques qui s'y étaient exprimées. J'ai alors créé une première version du modèle procédural qui a été publiée en français en 1996 puis a été présenté aux Etats-Unis à Hypertetex'97 par Jim Rosenberg. L'objectif affiché de ce modèle était de fournir un cadre théorique et un vocabulaire commun permettant de comparer divers points de vue. Il ne s'agissait pas de décrire ces points de vue mais de les projeter sur le même modèle afin de visualiser leurs différences et similitudes. Ce modèle devait tenir compte des connaissances et observations que j'avais faites durant 7 ans sur le fonctionnement de la revue *Alire*, revue numérique de poésie numérique que j'avais créée avec le groupe LAIRE en 1989. L'observation du fonctionnement diachronique des œuvres publiées avait alors mis en évidence une propriété fondamentale des œuvres numériques, la labilité, qu'aucun autre modèle ne prenait en compte.

1. 2 Périmètre de l'article

Le modèle procédural prend donc en compte, comme son nom l'indique, les procédures, qu'il faut comprendre dans leur désignation informatique, c'est-à-dire les algorithmes et jeux d'instructions, et les processus, certains invisibles au sein d'un dispositif et d'autres, média, bien visibles dans la production matérielle que réalise le programme en cours d'exécution. Il est donc, en quelque sorte, nativement bipolaire par nature : code et médias classiques.

Le modèle poursuit trois objectifs en ce qui concerne la littérature numérique :

- Fournir un cadre commun permettant de comparer divers points de vue théoriques
- Fournir un outil multidimensionnel de description des œuvres
- Permettre de proposer des approches nouvelles sur des sujets importants. Celles qui seront abordées ici concernent
    i. L'ontologique de l'œuvre numérique
    ii. La préservation
    iii. La réception des œuvres.

Il est raisonnable de considérer qu'il existe plusieurs formes de littérature numérique. Les diverses typologies qu'on rencontre dans le champ universitaire en témoignent. Je traiterai principalement de ce que je nomme la « littérature numérique programmée » qui regroupe les productions qu'un auteur ou un groupe d'auteurs programme lui-même dans un langage de programmation ou un environnement auteur, éventuellement graphique, qui *in fine* produit un programme ou une page Web. Cela exclue les productions dans lesquelles l'auteur ne gère que les médias (chat, blogs, publications sur réseaux sociaux notamment). Non pas que le modèle procédural ne puisse s'appliquer à ces productions, mais simplement parce que je me suis exclusivement intéressé aux productions programmées.

Dans cet article, je commencerai par décrire le modèle procédural tel qu'il peut être appliqué dans les champs des études littéraires numériques, puis je donnerai quelques exemples d'analyse sémiotique mettant en œuvre ce modèle avant de finir sur des propositions théoriques sur les sujets évoqués ci-dessus.

Cet article constitue un panorama de recherches, analyses et réflexions qui s'étendent sur presque 30 ans. Il n'est pas question, bien sûr, d'entrer dans tous les détails ni de mentionner toutes les applications du modèle, notamment au niveau des analyses sémiotiques. Il ne sera notamment pas question ici des outils théoriques mis en œuvre dans l'analyse des productions écran des programmes.

2 Un modèle en quatre dimensions

Le modèle s'organise selon 4 dimensions complémentaires mais hiérarchisées : matérielle, communicationnelle, sémiotique et cognitive au sens large. Cette dernière dimension couvre l'ensemble de ce qui se joue mentalement et inconsciemment chez le sujet (en situation de production ou de réception) lors de son contact avec l'œuvre et qui contextualise sa production du sens.

2. 1 La matérialité dans le modèle procédural

2. 1. 1 Le dispositif

a) Définition

Le modèle procédural traite de la matérialité de la situation analysée en considérant qu'elle constitue un « dispositif ». Ce dispositif est défini comme l'ensemble des artefacts, composantes physiques matérielles et groupes humains qui interviennent, à quelque titre que ce soit, dans la situation étudiée. Il distingue expressément les humains des composantes matérielles, s'opposant ainsi aux propositions de fusion artificiel/humain de type post-humain ou cyborg.

Les individus n'y sont pas considérés pour eux-mêmes mais pour le rôle qu'ils occupent à un moment donné dans le dispositif ; ce sont ces rôles d'acteurs sociaux qui sont repérés dans le dispositif sous forme de pôles. Les pôles sont des positions dans le dispositif dans lesquelles le sujet humain peut agir directement sur certains artefacts et objets du dispositif. Les pôles sont caractérisés par leurs possibilités d'actions directes sur les artefacts et objets du dispositif. Ce pouvoir d'agir est limité, il ne porte que sur une partie seulement du dispositif.

Un même individu peut occuper différents pôles mais jamais simultanément. C'est pourquoi le modèle fait explicitement la différence entre un lecteur, qui est un individu en situation de réception mais qui peut occuper divers pôles selon les modalités de réception qu'il met en œuvre, et un Lecteur qui est un pôle spécifique dans le dispositif. Il en va de même de l'auteur, qui est un individu, et du pôle Auteur qui est une position spécifique dans le dispositif. L'auteur occupe le pôle Auteur dans une étape de production mais peut ultérieurement occuper une autre position dans le dispositif.

Le modèle décrit ce dispositif selon un schéma structurel qui permet de visualiser synthétiquement la situation. Au besoin, ce schéma est décomposé en un scénario montrant le schéma du dispositif à chaque étape de l'évolution de la situation.

b) L'axe principal du dispositif

Le modèle procédural stipule qu'une transformation physique organise le dispositif. En littérature numérique programmée, cette transformation est le plus souvent le processus numérique qui transforme le programme écrit par le ou les auteurs en un exécutable lu par un lecteur, que cette transformation passe par une phase de compilation ou d'interprétation par un player ou un navigateur.

La méthodologie SADT, issue de l'ingénierie (Favier et al, 1996), stipule qu'une telle transformation s'effectue au sein d'une « boîte noire », que le modèle procédural dénomme un appareillage. En littérature numérique, cet appareillage est le plus souvent constitué de tous les

ordinateurs, écrans et périphériques divers qui interviennent dans la transformation, incluant l'Internet et le Web dans certaines productions. Selon les situations, d'autres éléments peuvent également y être inclus comme des objets, par exemple lors d'une performance, et un espace, un environnement spécifique, dans une installation par exemple.

La transformation est alimentée au sein de l'appareillage par une matière d'œuvre d'entrée et produit une matière d'œuvre de sortie. Le modèle procédural nomme, de façon générique, « source » la matière d'œuvre d'entrée, car elle correspond approximativement, le plus souvent, au programme source écrit par l'auteur, et « transitoire observable » la matière d'œuvre de sortie car elle correspond, généralement, au phénomène physique observé par le lecteur sur son écran. Ce phénomène est bien transitoire, il disparaît en fin d'exécution, et observable par le lecteur.

Il est important de noter que source et transitoire observable sont des composantes physiques, pas des signes. Ainsi, le source n'est pas le programme mais le fichier numérique du programme source, constitué d'un ensemble particulier de spins atomiques orientés, et le transitoire observable n'est pas l'animation lue sur écran ou la page Web affichée mais le phénomène physique de modulation des luminosités qui matérialisent ces signes. En tant que tels, le source et le transitoire observable peuvent être enregistrés (enregistrement écran, listing…) par des appareils et périphériques (imprimante, caméra, micro…) alors que les signes ne le peuvent pas. La séparation nette et précise entre la matérialité et les systèmes de signes est une hypothèse fondamentale du modèle procédural qui permet de travailler la pluralité des perceptions et interprétations.

La matière d'œuvre d'entrée est créée par une activité humaine, donc par un pôle qui comporte des acteurs humains : le pôle Auteur, et la matière d'œuvre en sortie de la transformation est récupérée et travaillée par un autre groupe humain, le pôle Lecteur, à partir de son action physique sur la partie du dispositif qui lui est accessible. Le dispositif est donc articulé en domaines. Un pôle ne peut agir de façon directe sur les artefacts internes à son domaine.

Un pôle ne peut pas agir directement sur un élément qui ne se trouve pas dans son domaine. Par exemple, en littérature numérique, dans le modèle procédural, on ne peut pas affirmer que l'Auteur programme le transitoire observable ou, ce qui revient au même, qu'il crée le transitoire observable. Réciproquement, un Lecteur ne peut accéder au programme de l'œuvre, il n'a qu'une vue partielle de l'œuvre. C'est pourquoi je nomme « lecture étroite » son activité. Elle consiste le plus souvent en la lecture numérique, celle qui lit sur écran le résultat de l'exécution du programme de l'œuvre, qu'il soit interactif ou non, génératif ou non, sans autre périphérique que ceux prévus par ce programme. Dans certains cas, le lecteur peut accéder au programme, mais il n'est plus alors en situation de Lecteur mais, comme nous le verrons ci-après, de méta-lecteur.

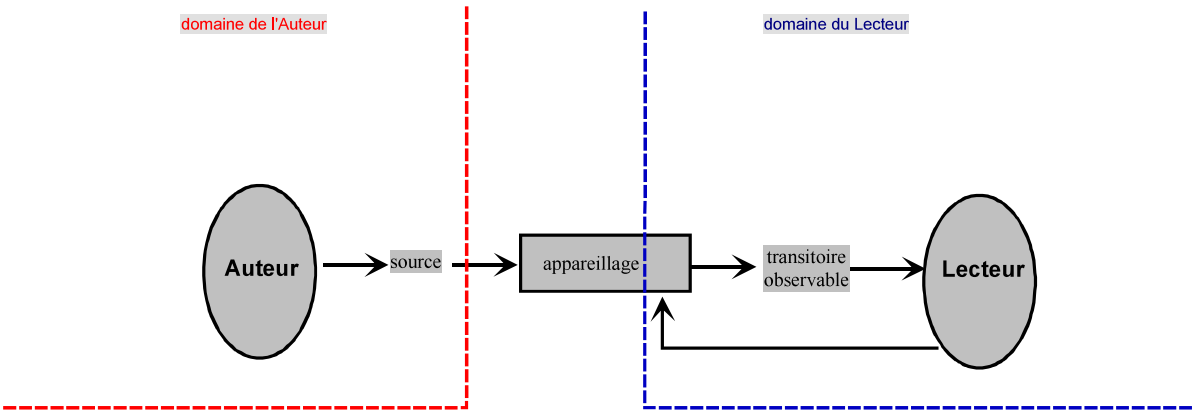


Figure 1 : l'axe principal du dispositif procédural (ou dispositif principal)

Ce schéma est général. Il ne présuppose aucune nature particulière de ses composants. Il peut par exemple s'appliquer à la littérature livresque : un auteur (Auteur) écrit un manuscrit (le source) qui va être transformé par la chaîne éditoriale et de diffusion (l'appareillage) en un ensemble de tâches d'encre (le transitoire observable) sur le livre (partie accessible de l'appareillage par le pôle Lecteur) que le lecteur (en situation de Lecteur) va pouvoir lire moyennant une activité de lecture (tourner les pages du livre).

Il s'applique à une œuvre musicale exécutée en concert : un compositeur (Auteur) écrit une partition (le source) qui est jouée par un orchestre (l'appareillage) dont le son produit (le transitoire observable) est entendu d'une certaine façon par l'auditeur (le Lecteur) en fonction de sa position dans la salle (son positionnement constitue l'action sur le dispositif).

En littérature numérique programmée, un auteur programmeur (l'Auteur), écrit un programme source (le source) dans un langage informatique donné qui va ensuite être complié ou interprété dans l'appareillage informatique constitué d'ordinateurs et éventuellement du Web, afin de produire sur l'écran du lecteur (Lecteur) un processus visuel et sonore (le transitoire observable) moyennant une action du lecteur sur son ordinateur, ne serait-ce que le lancement du programme.

Dans un dialogue, le source est le son émis par celui qui parle (Auteur) et le transitoire observable le son entendu par son interlocuteur (Lecteur). Ce son est plus ou moins bruité et déformé par rapport au source, de sorte que la perception du Lecteur ne rend pas totalement compte du son émis. Toutes ces perturbations sont liées à l'environnement spatial et à la façon dont il modifie physiquement le son (dispersion, réverbération, interférences…). Cet environnement constitue l'appareillage ; le milieu dans lequel se propage le son. Lorsque l'interlocuteur répond, il y a simplement inversion des pôles : l'interlocuteur devient Auteur et l'autre Lecteur. Cette gestion temporelle du dispositif explique pourquoi le modèle procédural n'établit pas de feedback entre les pôles Auteur et Lecteur : le transitoire observable existe toujours après le source et donc lorsque l'activité d'Auteur de ce source est achevée. Si les deux personnes parlent en même temps, aucun des deux n'écoute l'autre ; il n'y a alors plus de transformation organisatrice du dispositif et le modèle procédural ne s'applique plus.

Ce schéma n'est pas complet car il ne prend pas en compte toutes les particularités du dispositif, à savoir :

— Les acteurs humains qui font fonctionner l'appareillage. Ce groupe est dénommé « agents techniques » dans le modèle et leur rôle est essentiel, car ce sont eux qui ont le pouvoir réel sur l'appareillage. Ils peuvent ainsi façonner le transitoire observable indépendamment de l'intentionnalité de l'Auteur et modifier de façon très substantielle le transitoire observable

par rapport à celui prévu par l'Auteur. Ce groupe a donc une position de pouvoir à laquelle l'Auteur est subordonné. En musique, il s'agit des instrumentistes et du chef d'orchestre ; ils interprètent la partition selon leur ressenti et en fonction de leurs compétences techniques. Dans le numérique, ce sont les entreprises qui fabriquent le matériel utilisé et les logiciels mis en œuvre, notamment l'OS : IBM, Apple, Microsoft etc. Leur impact sur l'exécution du programme est important et se traduit par le phénomène de labilité dans lequel le transitoire observable ne résulte pas seulement du programme source écrit par le pôle Auteur mais également des diverses interventions des agents techniques, tant au niveau du matériel qu'à celui des logiciels. La labilité est omniprésente, imprévisible, impossible à éviter et se traduit par un rendu à l'exécution reproductible dans un contexte technique d'exécution donné mais différent d'un contexte à l'autre. La labilité relativise et parfois détruit le lien causal censé relier le source au transitoire observable. La labilité existe dans tous les dispositifs car quel que soit le dispositif, il existe toujours des agents techniques.

— L'existence de données induites au sein de l'appareillage. Ces données sont générées par le fonctionnement interne de l'appareillage. Elles ne sont pas introduites par l'Auteur dans son source mais conditionnent pourtant le transitoire observable. Dans le domaine numérique, ce sont par exemple les cookies ou le paramétrage d'un réseau de neurones obtenu par *deep learning*. Contrairement à la labilité, les données induites n'existent pas toujours

— L'existence de productions annexes qui ne transitent pas par l'appareillage : manifestes et écrits d'Auteurs, commentaires de Lecteurs, etc. Chaque pôle peut ainsi produire des éléments que le modèle qualifie de « documents ».

— La présence de groupes humains liés à l'existence du processus structurant mais qui ne sont pas directement impactés par la transformation. Ils sont en position méta par rapport à cette transformation et le modèle les dénomme des « méta-lecteurs ». Il s'agit d'un groupe hétérogène qui peut assumer plusieurs rôles distincts (critique, journaliste, chercheur…). Par exemple, La première fois qu'un chercheur accède à une œuvre numérique et la découvre, il est en situation de Lecteur en lecture étroite. Mais lorsqu'il analyse l'œuvre ensuite, il n'est plus en position de Lecteur mais de méta-lecteur car il observe certaines parties du dispositif pour répondre à certaines questions qu'il se pose sur l'œuvre, pour obtenir des informations. Les méta-lectures ont en commun d'utiliser des modalités d'accès aux différentes composantes du dispositif généralement instrumentées, contrairement à la lecture étroite qui est une activité de lecture en relation directe avec le programme lu. Par exemple, un chercheur peut procéder à une capture vidéo de ce qu'il observe à l'écran en lecture étroite afin de l'analyser de façon plus simple et approfondie, sans craindre la surcharge cognitive. Cette activité de méta-lecture instrumentée met en œuvre la modalité 5 de méta-lecture (cf. Figure 2). Le modèle distingue 7 modalités de méta-lecture les plus courantes mais il peut en exister vers n'importe quelle composante du dispositif.

Munis de ces ajouts, le schéma structurel complet du dispositif est alors :

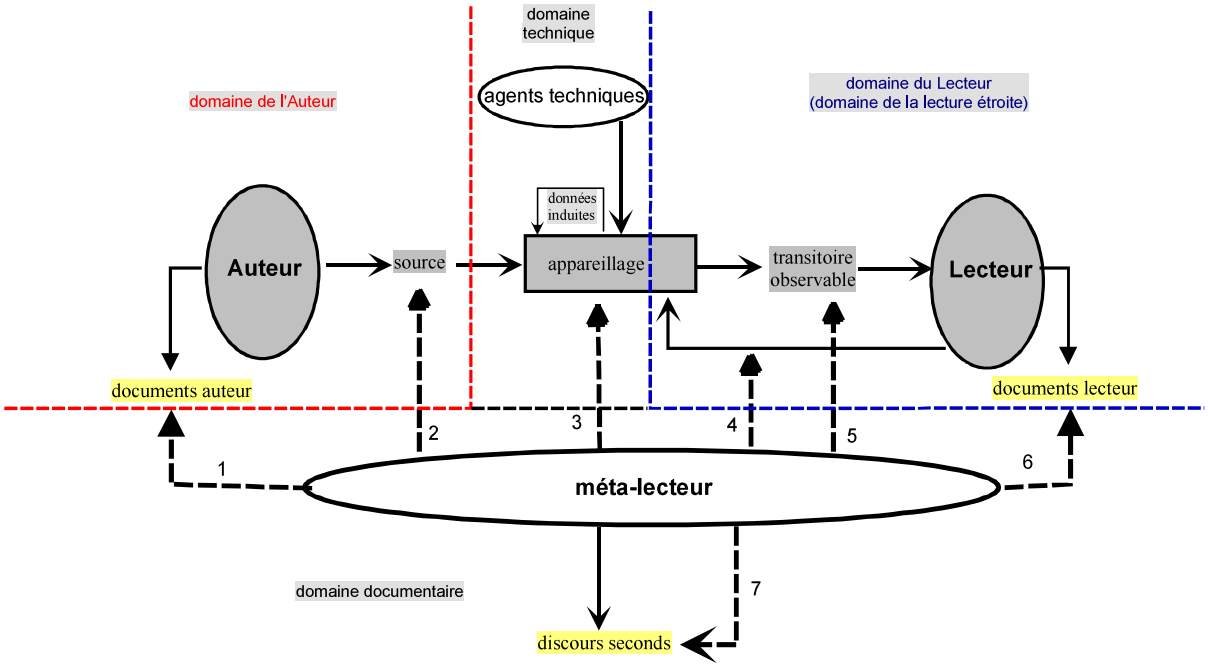


Figure 2 : schéma structurel du dispositif procédural

Les pôles humains repérés par des ellipses dans le schéma sont en fait des sous-systèmes qui peuvent être complexes. Dans la majorité des cas, ils sont néanmoins occupés en littérature numérique par un seul individu : un lecteur exécute le programme d'une œuvre créée par un auteur ; un chercheur analyse une œuvre.

2. 1. 2 Labilité et lecteurs éloignés

De nombreuses observations montrent que le transitoire observable ne dépend pas seulement du source mais aussi du contexte technique d'exécution (Bootz, « Ai-je lu ce texte ? », 294, « der/die leser ; reader/readers », 93-121). C'est le phénomène de labilité. Il démontre la puissance du pôle agents techniques.

Je considère que la labilité est la principale propriété des dispositifs numériques. Elle oblige à repenser notre compréhension de la littérature numérique, indépendamment de toute propriété générative, interactive ou animée.

La labilité détruit partiellement ou totalement la relation causale entre le source et le transitoire observable. Cette affirmation n'est pas intuitive car le principal axiome en informatique est justement que le programme décrit totalement le résultat de son exécution. En fait, c'est partiellement vrai. Si elle était totalement vraie, les anciens programmes fonctionneraient encore sur les ordinateurs actuels et les œuvres programmées en Flash continueraient également à fonctionner aujourd'hui. La labilité se produit en raison de l'impact technique, juridique ou marketing sur l'appareillage. La labilité est omniprésente. Elle ne peut être évitée et elle est reproductible sur un appareillage donné dans un contexte technologique qui demeure identique. Il est généralement impossible de détecter la labilité car elle n'a rien à voir avec du bruit.

Du fait de la labilité, deux lecteurs différents lisant sur des appareils différents vont observer des observables transitoires différents, cette différence n'étant pas inscrite dans le programme source. Ces lecteurs sont des lecteurs éloignés car ils n'observent pas le même transitoire observable. Si l'on considère que le transitoire observable contient l'œuvre, alors les lecteurs éloignés n'accèdent pas à la

même œuvre. Nous verrons dans la question ontologique comment le modèle procédural traite cette propriété.

La différence entre les transitoires observables auxquels accèdent les lecteurs éloignés, créée par la labilité, n'est pas intentionnelle. Elle n'est pas voulue par l'Auteur et elle implique donc que celui-ci repense son objectif créatif parce qu'il ne peut pas vraiment gérer ce que le Lecteur regarde. Que signifie créer une animation textuelle complexe si son esthétique est modifiée sur l'écran du Lecteur ?

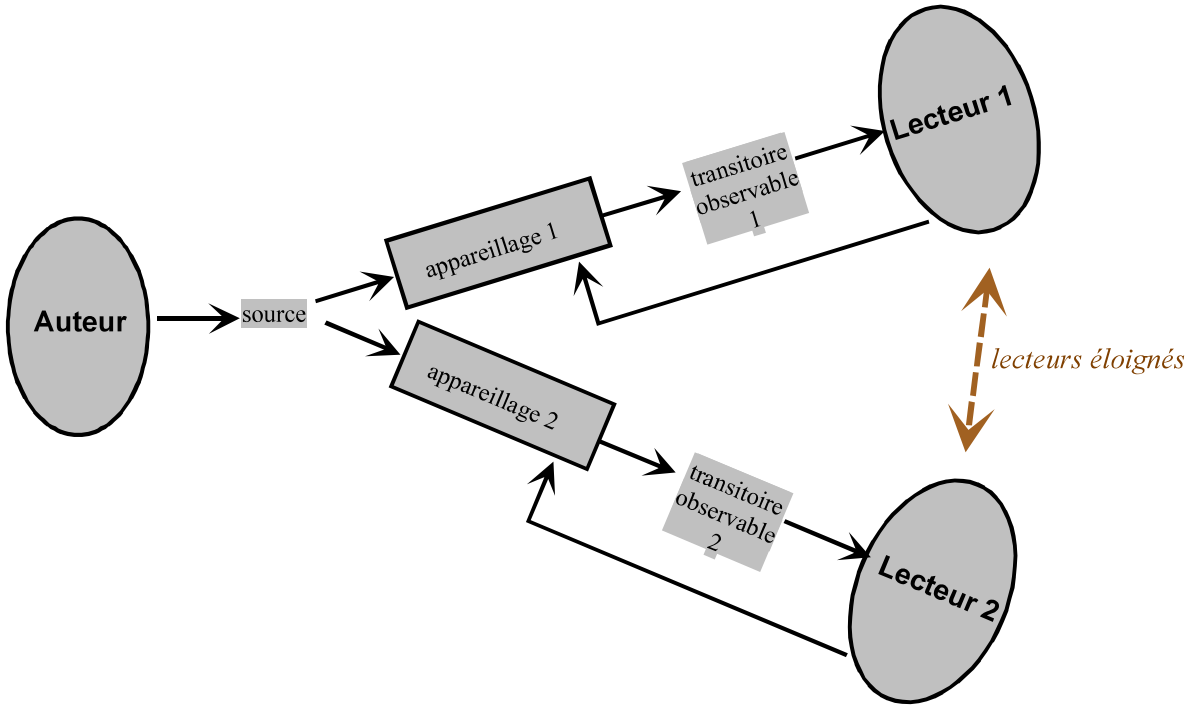


Figure 3 : effet de la labilité sur le pôle Lecteur : Les Lecteurs 1 et 2 sont éloignés l'un de l'autre.

2. 1. 3 Lecture étroite versus méta-lecture

L'activité du Lecteur est qualifiée de « lecture étroite » dans le modèle procédural car elle n'accède qu'à la composante produite par son activité de lecture sur l'appareillage et n'atteint pas le source. Dans le cas du livre, la lecture étroite n'est rien d'autre que la lecture usuelle du livre. En littérature numérique programmée, la lecture étroite correspond à la lecture numérique usuelle : le Lecteur accède directement au résultat produit par le programme, sans utiliser d'outil annexe, à partir des actions qu'il fait sur son appareil numérique (ordinateur, tablette, téléphone). Il n'accède pas au programme source. L'inaccessibilité du source entraîne une lecture incomplète qui peut produire de l'inconfort. Cette incomplétude de lecture s'observe notamment dans des commentaires négatifs de lecteurs de générateurs de textes mais elle se produit également dans les hypertextes et les animations de texte bien qu'elle y soit le plus souvent cachée au Lecteur. La lecture étroite est vraiment une situation de lecture frustrante que j'observe depuis que *Alire* existe (1989) et qui a d'ailleurs donné naissance à une esthétique typiquement française : l'esthétique de la frustration.

Dans certains types d'événements littéraires, par exemple les performances ou les installations, la personne qui lit se trouve dans une autre situation. Elle est en fait un méta-lecteur et non un Lecteur en lecture étroite. C'est pourquoi il est utile de préciser la nature de la situation analysée. Certaines situations relèvent de la lecture publique (spectacles, installations) et d'autres de la lecture privée. Les deux situations conduisent à un schéma structurel différent du dispositif. Les lectures publiques et

privées ne se réfèrent généralement pas à la nature de l'œuvre mais à la situation d'exécution. En lecture privée, l'auteur ne peut pas gérer l'effet de la labilité. En lecture publique, il le peut parce qu'il est situé dans le pôle agents techniques lors de l'exécution. C'est le seul cas où l'auteur peut gérer la labilité.

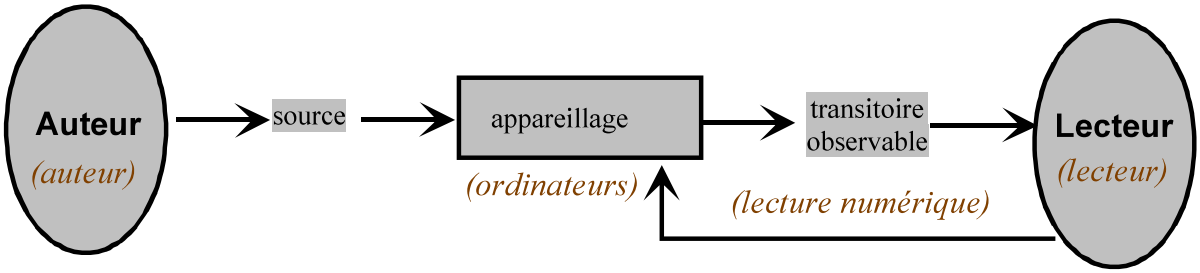


Figure 4 : dispositif en lecture privée

La méta-lecture se distingue de la lecture étroite par le fait que le méta-lecteur n'agit pas sur le dispositif dans le seul but de produire le transitoire observable. Il peut agir d'une façon différente, par exemple en lançant conjointement le programme de l'œuvre et une capture vidéo qu'il utilisera ultérieurement à des fins d'analyse. Il peut également être récepteur du transitoire observable dans une posture d'observation, par exemple lorsqu'il assiste à une performance numérique. Enfin, il peut être spectateur de l'activité d'autres lecteurs placés, eux, en lecture étroite, par exemple dans une installation. Le lecteur se positionnera alors tour à tour comme Lecteur et comme méta-lecteur (lecteur = Lecteur + méta-lecteur).

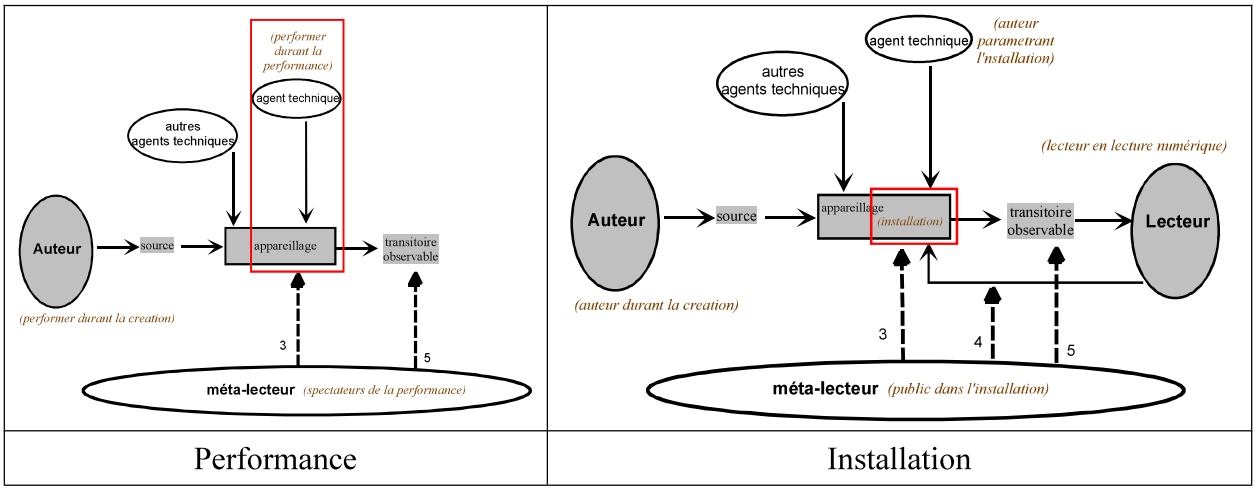


Figure 5 : dispositif en lecture publique

Dans la conception usuelle de l'art, le lecteur est tout à la fois celui qui procède à une activité de lecture (le Lecteur) et le destinataire de l'œuvre (lecteur = Lecteur). L'œuvre y est ainsi réduite à la seule composante physique située dans le domaine du Lecteur, celui de la lecture étroite. Elle est même le plus souvent réduite au transitoire observable (voire au texte-à-voir qui sera défini en 2. 3. 1) sauf pour les livres d'art où la matérialité du livre, donc la composante de l'appareillage accessible lors de la lecture, est constitutive de l'œuvre et dans les installations où le dispositif technologique lui-même est scénarisé.

En introduisant de façon générique les notions de lecture étroite et de méta-lecture, le modèle procédural suggère que, quelle que soit la nature privée ou publique du dispositif, l'activité usuelle de Lecture pourrait ne pas être suffisante pour accéder à la totalité de l'œuvre. Le modèle procédural dissocie ainsi la condition culturelle de lecteur en tant que récepteur de l'œuvre de sa condition

fonctionnelle d'actant nécessaire à la monstration de l'œuvre (lecteur > Lecteur). Cette dissociation est le pendant de celle de l'auteur que Jean-Pierre Balpe (95- 99) a théorisée dans son modèle du méta-auteur.

2. 2 La communication dans le modèle procédural

Le modèle procédural ne définit pas la communication comme une transmission entre un auteur et un lecteur. La communication a lieu dès lors qu'un acteur humain interne à un pôle, quelque soit ce pôle, attribue de la signification à un élément du dispositif, en liant cette signification à l'action d'au moins un autre acteur situé dans un autre pôle du dispositif. La communication met donc en relation deux pôles au moins du dispositif, sans que cette situation ne soit imposée arbitrairement par un pôle ou un autre. Le modèle diffère donc fondamentalement du tryptique émetteur/message/récepteur qui est très souvent implicite dans les analyses et qu'on retrouve en littérature sous le tryptique auteur/texte/lecteur. Dans le modèle procédural ce schéma est caduc, il n'est en fait qu'un cas particulier de dispositif qui n'est possible que sous certaines conditions.

On remarquera que dans la conception de la communication qui vient d'être énoncée, on ne communique pas avec soi-même.

2. 3 Les dimensions sémiotique et cognitive dans le modèle procédural

2. 3. 1 Texte-auteur et texte-à-voir

Le modèle procédural prend en compte le fait que des individus différents peuvent construire des textes différents sur la même réalité physique parce qu'ils perçoivent différemment cette réalité ou n'attribuent pas la même importance à ce qu'ils perçoivent. Il établit ainsi une distinction très nette entre les éléments matériels qu'un acteur peut percevoir dans le dispositif et l'ensemble des signes, le texte, qu'il y décèle. Le modèle nomme « texte-à-voir » l'ensemble des signes décelés par l'acteur dans le transitoire observable et « texte-auteur » ceux décelés dans le source. Texte-à-voir et texte-auteur sont composés de médias, au sens sémiotique du terme, alors qu'il n'y a pas de média dans le source ni dans le transitoire observable, uniquement de la matérialité. Un capteur, tel un micro, une imprimante ou une caméra, peut capter et enregistrer un source ou un transitoire observable, mais aucun capteur ne peut enregistrer un texte-auteur ou un texte-à-voir.

Texte-à-voir et texte-auteur ne sont pas les significations des transitoire observable et source mais leurs signifiants. Ils sont alors interprétés de façon classique. La distinction entre texte et matérialité n'affecte pas la possibilité de multiples interprétations des textes. En revanche, elle introduit la possibilité de multiples perceptions et donc de l'existence d'une multitude de textes sur une même réalité objective.

En utilisant le modèle tétradique du signe introduit par Klinkenberg (1996), nous voyons que le transitoire observable est le stimulus du texte-à-voir et le source celui du texte-auteur.

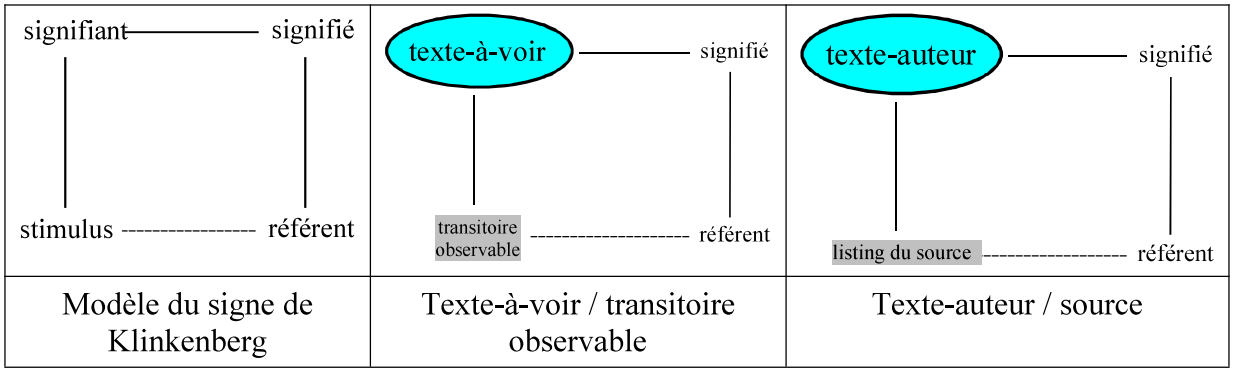


Figure 6 : signes principaux dans le modèle procédural

Notons que le fichier binaire constituant le source en littérature numérique programmée ne peut pas être directement perçu et ne peut donc pas être le stimulus d'un signe. Le stimulus du texte-auteur est alors son listing, imprimé ou affiché à l'écran.

2. 3. 2 Profondeur de dispositif

Le contexte physique dans lequel se trouve un acteur influence sa perception et donc son interprétation. Par exemple, le volume sonore, la luminosité, la distance à l'écran influent sur la lecture étroite. Ces contraintes physiques émanent du monde réel sont contenues dans l'appareillage.

En revanche, la perception et l'interprétation sont également contraintes par d'autres influences inhérentes à l'acteur lui-même : sa culture, l'état affectif et psychologique dans lequel il se trouve, ses compétences (linguistique, musicale, informatique etc.), ses goûts, ses connaissances, ses croyances et notamment l'imaginaire qu'il projette sur l'appareillage, la façon dont il se perçoit et perçoit les autres dans le dispositif, la façon dont il se croît perçu par les autres acteurs … Le modèle procédural regroupe tous ces paramètres dans le concept unique de profondeur de dispositif. J'ai introduit ce concept dans (Bootz, « Profondeur de dispositif… » 81-101). Il correspond, en ce qui concerne le Lecteur, au concept de « filtre interprétatif » de la sémiotique sociale. Je garderai néanmoins le terme de « profondeur de dispositif » qui ne se limite pas à la problématique de l'interprétation de signes à la réception mais s'applique également an amont, à la production de ce qui fera signe et, de façon générale, à tous les pôles La profondeur de dispositif est ce qui permet la décision sémiotique, et donc l'interprétation, mais inversement elle contraint cette décision et empêche l'acteur d'avoir certaines autres interprétations. Elle permet et restreint tout à la fois la compréhension et l'activité de l'acteur dans le dispositif.

Chaque individu possède sa propre profondeur de dispositif. Il s'ensuit que deux individus percevant le même transitoire observable (ou le même source) pourront y déceler des textes-à-voir (respectivement des textes-auteurs) différents.

On peut définir la profondeur de dispositif d'un pôle, même lorsqu'il regroupe plusieurs acteurs. Dans ce cas, la profondeur de dispositif du pôle est, selon les cas, soit la somme des profondeurs de dispositif individuelles, soit la résultant d'une négociation entre les acteurs, soit la profondeur de dispositif d'une autorité interne au pôle lorsque celui-ci possède une structure de pouvoir. Par exemple, la profondeur de dispositif qui s'exprime dans une interprétation orchestrale d'une symphonie est fondamentalement celle du chef d'orchestre.

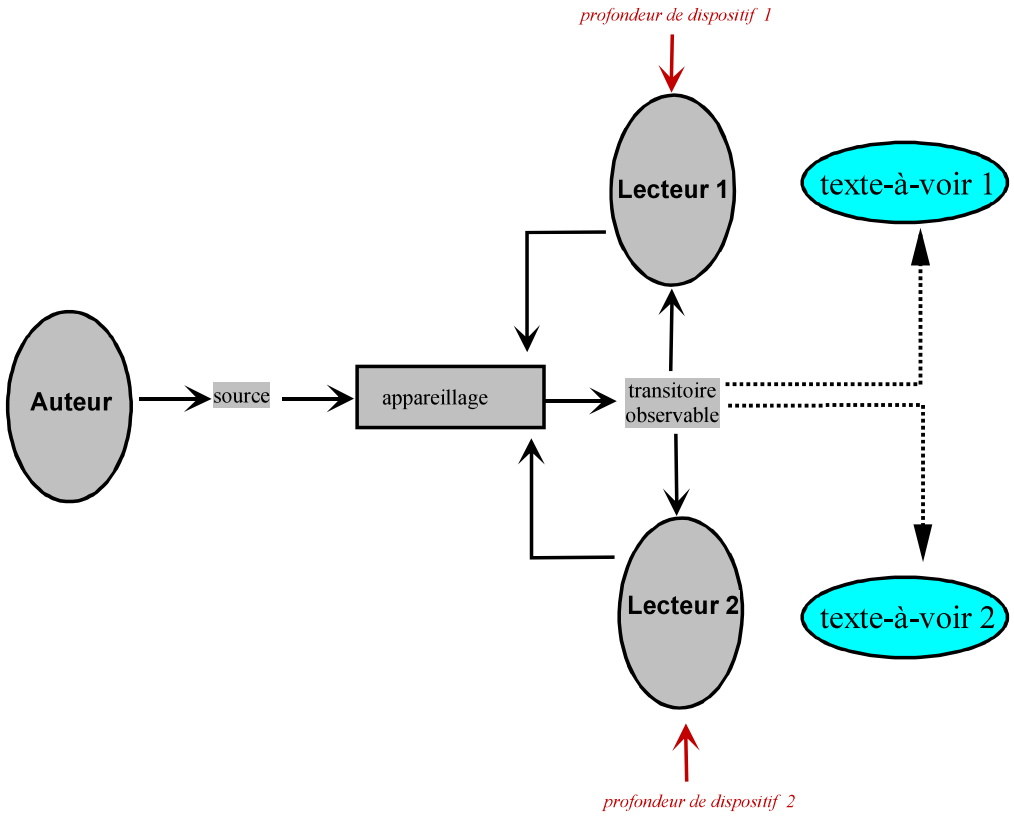


Figure 7 : texte-à-voir de deux lecteurs éloignés dont les profondeurs de dispositif diffèrent

Le modèle procédural ne considère pas qu'il existerait des interprétations correctes et d'autres fausses. Examinant la perception et l'interprétation d'un acteur ou d'un pôle, elle tente plutôt de mettre au jour les caractéristiques de la profondeur de dispositif de l'acteur ou du pôle qui conduisent à cette interprétation. C'est un exercice que j'ai souvent fait avec mes étudiants à partir de leurs observations de lecture des œuvres.

Prendre en compte la profondeur de dispositif dans l'interprétation implique que la signification et la connaissance sur le dispositif sont toujours relatives et jamais absolues car toujours dépendantes d'une profondeur de dispositif qui oriente le rapport au dispositif. Ce sont des points de vue portés sur la situation étudiée. Le modèle procédural lui-même est un point de vue issu de mes propres analyses de multiples situations de production comme Auteur, de lectures étroites et d'observations comme méta-lecteur, principalement en littérature numérique. Le modèle procédural possède d'ailleurs une place à l'intérieur de lui-même : il s'agit d'un discours second de mon activité de méta-lecture.

2. 3. 3 Schéma complet du modèle

L'ensemble de ces éléments aboutit au schéma complet suivant du modèle procédural dans lequel les couleurs des domaines rouge, bleu, noir sont relatives à un pôle.

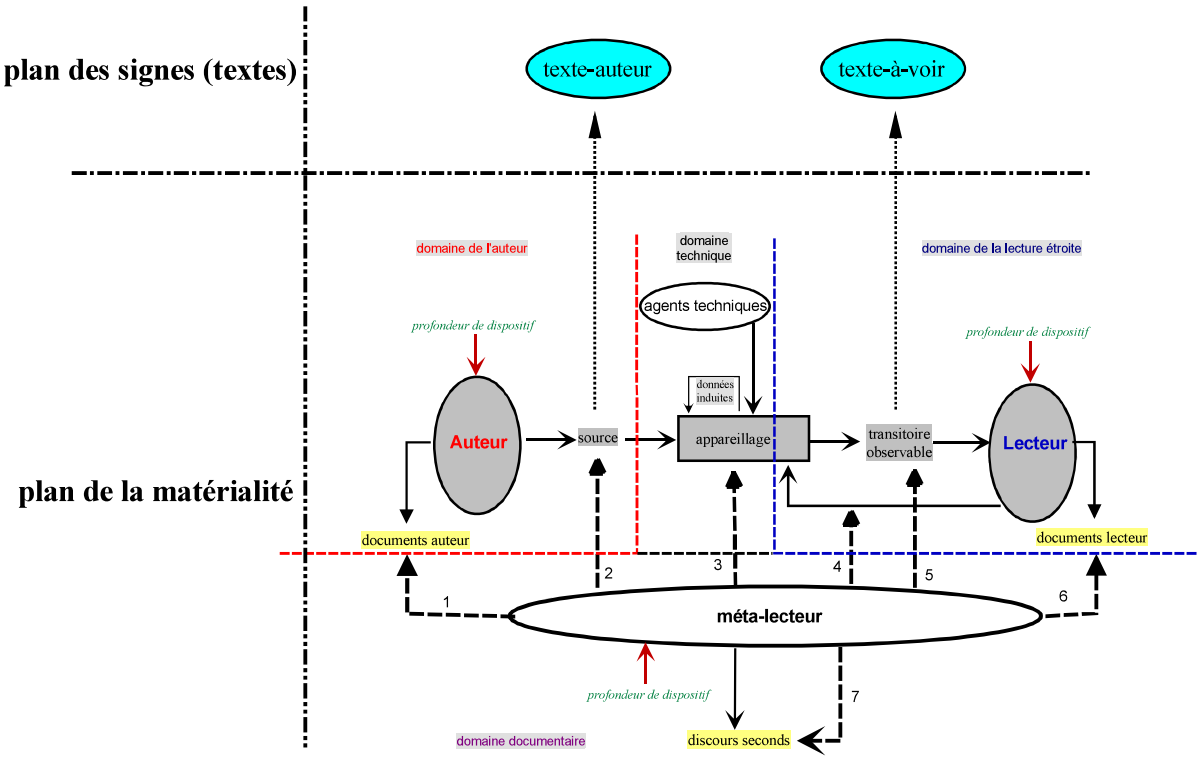


Figure 8 : schéma complet du modèle procédural

3 Projection de points de vue sur le modèle procédural

3. 1 Règles de projection d'un point de vue sur le modèle procédural

Le modèle procédural répond au premier objectif qui avait présidé à son élaboration : il constitue un cadre sur lequel on peut projeter différentes conceptions afin de les comparer. Il ne s'agit pas de décrire par le modèle procédural l'ensemble des caractéristiques de ces conceptions, mais uniquement de décrire la façon dont elles perçoivent et comprennent le dispositif. Pour ce faire, la projection utilise une grammaire, un ensemble de règles graphiques identiques pour tous les point de vue représentés afin de mettre en évidence les parties du dispositif que le point de vue représenté sous-estime ou privilégie par rapport au modèle procédural et, surtout, le domaine d'action qu'il attribue aux différents acteurs.

Ces règles sont les suivantes (Bootz, « Adaptive generators and… ») :

- Jouer sur l'épaisseur des traits et formes dans le schéma du modèle procédural en supprimant totalement ou éclaircissant les composantes du dispositif non prises en compte dans le point de vue et en mettant en gras celles qui sont privilégiées.

- Déplacer les frontières des domaines d'acteur pour rendre compte du domaine d'action attribué à l'acteur dans le point de vue.

- Les particularités des points de vue qui ne peuvent être prises en compte par le modèle procédural ne sont pas retranscrites : le modèle a une visée de visualisation à des fins de comparaison, pas d'explicitation complète des points de vue.

La visualisation ainsi obtenue exprime, depuis le point de vue du modèle procédural, la façon dont le point de vue visualisé comprend le dispositif.

3. 2 Le dispositif frontal

La quasi-totalité des points de vue théoriques exprimés en littérature numérique reposent implicitement sur une approche très classique du dispositif de l'œuvre littéraire, issue de la littérature imprimée et culturellement stabilisée par les arts média : cinéma, musique, vidéo.

Cette approche considère que l'œuvre est réduite à un texte au sens sémiotique large, c'est-à-dire un ensemble de signes. Elle ne prend pas en compte la profondeur de dispositif, et suppose alors que le texte est lu par le lecteur de la façon dont il a été pensé par l'auteur. Dans tout cet article, les termes lecteur et auteur sont ici utilisés au sens large comme synonymes de récepteur et de créateur. Elle néglige la dimension matérielle du texte, ignore la labilité et oublie de ce fait le rôle des agents techniques. Enfin, elle considère que la réception est totalement affaire de lecture étroite, ignorant ainsi la méta-lecture. Elle considère de plus que le texte est unique, c'est-à-dire que le texte lu par le lecteur (ici lecteur = Lecteur) est celui qui a été écrit par l'auteur (auteur = Auteur). L'œuvre est donc, *in fine*, le texte accédé par le Lecteur.

Je nomme cette conception le « dispositif frontal » car tout se passe comme si auteur et lecteur se tenaient tous deux dans le même espace, face au texte, l'un l'écrivant, l'autre le lisant. La transformation principale par l'appareillage est alors une simple transmission, l'appareillage est par conséquent négligé.

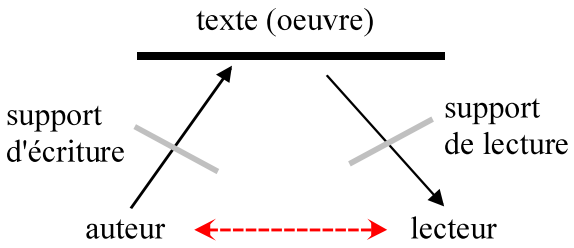


Figure 9 : le dispositif frontal

Projeté sur le modèle procédural, le dispositif frontal de la littérature imprimée se décrit comme suit : le source est un manuscrit, il contient lui-même le « texte », il n'est jamais qu'une anticipation matérielle du transitoire observable (l'encre des pages du livre), il le contient potentiellement. Le texte, assimilé à l'œuvre dans la conception livresque, est donc à l'intersection des domaines Auteur et Lecteur.

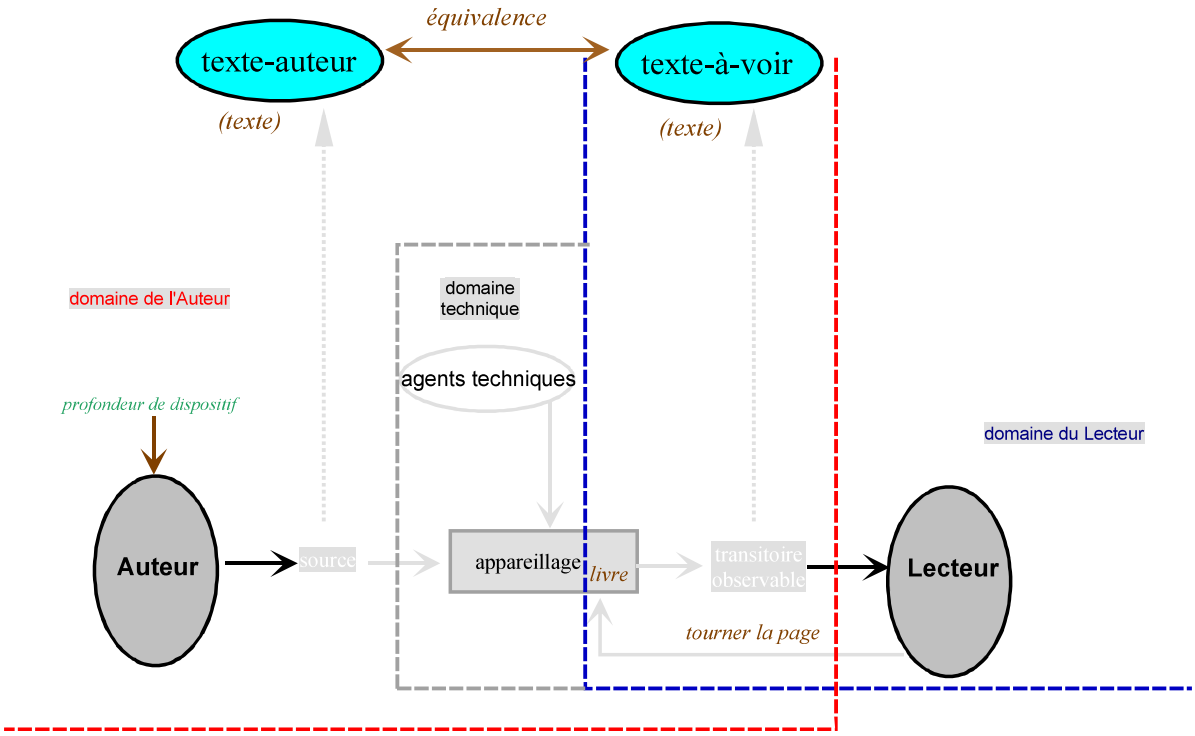


Figure 10 : visualisation du modèle frontal du livre dans le modèle procédural

Bien évidemment, en littérature numérique programmée, le source n'est pas un manuscrit mais un fichier et l'espace des signes dont il est le stimulus n'est pas écrit dans le même langage que le texte-à-voir.

Le modèle frontal est une approximation limite, un imaginaire. On peut montrer (Bootz, 90- 105) qu'il traduit en termes de dispositif la théorie de la communication de Weaver et Shannon (1949).

De façon générale, bien que cette perception du dispositif numérique soit implicitement, le plus souvent, celle des auteurs, les chercheurs ont eu tôt fait de percevoir qu'elle est problématique en littérature numérique et ont proposé d'autres conceptions. Celles-ci jouent principalement sur les positions Auteur et Lecteur mais continuent le plus souvent de négliger l'impact de la matérialité du dispositif. Ainsi en est-il du wreader dans l'hypertexte ou du méta-auteur dans la théorie générative.

3. 3 La conception hypertextuelle du *wreader*

La conception hypertextuelle (Bolter, 27 ; Landow, 14) suppose le contrôle complet de l'appareillage par le lecteur, au détriment du pouvoir de l'auteur. La frontière du domaine du Lecteur est donc déplacée. De plus la lecture étroite y est assimilée à une écriture, fusionnant ainsi lecture et écriture dans le concept de *wreader*. La conception hypertextuelle apparaît donc comme une survalorisation du rôle et du pouvoir de la lecture étroite. Elle crée une dissymétrie entre l'auteur et le lecteur qui se répercute sur la définition de l'œuvre : l'œuvre est ce que le Lecteur lit (transcription du postulat de la liberté du lecteur, central dans la théorie hypertextuelle).

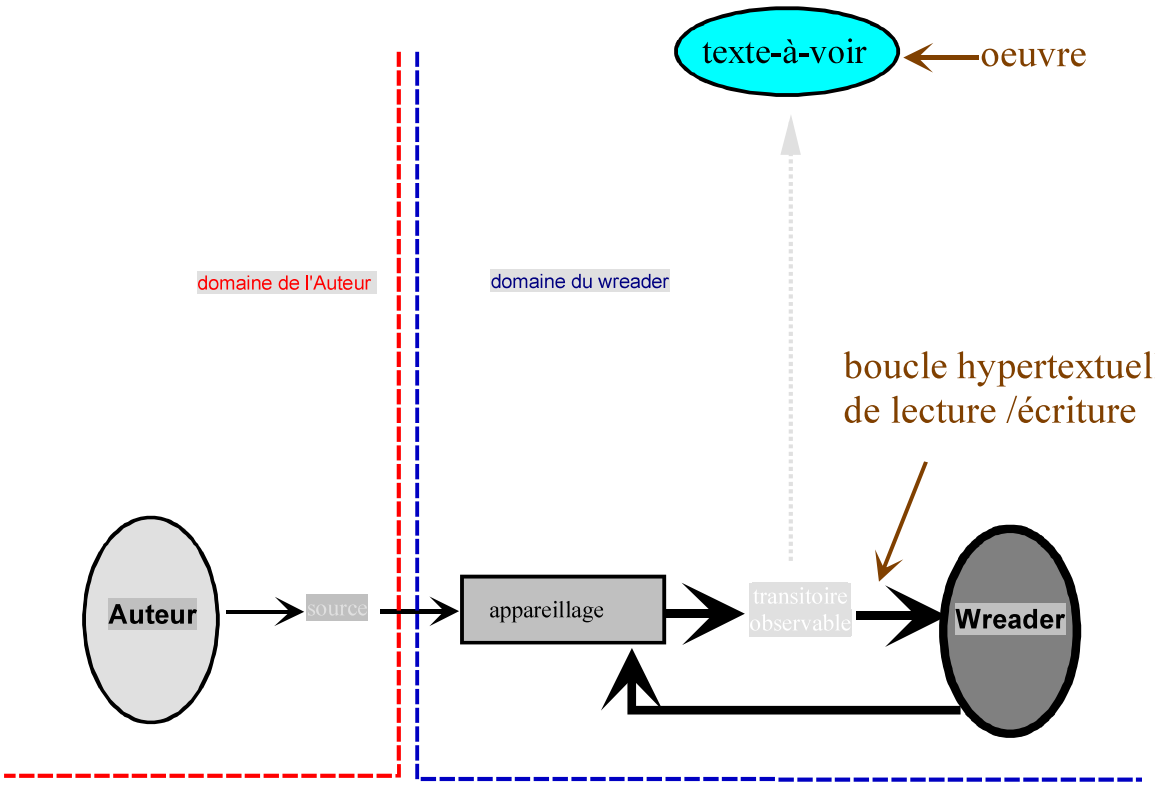


Figure 11 : visualisation de la conception hypertextuelle dans le modèle procédural

3. 4 Le méta-auteur

Jean-Pierre Balpe (95-99) attribue bien la qualité d'auteur, dans le sens culturel du terme, à l'Auteur humain, le concepteur du programme génératif. En considérant que l'œuvre demeure le texte généré dans le domaine du Lecteur, il est amené à dissocier les dimensions culturelle et fonctionnelle traditionnelles de l'auteur, celui-ci étant dans le modèle frontal la personne qui tout à la fois conçoit et écrit le texte.

Cette dissociation l'amène à attribuer le rôle fonctionnel de l'auteur à la machine et à nommer « méta-auteur » la situation de l'auteur culturel qui conçoit et écrit le programme, donc à la position Auteur du modèle procédural, mais ce méta-auteur n'accède pas au texte généré, ce qui se traduit dans le modèle procédural par un non-déplacement de la frontière de son domaine. Par ailleurs, Balpe demande à son lecteur de lire le texte généré comme un extrait de roman classique, ce qui suppose que ce dernier possède une profondeur de dispositif classique. Il suppose donc que la réception demeure conforme à celle du dispositif frontal, à savoir que lecteur et Lecteur sont confondues, que l'œuvre est le texte-à-voir et que ce lecteur n'accède pas au source dans sa lecture. En revanche, en attribuant au lecteur en position de Lecteur une profondeur de dispositif classique, il inverse la proposition du modèle frontal sur la profondeur de dispositif, : celle-ci n'est plus imposée par l'auteur mais par le lecteur, ce qui lui permet de défendre une liberté du lecteur à l'instar de la conception hypertextuelle et de s'opposer frontalement à la théorie de la lecture d'Umberto Eco : « *l'intentio lectoris n'a plus à retrouver les indices de l'intention auctoris* » (Balpe, « Un roman inachevé – dispositifs » 52). La théorie du méta-auteur continue de négliger la matérialité de l'appareillage et du transitoire observable.

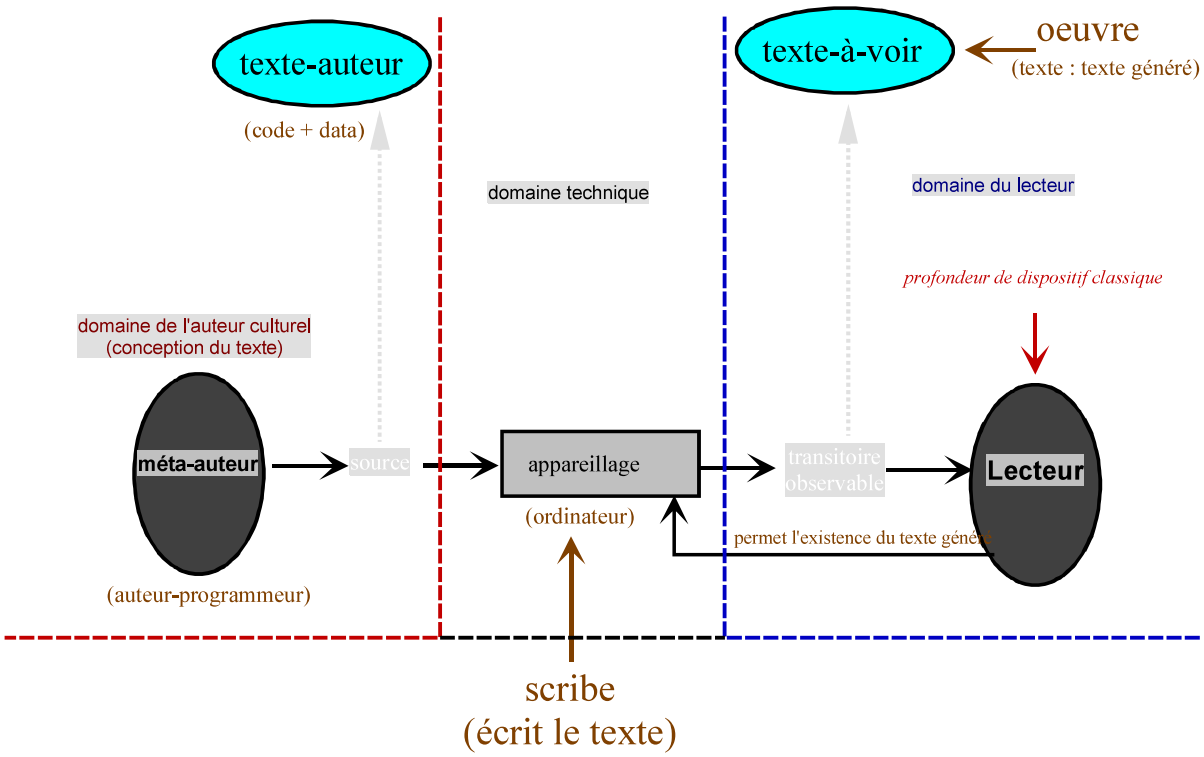


Figure 12 : visualisation de la théorie du méta-auteur dans le modèle procédural

3. 5 Le cybertexte

D'autres approches, comme celle du cybertexte (Aaseth, 18) ou du technotexte (Hayles, 24) prennent en compte d'une certaine manière la matérialité du dispositif

Le cybertexte abolit la distinction entre auteur et lecteur en parlant d'opérateur. Cela signifie que seule l'activité physique des acteurs est prise en compte, comme dans le modèle frontal, et que les domaines Auteur et Lecteur sont équivalents, induisant ainsi le même schéma du dispositif dans chaque domaine. La distinction entre auteur et lecteur réapparaît néanmoins insidieusement au niveau du signe à propos de la dualité textons/scriptons. On comprend à la lecture de l'ouvrage d'Espen Aarseth que les textons sont présents dans le texte-auteur et les scriptons dans texte-à-voir. À l'instar de la quasi-totalité des points de vue exprimés, le cybertexte néglige le stimulus au profit du signifiant des textes. La relation entre texte-auteur et texte-à-voir est la *traversal fonction* qui relie scriptons et textons.

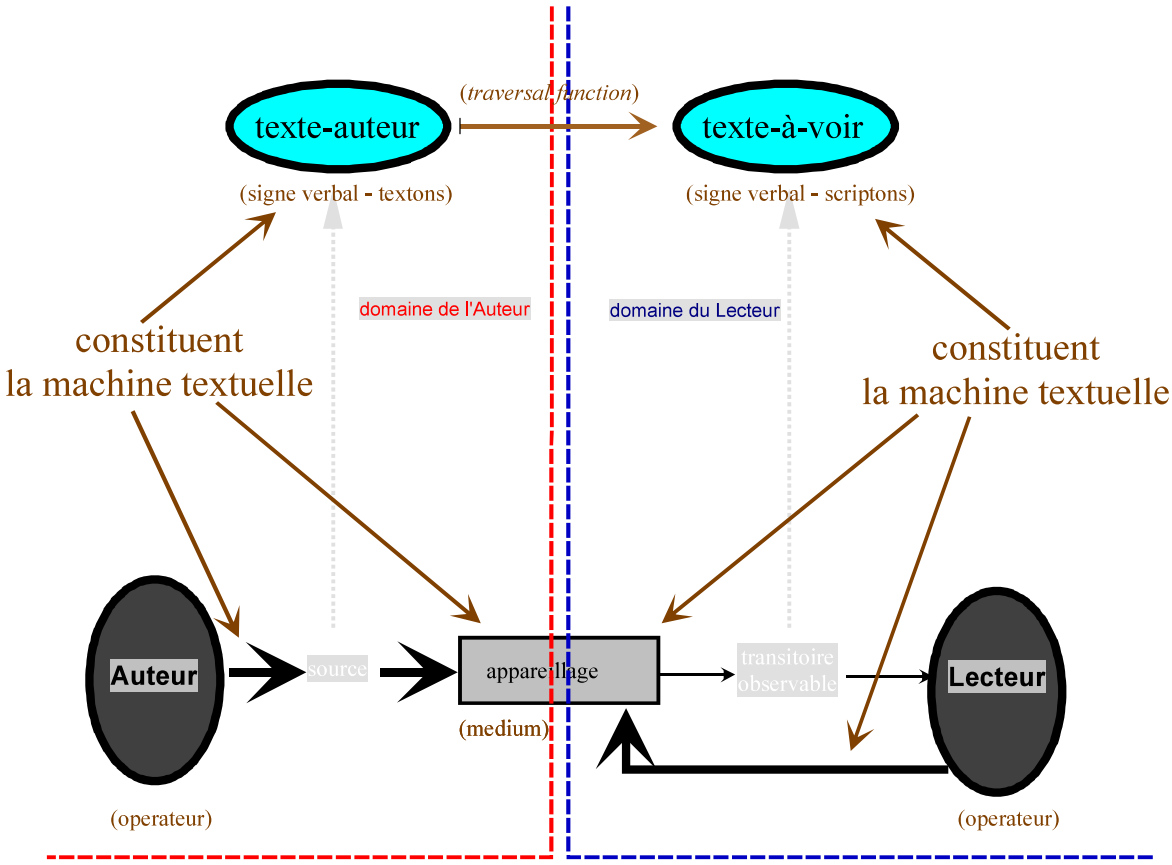


Figure 13 : visualisation de la conception du cybertexte dans le modèle procédural

3. 6 IA et machine intelligente

Dans les conceptions de « machine intelligente », la dimension informatique du programme est prise en compte et sa relation au texte-à-voir est explicitée. Le texte-à-voir demeure considéré comme le seul « texte » de l'œuvre et la problématique traitée est le rôle du code informatique au regard du texte ce qui, par voie de conséquence, implique de redéfinir la fonction Auteur. Cette problématique générale de l'art programmé est déjà celle du méta-auteur. La labilité, elle, demeure ignorée.

Prendre en compte le rôle du programme est une chose, accorder une intelligence à la machine en est une autre car cela implique de lui attribuer une part d'intentionnalité et un véritable pouvoir de décision, autre qu'un simple aléatoire. Dans le modèle procédural, cela revient à considérer que l'appareillage lui-même renferme un agent technique de nature non humaine.

Cette approche a pris plusieurs formes dans l'histoire de la littérature numérique.

3. 6. 1 Le mythe du robot-poète

Ce mythe (Winder, 187-213) consiste à considérer que la machine, incluant software et hardware, est l'auteur de ce qu'elle produit, cette production étant donnée à lire. C'est un point de vue qui est apparu dès les années 1950 en littérature numérique (Vian, 219-226). Ce mythe néglige complètement les pôles humains autres que celui du Lecteur. La machine (l'appareillage) est censée créer la matérialité du texte (elle remplace donc la position Auteur et le source) et, surtout, le « texte », cet espace des signes de l'œuvre. On obtient alors le schéma suivant dans lequel l'œuvre est située classiquement à l'intersection des domaines de l'Auteur et du Lecteur. On remarquera la dimension « magique » attribuée à la technologie : les pôles Auteur et agents technologiques sont totalement

absents ainsi que le source : la « machine » possède dans la situation créative une autonomie dégagée de tout intervenant humain. En revanche, comme l'œuvre demeure classiquement définie comme le texte lu par le Lecteur, ce mythe est parfaitement compatible avec le dispositif frontal. Rien, dans ce modèle, n'interdit que l'auteur soit non humain ; hormis un postulat dans la profondeur de dispositif culturelle.

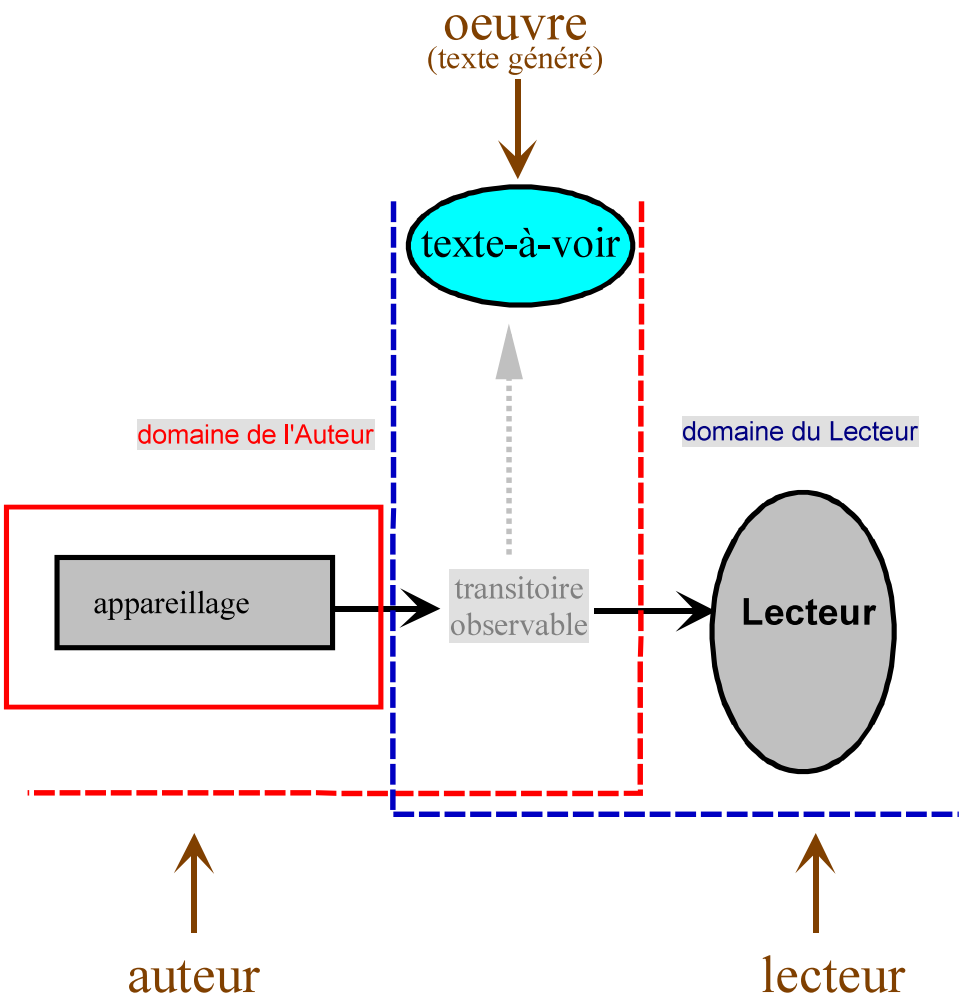


Figure 14 : visualisation du robot-poète dans le modèle procédural

Ce mythe est encore souvent utilisé à propos de l'intelligence artificielle supposée créative et douée d'un pouvoir de décision autonome.

3. 6. 2 Partenariat entre l'homme et la machine

Ross Godwin (Rapkin, 2018) propose une variante intéressante de ce mythe. Il considère que la création est un partenariat entre l'homme et la machine.

Ross Godwin crée des œuvres qui utilisent une intelligence artificielle. L'une d'elles, *one the road* est publiée en tant que roman imprimé par Jean Boite (Godwin, 2018).

Pour créer cette œuvre, Ross Godwin a réalisé un réseau de neurones, utilisé de nombreux textes littéraires anglais pour l'apprentissage profond de ce réseau et couplé ensuite ce réseau à des capteurs : une caméra, un microphone et un GPS placés sur une voiture. Il a alors effectué un trajet au cours duquel le programme a écrit le roman, sur la base des données fournies par ces capteurs. Ross

Godwin se définit comme partenaire de la machine dans l'acte de création parce qu'il jouait le rôle d'agent technique lors de l'écriture du texte.

Jean Boite et lui considèrent que l'œuvre est le texte-à-voir du roman publié. Il ne peut en être autrement car la littérature imprimée est un prototype du dispositif frontal. Ils ne font aucune différence entre le résultat imprimé par l'ordinateur et le texte publié, le premier étant perçu comme le manuscrit du second.

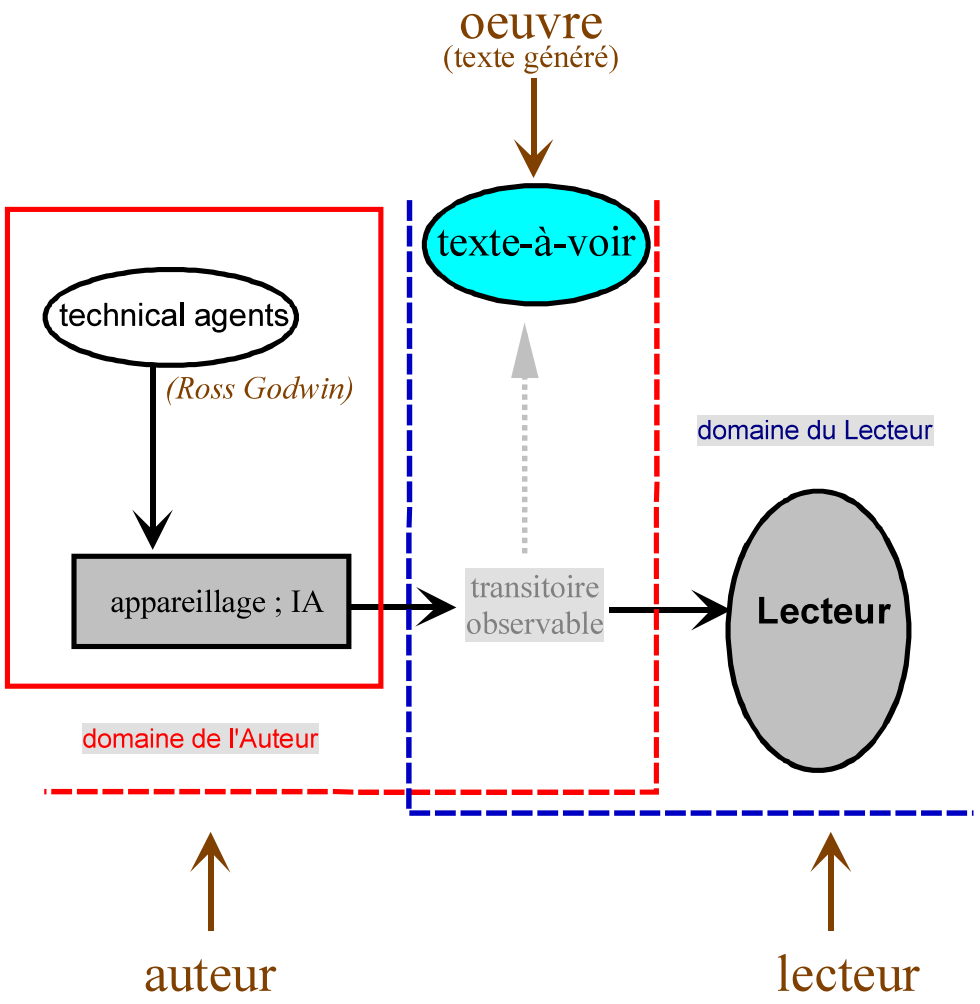


Figure 15 : visualisation de la conception du partenariat homme / machine

3. 6. 3 Comprendre *one the road* comme une performance

La conception du programme n'est pas algorithmique puisque l'IA ne l'est pas, ce qui a incité Ross Godwin à lui attribuer un certain caractère anthropomorphe d'intelligence. L'analyse par le modèle procédural de l'ensemble du processus ayant mené à la publication du livre invite en revanche à penser différemment et à considérer que le processus de génération par l'IA constitue une performance.

L'appareillage complet est constitué de l'ordinateur, des capteurs, de l'imprimante et de la voiture. Le trajet en voiture constitue la performance elle-même. Durant ce trajet, Ross Godwin n'est pas en relation avec l'IA mais uniquement avec la voiture qu'il conduit et les capteurs qu'il entretient. Il n'est donc pas partenaire de l'IA mais gouverne en partie la transformation interne à l'appareillage qui produit le document imprimé. Il est en situation d'agent technique. Notamment, il choisit par son itinéraire l'espace de données utilisées par l'IA pour réaliser cette impression en temps réel. C'est en

cela qu'il est performeur : le texte imprimé aurait été bien différent si le voyage avait été réalisé au Groenland ou en Patagonie.

Avant la performance, Ross a réalisé les préparatifs : il a créé le réseau de neurones puis l'a complété avec un large ensemble de données pour le deep learning, et cet ensemble n'a pas été quelconque : il s'est agi d'une large palette d'ouvrages reconnus de la littérature anglo-saxonne. Durant cette phase de programmation / apprentissage il était en situation d'Auteur. Les poids neuronaux créés lors de l'apprentissage profond constituent au regard du modèle procédural des données induites car elles ne sont pas générées par l'Auteur ni connues de lui mais interviennent dans la production du transitoire observable.

Après la performance, il a évalué le résultat imprimé et en a retiré une partie en vue de la publication. Durant cette phase, il était en situation de méta-lecteur et le document présenté pour publication est alors un discours second de la performance, qu'il soit publié ou non. Ce n'est d'ailleurs pas le seul discours second ayant rendu compte de cette performance. David Smoller a accompagné Ross Godwin durant son périple et a réalisé un documentaire vidéo sur cette performance. Pourquoi devrait-on considérer le résultat publié par Jean Boite comme un roman et non un document témoin ? uniquement parce qu'il est présenté comme un roman et que nous sommes culturellement prisonniers de la conception du dispositif frontal. S'affranchir de cette conception simplifie énormément la compréhension de ce type de production et évite les discours stériles qui, logiquement et de façon compréhensible, dénigrent l'art numérique. Ne restons pas prisonniers d'un imaginaire inadapté, même s'il s'est construit durant des siècles.

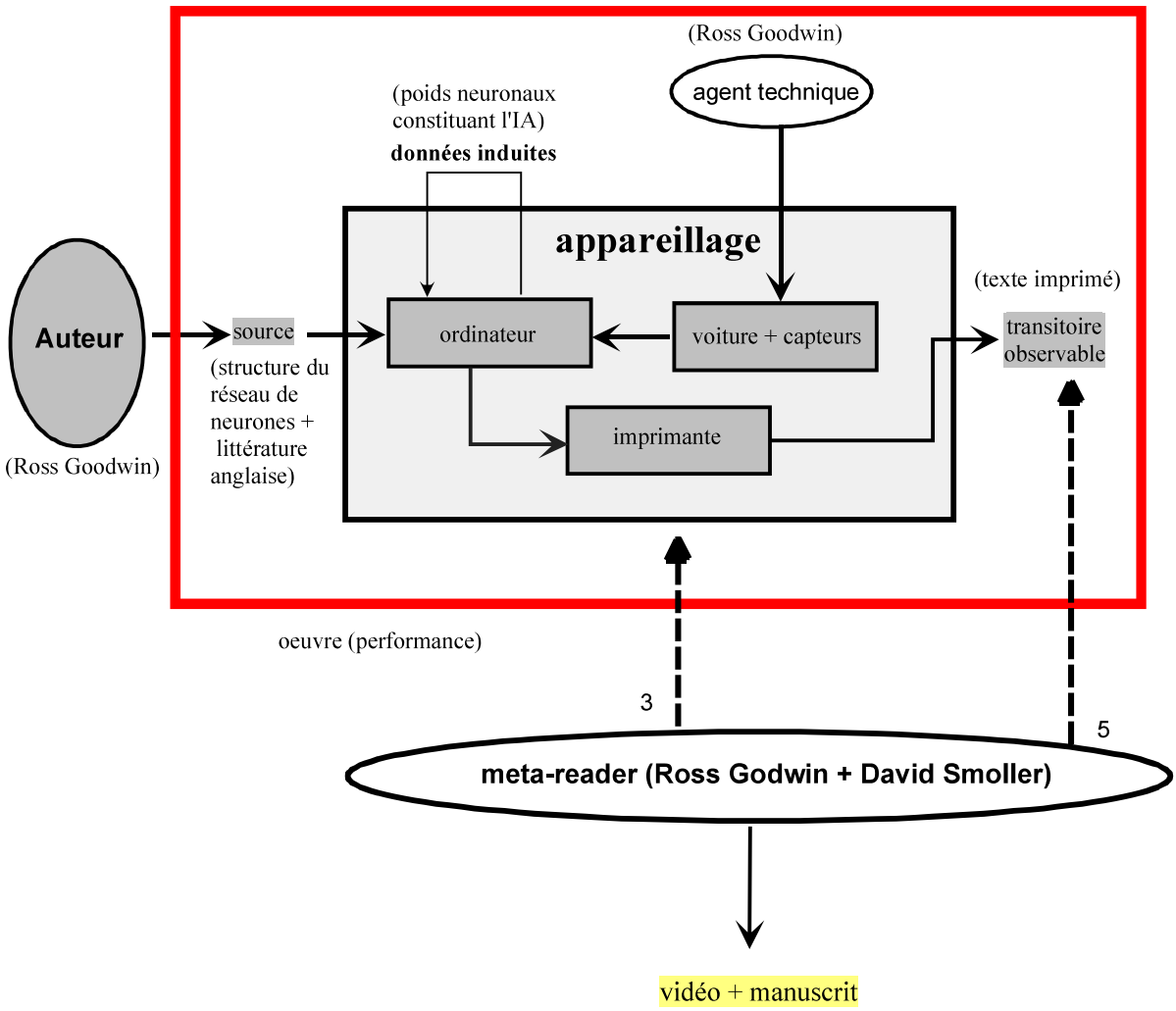


Figure 16 : interprétation de *one the road* dans le modèle procédural

3. 7 L'écrit-lecteur

3. 7. 1 Le concept d'écrit-lecture de Barbosa

Le concept d'écrit-lecture de Pedro Barbosa (189- 202) diffère du concept hypertextuel de wreader bien qu'il se traduise en anglais par le même terme. Il s'agit d'un concept lié à la génération combinatoire de texte. Il prend en égale considération le source et le transitoire observable ; plus précisément le texte-auteur informatique perçu dans le source lors de la programmation et le texte-à-voir média résultant de l'exécution. Pedro Barbosa a introduit ce concept à propos du générateur de textes syntext. On écrit indifféremment syntext et sintext. Il s'agit en fait d'un interpréteur qui permet à un auteur de créer un programme combinatoire reposant sur l'algorithme des phrases à trous créé par Christopher Sytrachey (1954) sans avoir à écrire une seule ligne de code. Cet auteur se contente d'écrire deux fichiers de données qui sont interprétés par syntext : l'un contient le programme génératif sous la forme de moules à trous complétés par des listes de vocabulaires pouvant combler les trous et l'autre gère l'affichage à l'écran.

```
run_now;
clear_screen;
seed_randomize(1111);
delay(5);
{save_disk;}
{pause;}
a=0;
:inicio:;
a=a+1;
new_line;
if(a>15) go_to 2;
print(a);
new line;
```

```
[frase["Le bonheur est dans "[A["la nature"]A]", non dans "[A["le corps"]A]"."]frase]
[frase[[B["mystŠre"]B]" sans "[B["patience"]B]" n'est que "[B["temps"]B]" sans "[B["odeur"]B]"."]frase]
[frase["Rien ne plait tant a "[A["la nature"]A]" que "[A["le corps"]A]"."]frase]
[frase["On renonce plus ais,ment a "[A["l'univers"]A]" qu'a "[A["le mystŠre"]A]"."]frase]
[frase["Ce qui vient par "[A["l'amour"]A]" s'en va par "[A["le corps"]A]"."]frase]
[frase["A quoi bon "[A["la science"]A]" devant "[A["le mystŠre"]A]"?"]frase]
[frase[[A["la science"]A]" est la continuation de "[A["l'univers"]A]" par d'autres moyens."]frase]
[frase["La haine de "[A["la science"]A]" n'est autre que l'amour de "[A["l'univers"]A]"."]frase]
[frase["Quand "[A["l',criture"]A]" nous quitte, c'est que "[A["l'angoisse"]A]" n'est pas loin."]frase]
[A["l'amour"]A]
[A["l'angoisse"]A]
[A["l',criture"]A]
[A["l'enfance"]A]
```

affichage	Générateur de phrases

Figure 17 : exemples de fichiers de données de la version syntext des aphorismes de Marcel Benabou

L'écrit-lecteur accède ainsi au code et au résultat de l'exécution de Syntext. Barbosa considère alors l'écrit-lecteur comme occupant simultanément les rôles Auteur et Lecteur.

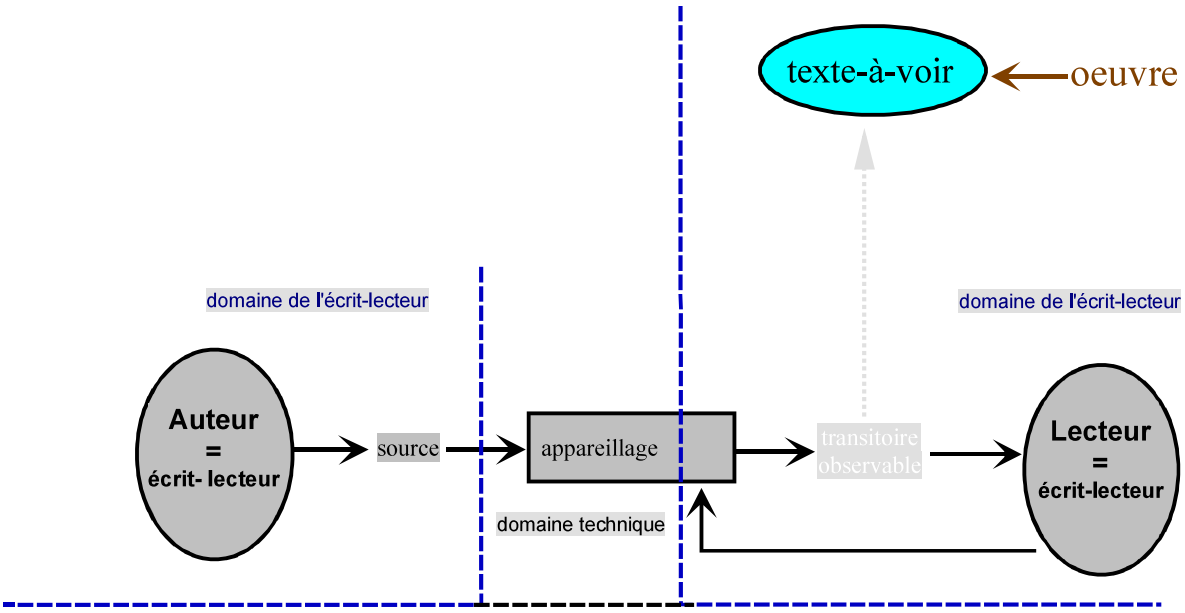


Figure 18 : visualisation de l'écrit-lecture de Barbosa dans le modèle procédural

3. 7. 2 L'écrit-lecture dans le modèle procédural

La conception de l'écrit-lecteur de Pedro Barbosa va à l'encontre du présupposé communicationnel du modèle qui stipule qu'on ne communique pas avec soi-même. On ne peut, dans ce cas, être à la fois Auteur et Lecteur. L'introduction de la méta-lecture par le modèle procédural permet de résoudre ce problème.

En fait, l'écrit-lecteur ne lit pas comme le fait un Lecteur en lecture étroite, il ne fait que vérifier les propriétés du texte-à-voir qu'il détecte dans le transitoire observable affiché sur son propre ordinateur. Il ne s'agit pas de lecture mais de vérification. Il s'agit clairement d'une activité de méta-lecture. Pendant que l'acteur finalise les fichiers de données, il bascule constamment entre une méta-lecture qui observe et vérifie le texte-à-voir en connaissant le texte-auteur et en activant la génération (modalités 2, 3 et 5 de la méta-lecture) et une position d'Auteur qui modifie le source, à savoir les fichiers de données utilisés par syntext. Notez que dans ce processus, il n'y a pas de position Lecteur du tout. Ce processus est en fait interne au pôle Auteur de la situation dans laquelle le générateur est fourni avec syntext à un autre individu Lecteur qui n'accède plus aux fichiers de données dans sa lecture. Notons que Pedro Barbosa n'est pas le programmeur de Syntext, qui a été créé par Abilio Cavalheiro.

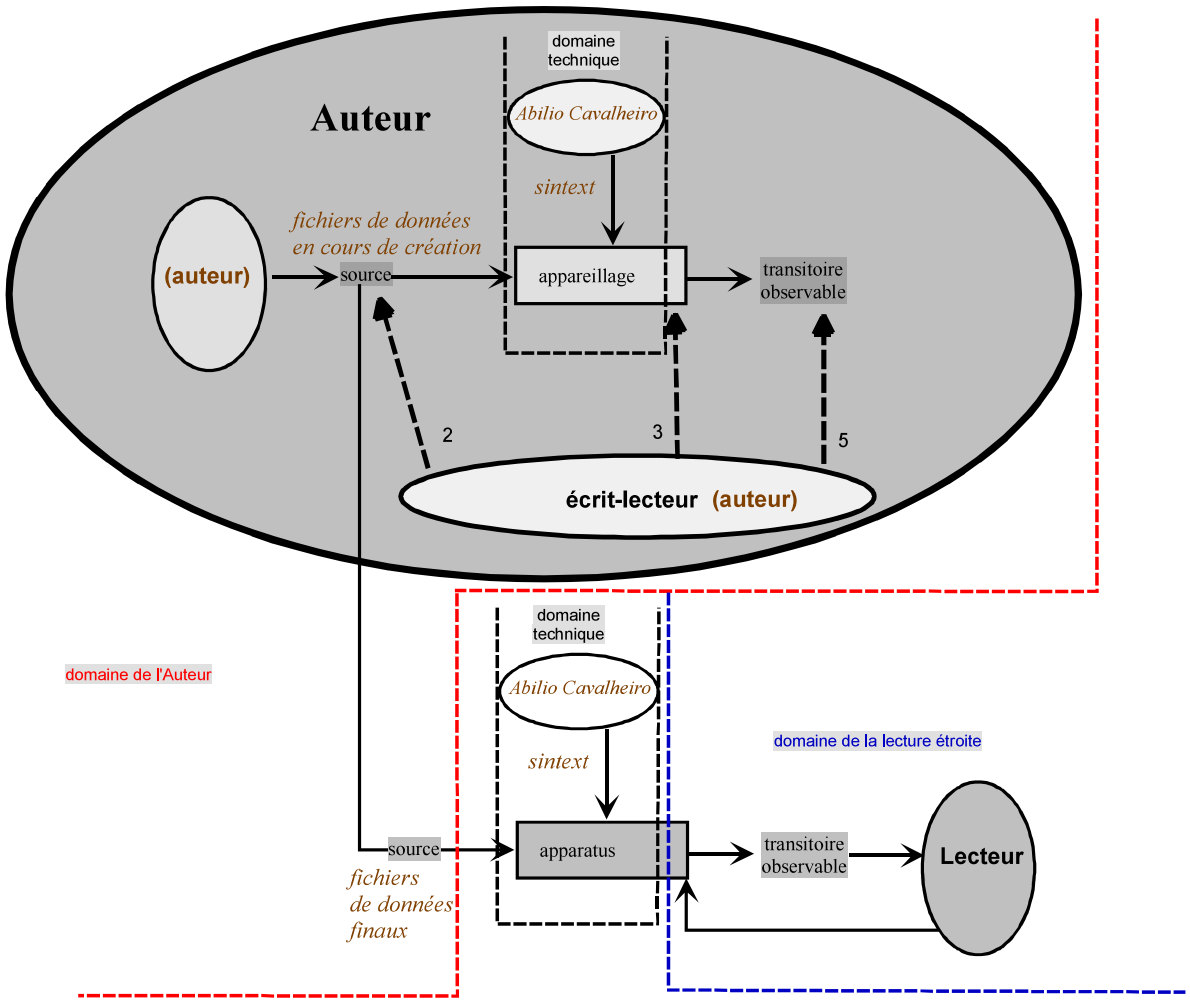


Figure 19 : l'écrit-lecture comme sous-système du pôle Auteur

Ce sous-système d'écrit-lecture est présent dans tout dispositif en littérature numérique : tout auteur vérifie le résultat de son programme en l'exécutant sur son propre ordinateur dans un comportement d'écrit-lecture. Il arrive également que l'auteur impose des paramètres au programme dans certains tests, ce qui relève bien des manipulations d'un méta-lecteur.

4 Analyse sémiotique des œuvres

4. 1 Espaces de signes, espaces signifiants.

4. 1. 1 Espaces de signes versus espaces signifiants

Un espace de signes pour un acteur est un espace sur lequel l'acteur peut détecter des signes parce qu'il en perçoit le stimulus physique. Mais un acteur peut aussi attribuer un sens à un espace qu'il ne perçoit pas. Cet espace est alors dénommé espace signifiant pour l'acteur.

Le schéma structurel fait apparaître différents espaces qui sont potentiellement des espaces de signes ou des espaces signifiants, selon la position de l'acteur : le texte-à-voir, le texte-auteur et l'activité de lecture en lecture étroite. L'activité d'agent technique est aussi un espace de signes dans une performance. La transformation interne dans l'appareil peut aussi être un espace signifiant pour tous les pôles. Les documents auteur et lecteur ainsi que les discours seconds de la méta-lecture sont également des espaces de signes.

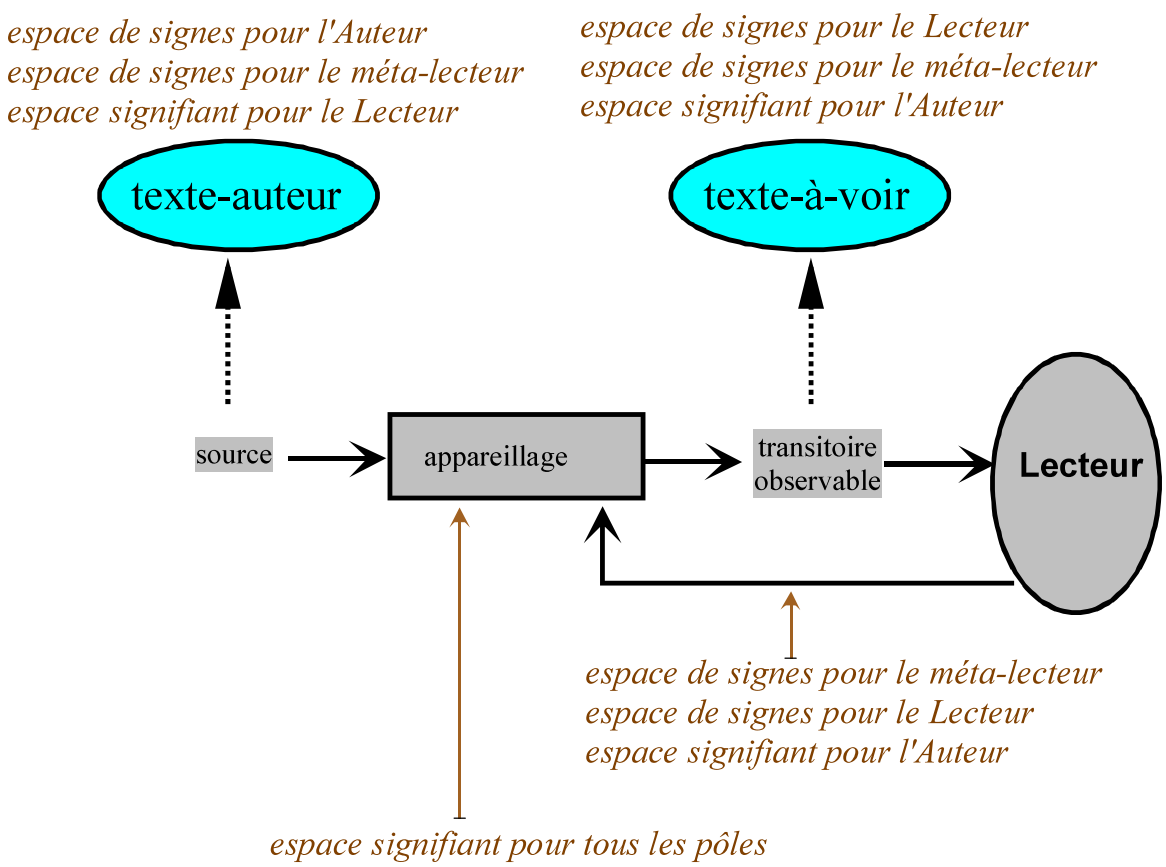


Figure 20 : principaux espaces potentiels signifiants ou de signes dans le dispositif principal

4. 1. 2 Impact des espaces signifiants sur l'interprétation

La transformation à l'intérieur de l'appareillage n'est pas un espace de signes car aucun être humain ne peut la voir, mais elle peut être un espace signifiant. On peut donner un sens à cette transformation car elle est indexée dans le texte-auteur (le programme) et dans le texte-à-voir. Plusieurs auteurs ont créé des œuvres qui reposent sur cet espace signifiant. Je pense à la *ping poetry* de Sandy Baldwin (2009) et à ma génération adaptative (Alire, 1994 ; Bootz, 2003). Dans le *ping poem*, Sandy Baldwin considère l'appareillage comme le temps et l'espace de son être numérique. Ce sens est indexé à la fois dans le texte-auteur et le texte-à-voir qu'un méta-lecteur peut percevoir. Cette œuvre utilise un programme de test des réseaux : Sandy Baldwin envoie un ping, c'est-à-dire un signal bref, vers une adresse internet et récupère les dates et adresses des serveurs par lesquels le ping est passé. Le source est constitué des pixels des lignes de commande qui envoie le ping et le texte-à-voir ceux des lignes de résultat du test. Dans cette œuvre il n'y a pas de Lecteur : les personnes qui accèdent à l'écran sont en situation de méta-lecture.

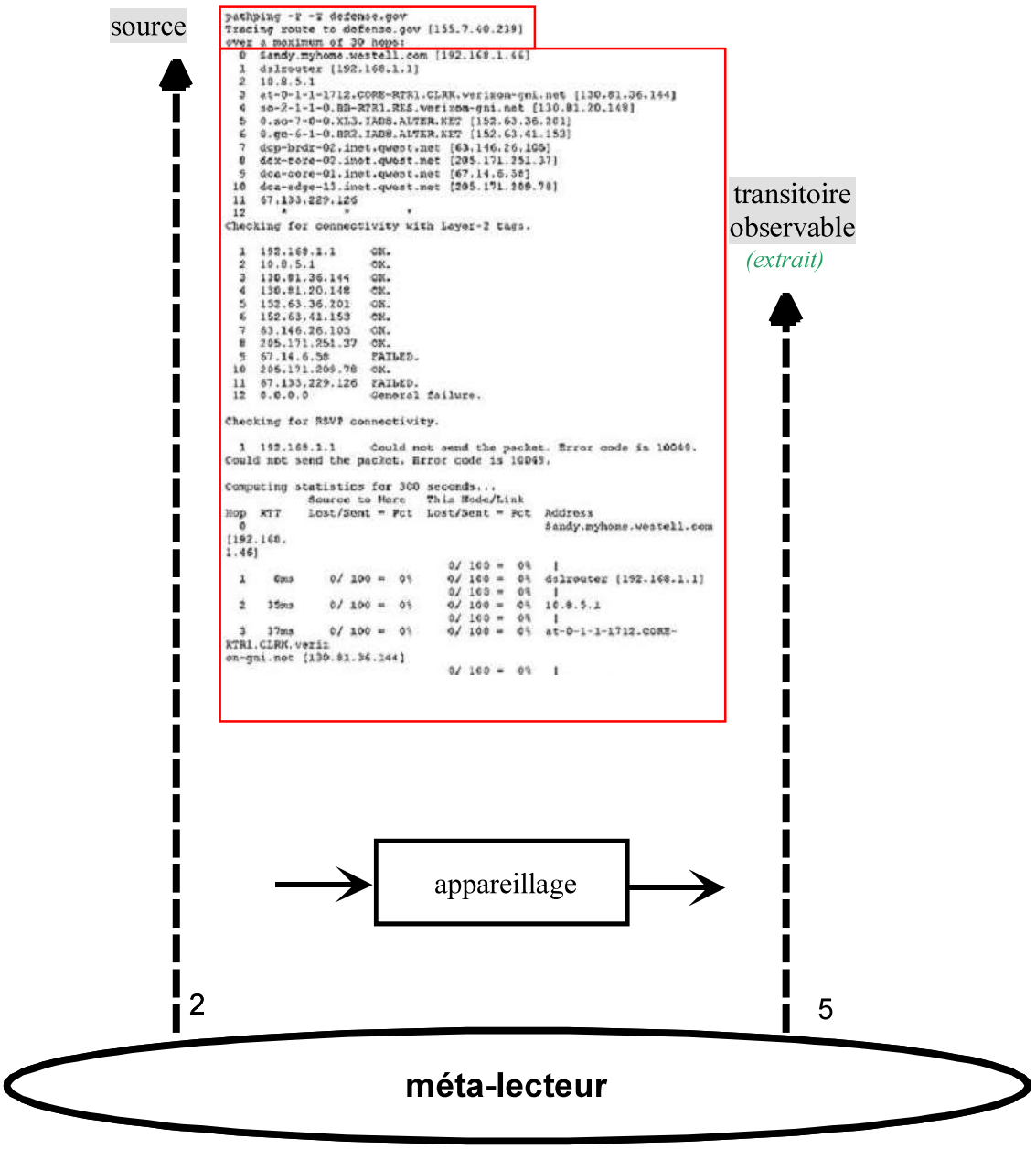


Figure 21 : *ping poem*

Dans la génération adaptative, je considère que l'appareillage est le lieu d'un conflit entre l'intentionnalité de l'Auteur déléguée au programme et l'intentionnalité technique que les agents techniques implémentent dans l'appareillage. La génération adaptative n'est indexée que dans le texte-auteur, le programme, via des tests. Elle ne peut être perçue depuis la position du Lecteur.

Le comportement de l'appareillage est également un espace signifiant dans les métaphores matérielles que Katherine Hayles (2002) introduit dans sa théorie du technotexte. Par exemple, dans l'œuvre de Jean-Marie Dutey, *le mange texte* (1989), une métaphore matérielle est due à l'obsolescence. Un message d'erreur s'affiche lorsqu'on essaie d'exécuter le programme sur les ordinateurs actuels, car il s'agit d'un ancien programme Dos. Ce message d'erreur provient de l'OS mais il faut considérer que ce message, ou plutôt les pixels qui le constituent, constitue le transitoire observable de l'œuvre, même si cet observable transitoire n'a plus aucune relation causale avec le source. Le lien causal entre le source et le transitoire observable est totalement rompu bien que le transitoire observable existe, et l'œuvre est obsolète pour la position de Lecteur, mais pas pour un méta-lecteur.

Un méta-lecteur peut reconstruire à partir du texte-auteur le texte linguistique qui devrait apparaître dans le texte-à-voir. Ce texte linguistique utilise le déictique "vous" et il semble alors que le programme s'adresse au Lecteur depuis l'intérieur de l'appareillage. Le méta-lecteur peut alors interpréter l'impossibilité de lire le texte en lecture étroite comme une métaphore matérielle de la mort. Dans cette métaphore matérielle, la position du Lecteur joue métaphoriquement la situation de mort que le texte exprimerait ; l'activité de lecture étroite est un espace de signes pour un méta-lecteur. L'œuvre ne peut devenir obsolète pour un méta-lecteur.

Tard hier soir chez vous sans rien dire,
Très star, très vamp, yeux pers, fard gris,
Robe soie trop snob, elle boit, elle voit
Quel type vous êtes, quel ciel vous sied.
Môme tant usée, muse haïe, elle vous voit
déjà ivre mais réel, mâle mais mort, vide.

Figure 22 : texte du *mange texte* (non mis en forme graphique)

En règle générale, comme l'activité de lecture étroite est un espace de signes pour la méta-lecture, il est impossible de ne pas lire car le lecteur en position de Lecteur ne lit pas le texte-à-voir depuis l'extérieur de l'œuvre comme il le fait en lisant un livre, il le lit pour un méta-lecteur à l'intérieur même de l'œuvre, même si personne n'occupe physiquement la position de méta-lecture lors de sa lecture étroite. Le seul fait que la méta-lecture soit une position dans le dispositif, actualise cette caractéristique : il est impossible de ne pas lire une œuvre numérique que l'on exécute. De même qu'il n'est pas nécessaire qu'un livre soit réellement lu pour que son texte ait un sens pour un lecteur hypothétique, il n'est pas nécessaire que lecture étroite et méta-lecture soient réelles ou actuelles pour que leur relation fasse sens dans l'œuvre numérique.

Dans certains cas, un lecteur peut également interpréter sa propre activité de lecture étroite. Il s'agit de la « double lecture », modalité de lecture du Lecteur complémentaire de la lecture étroite. Par exemple, l'œuvre hypertextuelle *Florence Rey* (2002) de Patrick Burgaud est très difficile à lire : on revient souvent sur les mêmes nœuds et il est difficile de trouver des zones actives. Florence Rey est un personnage réel qui était en prison lorsque Burgaud a créé cette œuvre et la préface de l'œuvre explique que ces difficultés de lecture font métaphoriquement jouer au Lecteur l'état d'enfermement de Florence Rey. Le Lecteur peut alors interpréter sa lecture étroite dans une métaphore matérielle comme l'expérience de l'enfermement. Dans cette métaphore matérielle, sa propre activité de lecture étroite devient un espace de signes pour le Lecteur, différent de ce qu'il est pour un méta-lecteur.

4. 2 Typologie des signes

4. 2. 1 Signes distribués et non distribués

La position Auteur ne donne accès qu'à un seul espace de signes : le texte-auteur. Généralement le Lecteur ne procède pas à une double lecture. Il n'accède alors également qu'à un seul espace de signes : le texte-à-voir. Le texte qu'ils perçoivent dans leurs espaces de signe respectifs est construit avec des signes n'appartenant qu'à ce seul espace. Ce sont des signes unaires. Les signes unaires ne sont pas distribués sur plusieurs espaces. Des espaces signifiants supplémentaires peuvent jouer un rôle dans la signification.

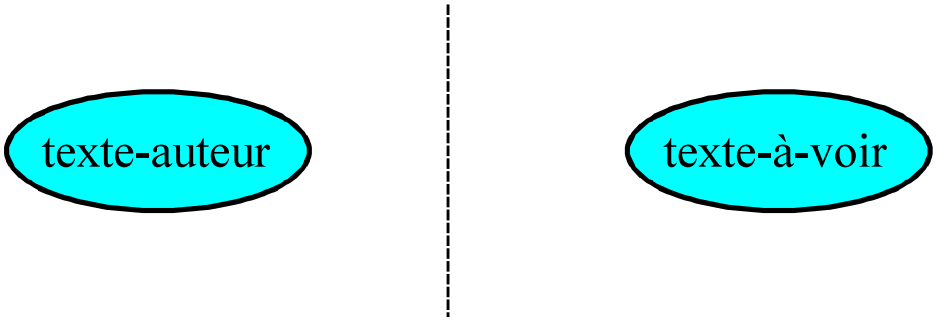


Figure 23 : signes unaires respectivement pour l'Auteur et le Lecteur

Dans une double lecture, le Lecteur met en correspondance rhétorique le texte-à-voir et son activité de lecture. Il utilise alors un espace de signes duaux : le signe décelé est distribué sur deux espaces distincts. Les signes du texte-à-voir intervenant dans ce signe dual ne sont pas nécessairement ceux repérés dans l'espace des signes unaires du texte-auteur. C'est le cas dans *Florence Rey* où le signe dual utilise le prologue (paratexte) et non le texte narratif de l'espace unaire qui se développe ensuite à l'écran. Signes unaires et signes duaux sont complémentaires dans l'interprétation, les textes qu'ils constituent sont différents.

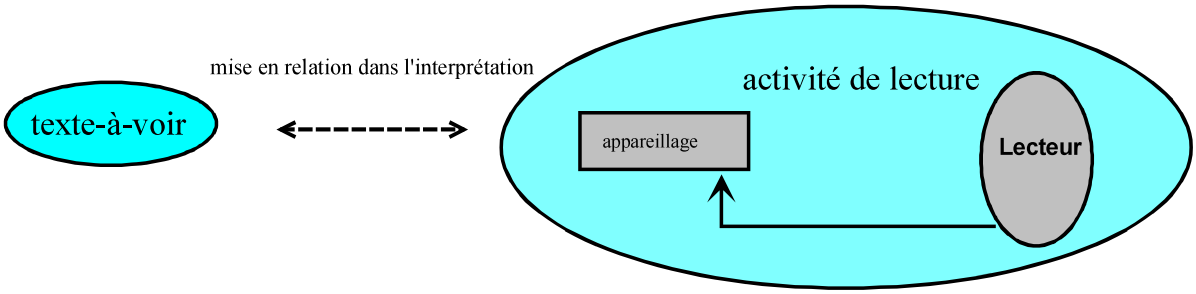


Figure 24 : espace de signes duaux pour le Lecteur

La méta-lecture offre l'ensemble de signes le plus riche. On y trouve les espaces de signes unaires du texte-auteur et du texte-à-voir, plusieurs espaces de signes duaux et un espace de signes ternaires distribués sur 3 espaces différents.

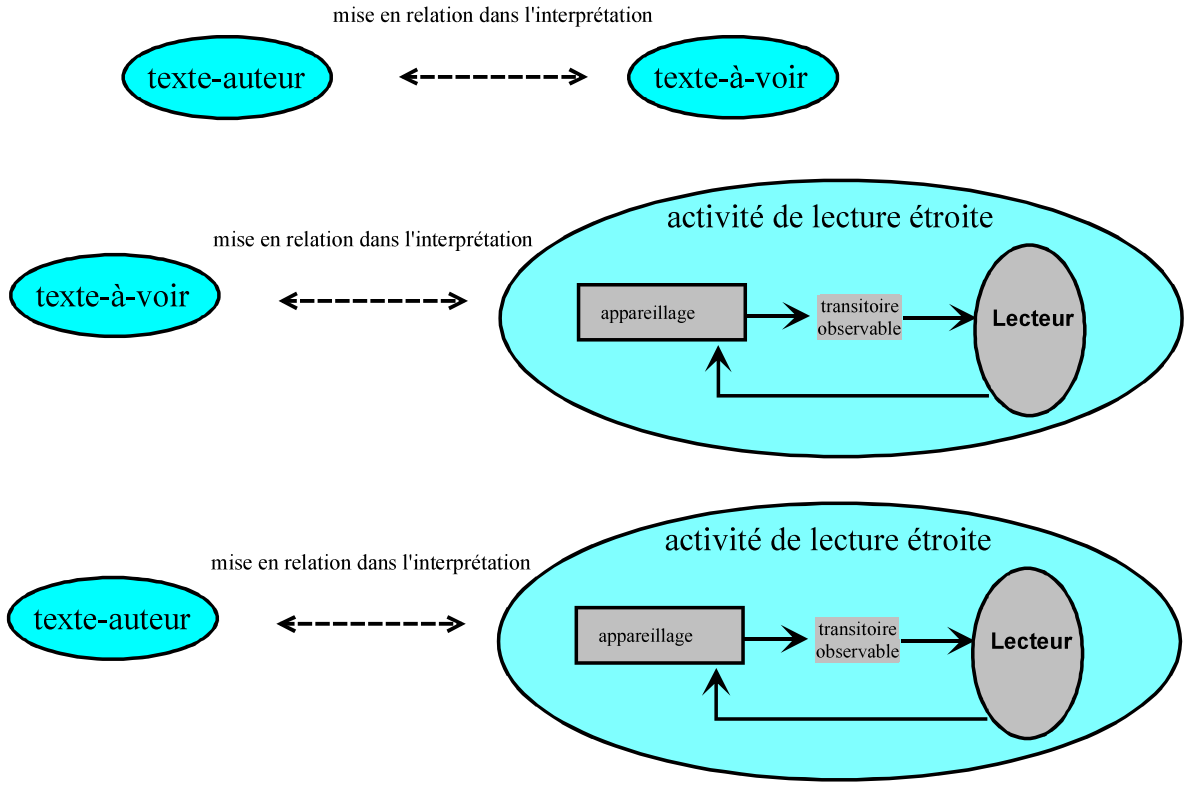


Figure 25 : espaces de signes duaux pour le méta-lecteur

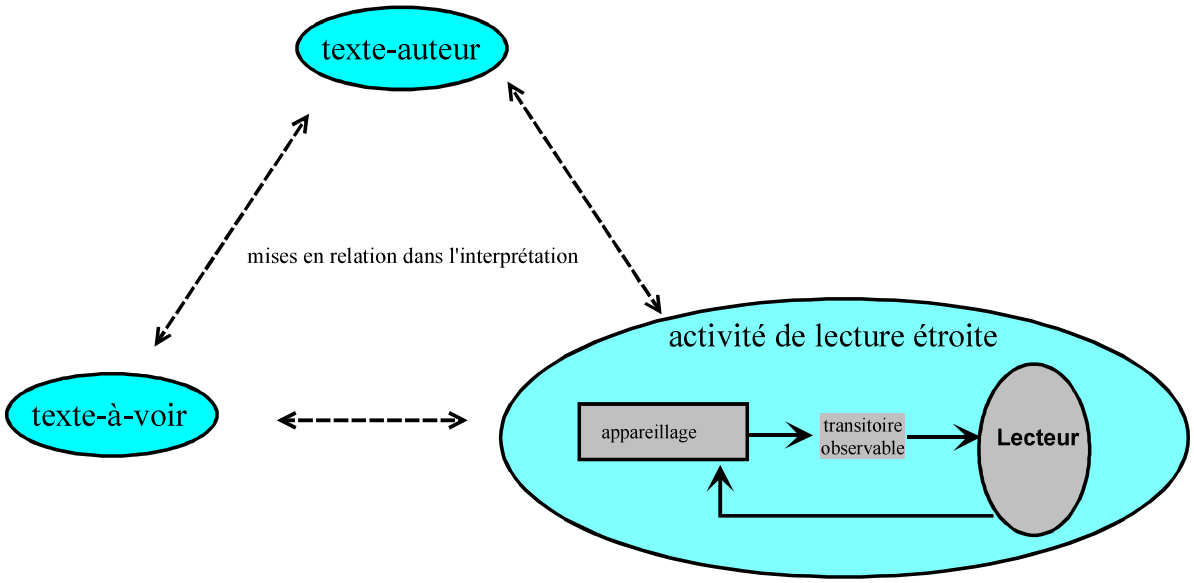


Figure 26 : espace de signes ternaires pour le méta-lecteur

Le modèle procédural ne s'intéresse pas à la transformation des signes entre un pôle et un autre comme le fait la *traversal fonction* du cybertexte parce que les schémas précédents montrent que le nombre de textes qui peuvent être décelés dans le dispositif est très important, notamment en méta-lecture. Ces textes sont composés de signes soit unaires, soit duaux, soit ternaires, sans mélange de ces trois types. Ils interviennent de façon complémentaire dans l'interprétation du pôle. On voit donc que le modèle simple de textons/scriptons est très nettement insuffisant pour rendre compte de la richesse sémiotique des œuvres ; il ne s'applique, tout au plus, que dans le signe dual qui met en relation le texte-auteur et le texte-à-voir en méta-lecture.

Tous ces textes potentiels incitent à repenser la nature de la littérature numérique. Elle ne consiste pas à utiliser des moyens numériques plus ou moins sophistiqués pour produire une littérature plus ou moins innovante, mais elle distribue le texte dans des espaces multiples, le rendant multidimentionnel. La littérature numérique programmée ajoute au texte de l'œuvre le média numérique du programme : programme et médias observables en lecture étroite (mots, images, sons) y sont alors mis sur le même plan, constituent des pans du texte multiple de l'œuvre. Voilà pourquoi le modèle procédural ne s'attache pas à la transformation fonctionnelle d'un ensemble de signes dans un autre mais à la rhétorique qui s'instaure dans leurs juxtapositions. Le modèle théorise en ce sens la conception du groupe LAIRE à l'origine de la revue *Alire* puis du collectif Transitoire Observable.

4. 3 La figure du proxymore dans les signes duaux pour la méta-lecture

Les signes duaux donnent lieu à une rhétorique très riche en fonction des fonctionnalités de méta-lecture utilisées. En Voici quelques exemples sur des signes duaux distribués sur le texte-auteur et le texte-à-voir. Ces espaces sont accessibles en utilisant les modalités de méta-lecture 2 et 5. La rhétorique change lorsqu'on considère une métaphore matérielle utilisant en plus la modalité 3 (prise en compte de l'espace signifiant de l'appareillage). Dans l'image de gauche, le premier exemple sur la ligne 1 provient de mon travail *passage* (2010) et le second, sur la deuxième ligne, montrant une locomotive, est un poème en C obfusqué de Marschall (1986).

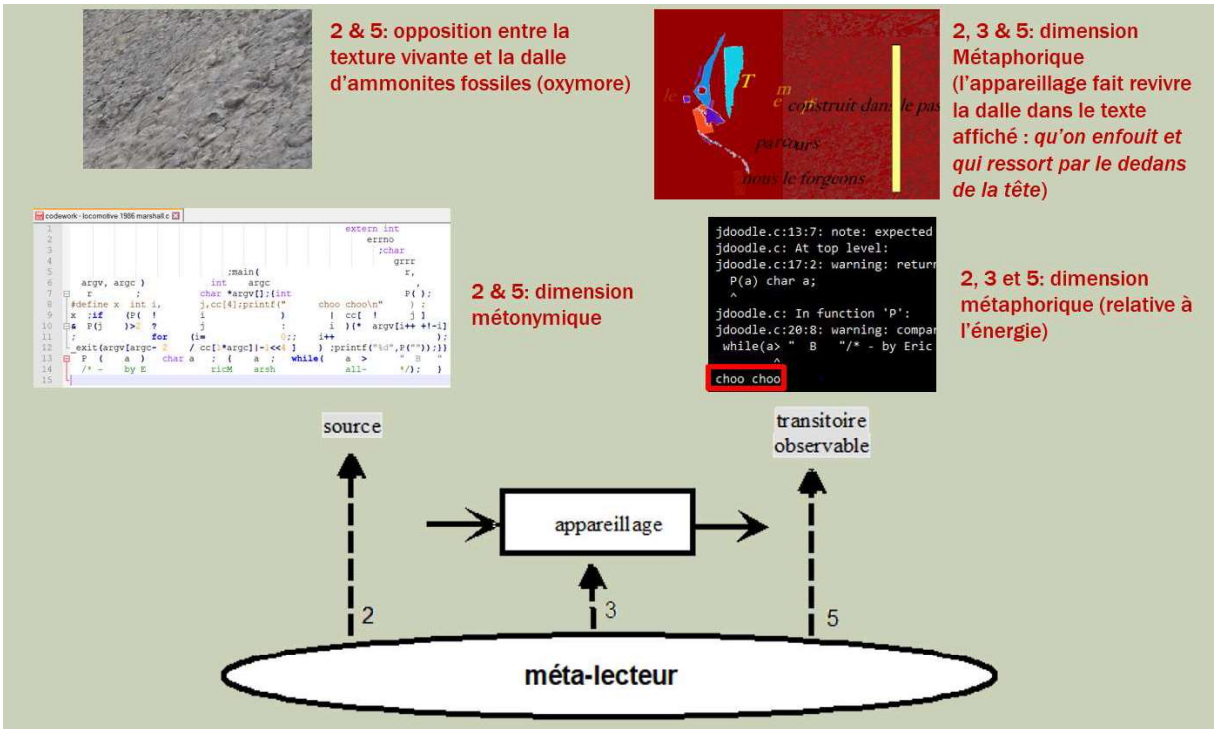


Figure 27 : signes duaux et rhétorique qu'ils impulsent en fonction des modalités de méta-lecture

La relation entre le texte-auteur d'une œuvre littéraire programmée et le texte-à-voir crée très souvent un trope spécifique global que j'appelle un proxymore car il est constitué de propriétés opposées dans chaque espace de signes. De ce fait, le signe dual rassemblant ces oppositions possède une dimension d'oxymore et le "pro" indique que cette dimension d'oxymore n'existe qu'en art programmé. Notons que le proxymore ne se déduit pas d'une lecture informatique du programme mais bien d'une lecture média de celui-ci.

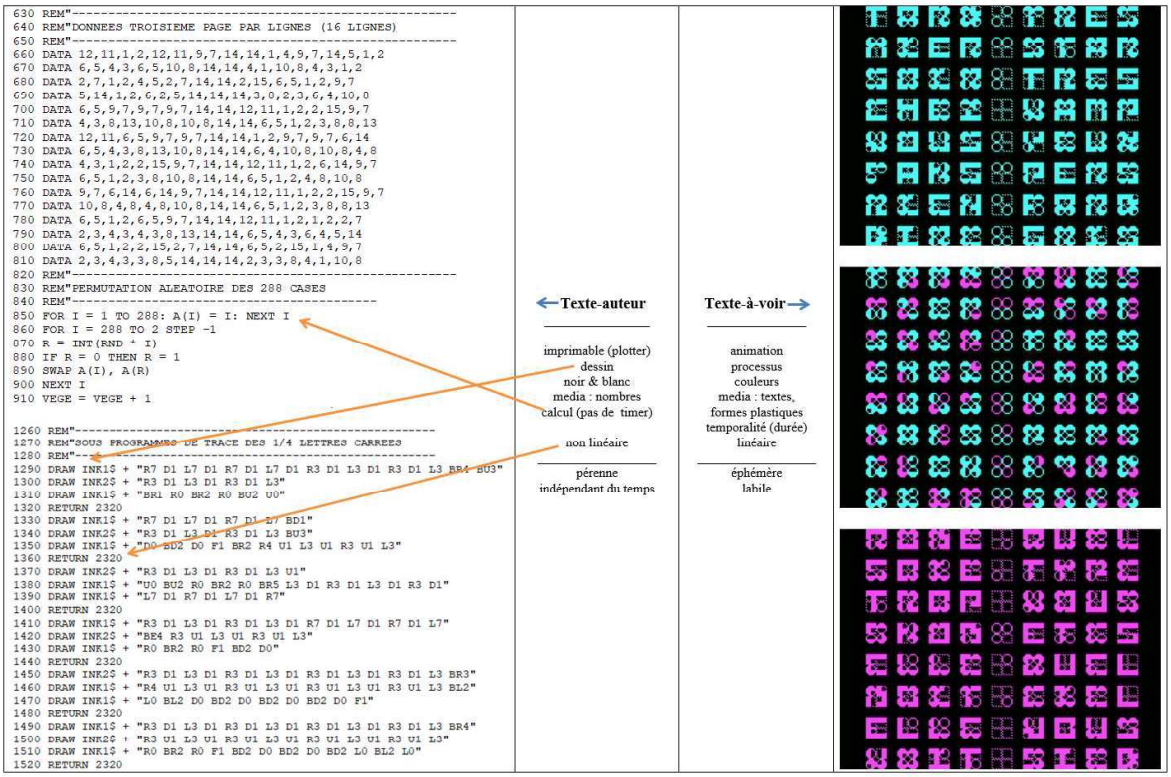


Figure 28 : le proxymore dans l'œuvre de Dutey *le mange texte (1989)*

4. 4 Analyse des signes unaires du programme

4. 4. 1 Les tresses du texte-auteur

Considérer que le texte-auteur participe à un texte possédant de la littérarité, signifie qu'il ne faut pas seulement déceler des signes informatiques dans le programme. Cela vient d'être signalé à propos du proxymore. La figure du proxymore est construite sur un signe dual et le texte-auteur, le programme, y participe en tant qu'espace participant à un texte distribué. Mais on peut appliquer la même quête sur le programme considéré comme espace non distribué de signes unaires non informatiques. Bien sûr, Les commentaires et les noms de variables ne sont pas des signes informatiques mais déjà des signes unaires qui peuvent participer de la littérarité, mais il faut aussi donner un sens non informatique aux instructions elles-mêmes.

Il n'existe pas actuellement de modèle sémiotique de signes non informatiques dans les programmes. C'est pourquoi j'ai créé le modèle des tresses. Je l'ai d'abord conçu pour créer mes propres textes animés en 2003 et je l'utilise pour des analyses de programmes depuis 2010 (Bootz, « art programmé »). Récemment, j'ai analysé l'ensemble du programme source de l'œuvre *Orion* de Tibor Papp (Bootz, « Les formes programmées dans… ») avec ce modèle. Cette analyse a donné comme discours second un document imprimable de plus de 60 pages et plusieurs giga-octets de documents numériques. Elle est en cours de publication.

Une tresse est toute partie de programme qui fait sens par elle-même dans la position de l'Auteur ou du méta-lecteur. C'est un signe et, comme tout signe, il est relatif à la personne qui le décèle, mais il a toujours la même structure. La partie la plus importante de la tresse est la tête de tresse qui contient la logique et l'objectif de la tresse. La tête de tresse exprime l'algorithme qui dit dans quel but cette tresse existe dans le texte-auteur, le pourquoi de la tresse. L'effecteur exprime l'algorithme décrivant la stratégie mise en œuvre dans la tresse pour atteindre son objectif : le comment de la tresse.

Il renferme également tous moyens informatiques utilisés par la tresse. C'est la partie fonctionnelle de la tresse. Les data média sont également intéressants à considérer dans une perspective non informatique.

Une tresse isolée du programme complet et exécutée seule produit généralement un média à l'écran. Il est souvent impossible d'imaginer réellement et totalement ce qu'est ce média, uniquement en regardant le code source du texte-auteur. Ce média est idéalement ce que le programmeur veut que cette tresse produise. Il exprime le sens informatique de la tresse mais est soumis à la labilité.

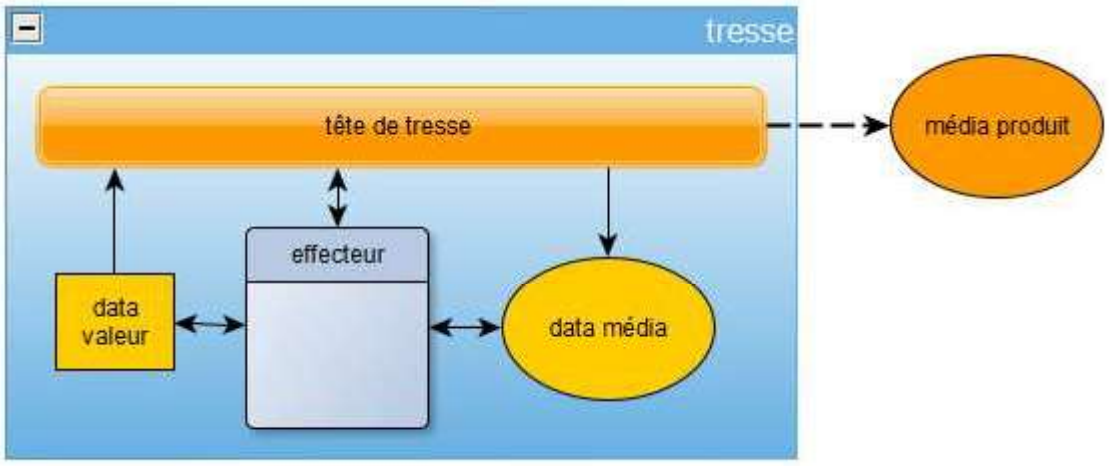


Figure 29 : structure d'une tresse et média produit

4. 4. 2 Ghost dans le texte-à-voir

Le média produit par une tresse n'est en général pas présent à l'identique dans le texte-à-voir créé lorsque l'ensemble du programme est en cours d'exécution, car ce transitoire observable résulte des interactions entre plusieurs tresses. Le média produit par une tresse peut alors lui- subir des modifications par couplage aux autres tresses dans le programme complet. Ces couplages instaurent une rhétorique entre le média produit par la tresse et le texte-à-voir. Cette rhétorique enrichit la textualité des signes duaux du méta-lecteur. Seul lui en effet peut accéder dans les mêmes conditions, ce qui élimine la labilité entre le média produit et le texte-à-voir, tout à la fois au média produit par une tresse et au texte-à-voir créé par le programme complet. L'auteur ne peut accéder à ces deux médias qu'à partir de l'exécution de la tresse et du programme complet dans un processus d'écrit-lecture qui est, rappelons-le, interne à son pôle Auteur. La rhétorique qu'il y décèle demeure donc virtuelle pour lui. Le Lecteur, quant à lui, ne pouvant accéder au source, il ne peut déceler aucun média produit par des tresses.

Lorsque les couplages entre tresses sont très perturbateurs et qu'ils empêchent le média produit par l'une d'elle de se manifester dans le texte-à-voir, celui-ci devient alors un fantôme, un ghost à l'intérieur du texte-à-voir : il existe virtuellement, il est réellement produit à l'exécution du programme complet mais il n'est jamais exprimé, actualisé, ni dans le code du texte-auteur, ni dans le texte-à-voir. Le ghost est une figure de rhétorique spécifique de la méta-lecture, tout comme le proxymore.

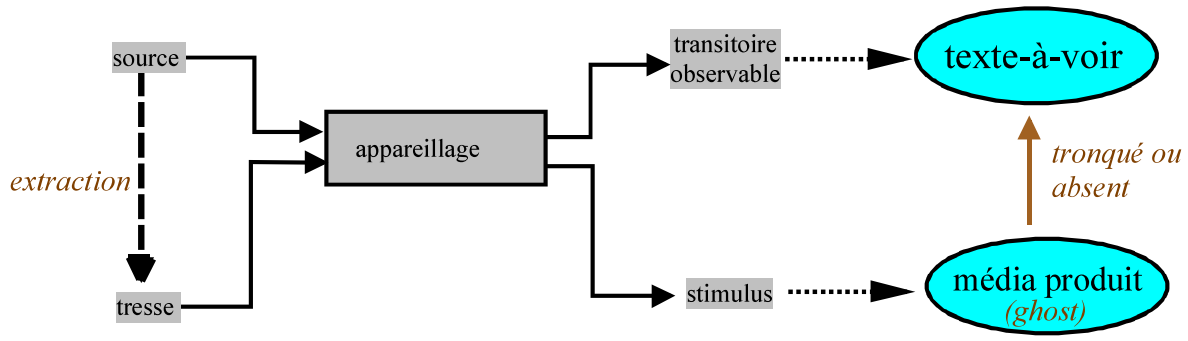


Figure 30 : méta-lecture d'un ghost

À titre d'exemple, j'ai extrait une tresse de mon poème *passage* et l'ai exécutée seule. Le poème que la tresse affiche est différent de celui affiché dans le texte-à-voir. Le poème que la tresse isolée compose n'est pas génératif, il est réellement composé pendant que cette tresse s'exécute dans le programme complet. Il est réellement créé et affiché en clair mais ne peut jamais être vu. C'est un ghost dans le texte-à-voir.

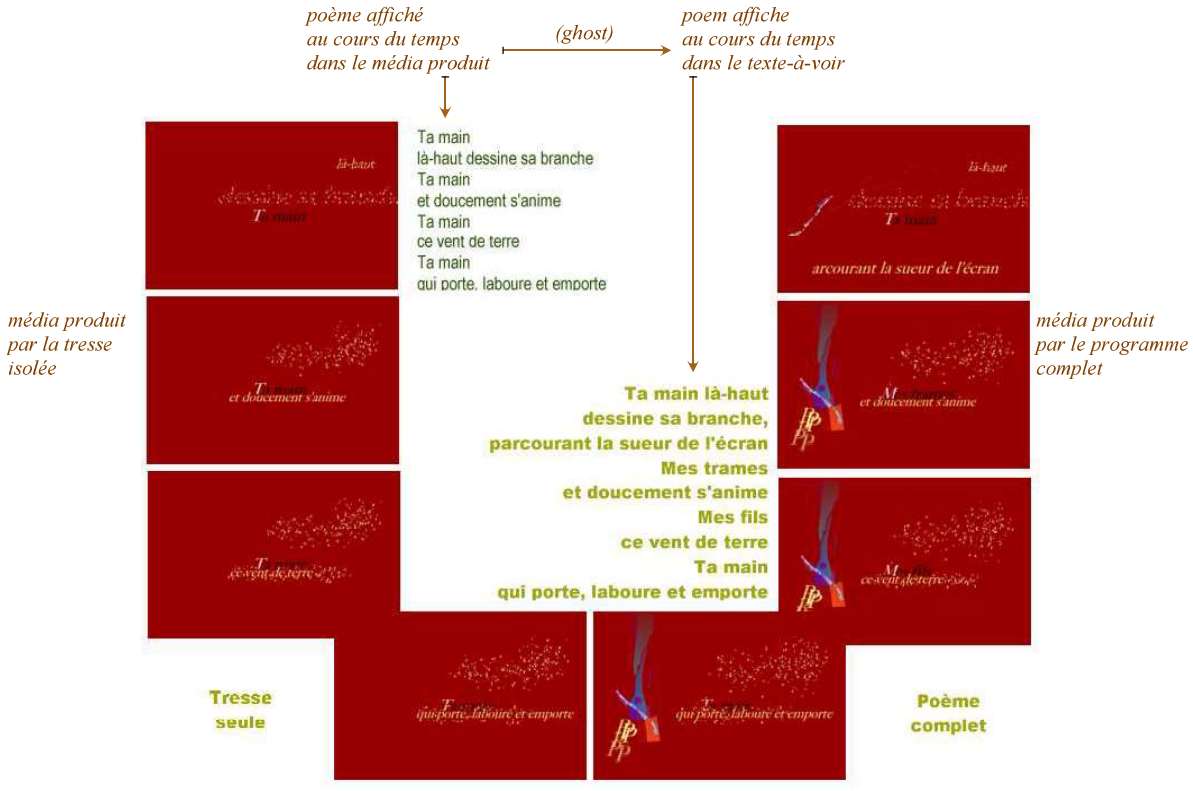
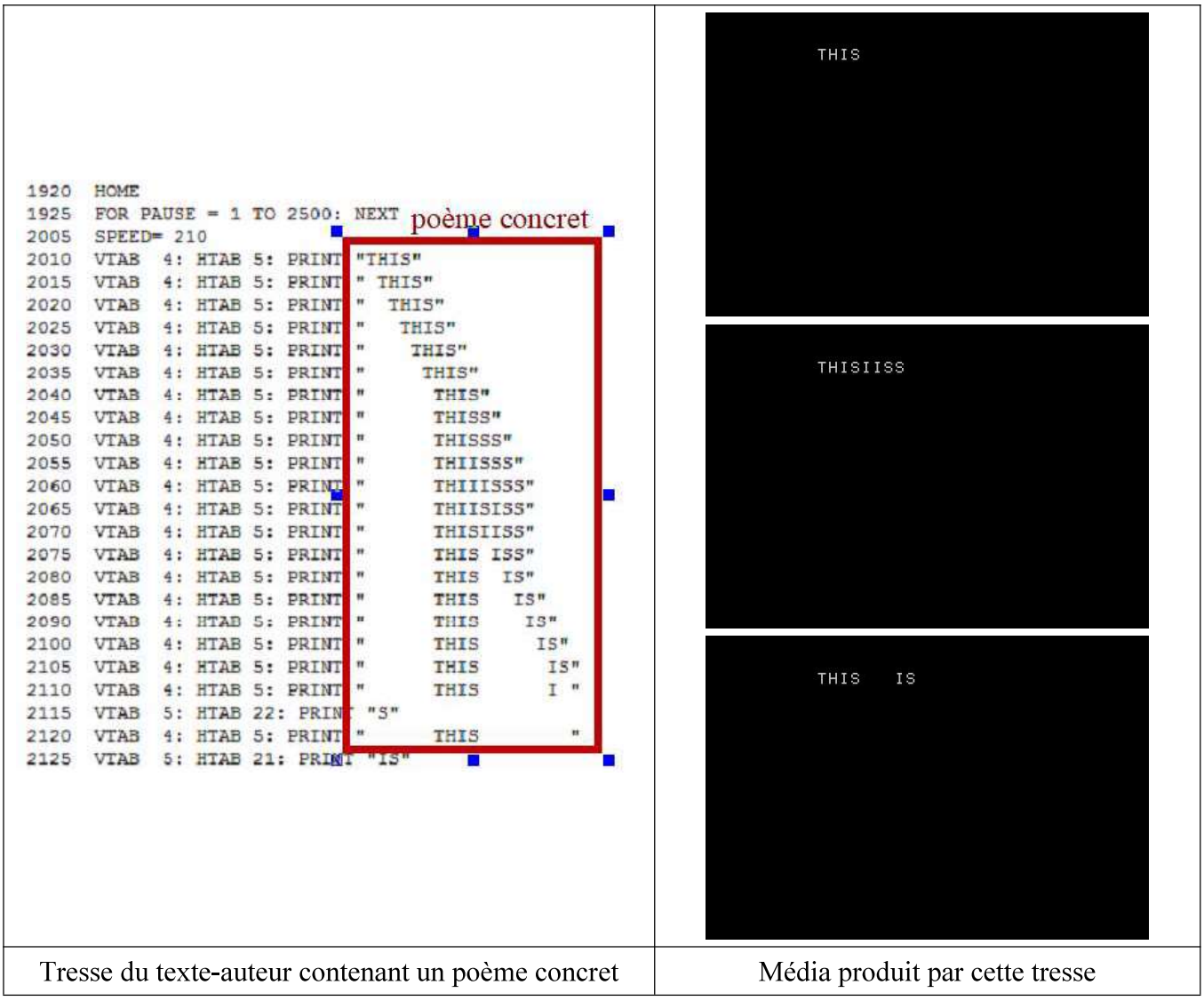


Figure 31 : ghost dans une séquence de passage (Bootz & Frémiot, 2009)

4. 4. 3 Signes unaires internes aux tresses

La tresse elle-même est un signe unaire non informatique du texte-auteur, bien qu'elle soit écrite en langage informatique, à l'instar du langage informatique qui est lui-même écrit en langue anglaise. Toute partie de sa structure non linéaire peut aussi se révéler être une tresse, notamment certains data média et la tête de tresse. Cette structure récursive des signes unaires n'est rien d'autre que la première articulation telle qu'elle existe entre les monèmes en linguistique : une phrase est un signe, lui-même composé de signes que sont les mots.

Nous pouvons trouver quelques signes unaires constitués de poèmes concrets classiques dans les data média de *first screening* de Bp Nichol. Ces poèmes concrets ne sont pas affichés à l'écran et la tresse qui les contient ne crée pas un texte final dans le texte-à-voir, seulement le début d'un texte animé dans l'exemple ci-dessous. Ainsi, en utilisant le vocabulaire du cybertexte, le poème concret est un texton mais ce qu'il produit n'est pas un scripton. La traversal fonction et le modèle des textons et des scriptons ne sont pas suffisants pour analyser les propriétés sémiotiques des textes numériques.



Tresse du texte-auteur contenant un poème concret	Média produit par cette tresse

Figure 32 : une tresse et son média produit dans *first screening* de Bp Nichol (1984)

Un autre signe unaire intéressant se trouve dans la tête de tresse de 3 tresses différentes dans l'œuvre *Orion* (2000) de Tibor Papp. Ces tresses construisent ce que nous avons appelé dans le groupe Transitoire Observable une forme programmée (Bootz, Gherban et Papp). Une forme programmée est une forme littéraire fixe au sens où le sonnet est une forme littéraire fixe, mais cette forme est distribuée dans la tresse et dans les médias que cette tresse produit.

J'appelle la forme programmée que Tibor Papp a inventée un "aléatoire sous contrainte". Elle fonctionne de la manière suivante : le programme utilise comme data média un poème sonore organisé en une structure tabulaire. Il choisit au hasard une ligne de cette structure qu'il fait entendre au Lecteur. Le texte-à-voir sonore semble donc être aléatoire dans le pôle Lecteur.

Le texte sonore data média est construit en appliquant un ensemble de contraintes sur un noyau minimal de textes sonores. Ce jeu de contraintes et ce noyau de textes ne sont pas écrits dans le programme, ils doivent être déduits par une analyse profonde de la structure du data média. On découvre alors que ce data média sonore est unique. Aucune autre possibilité n'existe en appliquant le jeu de contraintes sur les textes de base. Il n'y a donc aucun hasard pour le pôle Auteur.

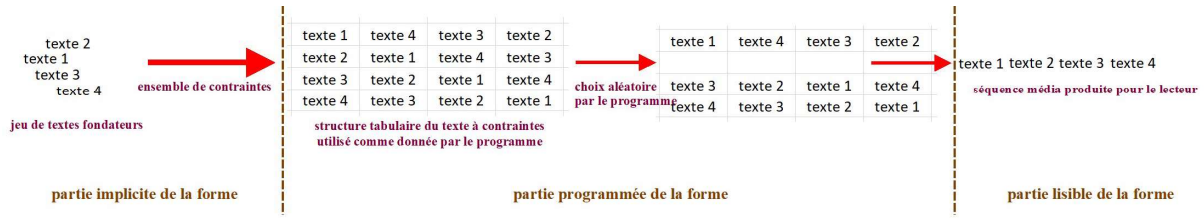


Figure 33 : structure de la forme programmée « aléatoire contraint » dans Orion de Tibor Papp

Ici, l'ensemble des contraintes et les textes de base sont des ghosts à l'intérieur du texte-auteur et non à l'intérieur du texte-à-voir.

Le programme ne rend pas audible le data média sonore mais fonctionne comme une médiation entre le texte-à-voir et ce texte qui, bien que sonore, est construit avec des méthodes classiques de contraintes graphiques.

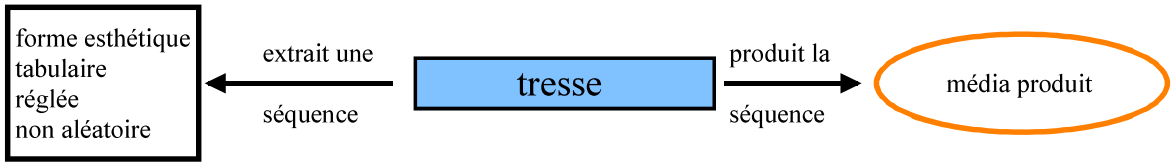


Figure 34 médiation de la forme « aléatoire contraint » entre le texte-auteur et le texte-à-voir

5 Pour aller plus loin

5. 1 Ontologie de la littérature numérique programmée

Au regard de toutes ces propriétés, comment peut-on définir ou caractériser une œuvre numérique littéraire programmée ? Quelle est l'ontologie de l'œuvre numérique ?

Le modèle procédural montre que le texte est multiple et très difficile à appréhender. Il n'est pas le même pour tout le monde, il dépend de la profondeur de dispositif de l'individu et il change en fonction de la position de cet individu dans le dispositif, en tant qu'Auteur, Lecteur en lecture étroite ou méta-lecteur. Il est distribué sur plusieurs espaces, construit sur plusieurs plans qui utilisent un système de signes parmi les systèmes unaires, duaux et ternaires, ces plans pouvant entrer en relation rhétorique les uns avec les autres. Il peut contenir des ghosts dans différents plans, qui ne peuvent être détectés que par déconstruction. Il semble donc en fait impossible de définir une œuvre littéraire numérique programmée comme un texte.

Peut-on la définir par une matérialité comme tentent de le faire le cybertexte et le technotexte ?

Le modèle procédural montre que cette matérialité est distribuée sur plusieurs parties du dispositif. Pire, ce dispositif est sujet à la labilité et le transitoire observable est alors imprévisible et différent d'un contexte technique à un autre. Une partie de cette matérialité disparaît avec l'obsolescence. Cette matérialité est alors infinie, non pérenne et non suffisamment stable pour permettre de définir l'œuvre par sa matérialité.

Nous devons donc nous tourner vers une ontologie qui ne se focalise ni sur la matérialité ni sur la textualité. L'ontologie spinoziste est un bon candidat. Pour Spinoza, l'individu existe dans deux dimensions qui sont en relation : la matérialité et l'essence. La matérialité est infinie et mortelle. Ces caractéristiques rendent bien compte du dispositif procédural des œuvres numériques programmées. Selon Spinoza, l'essence est éternelle et constitue une puissance d'agir. L'individu agit à travers la matérialité du dispositif bien sûr. Il est vrai que la matérialité de l'œuvre : source, appareil, transitoire observable, documents, agissent sur toutes les positions à l'intérieur du dispositif. On ne peut alors certes pas définir mais caractériser une œuvre numérique, et toute œuvre en général, comme un individu spinoziste caractérisé par son " pouvoir d'agir ". Quel peut être ce pouvoir ?

Mon hypothèse est qu'une œuvre agit sur quelqu'un dès lors que cette personne considère qu'une partie du monde physique est la matérialité ou une partie de la matérialité de l'œuvre (ses parties extensives dans le vocabulaire de Spinoza). L'œuvre est une œuvre numérique littéraire dès lors que tout texte construit sur cette matérialité est compris comme un texte (tissu de signes) ou une partie de texte doté de littérarité. Plus simplement dit, une œuvre est une œuvre parce que certaines personnes considèrent que c'est une œuvre. Une œuvre littéraire numérique est une œuvre littéraire numérique parce que certaines personnes considèrent qu'elle l'est. C'est ontologique et non tautologique. Cela est dû au fait qu'en réalité, seuls les êtres humains agissent sur d'autres êtres humains à travers des dimensions matérielles et textuelles. Le pouvoir d'agir de l'œuvre est un agrégat de pouvoirs d'agir humains.

En ce sens, la matérialité et le texte ne définissent pas une œuvre, ils en sont des dimensions. En tant que pouvoir d'agir, l'œuvre n'a pas à être identique pour tout le monde ; elle peut agir différemment sur deux individus distincts. Il n'est pas obligatoire non plus qu'il y ait un consensus culturel sur elle : les débats et les controverses sur son appartenance ou non à l'ensemble des œuvres participent déjà à son action dans le monde, ils manifestent son pouvoir d'agir culturel et donc son existence en tant qu'œuvre puisque, si débat il y a, c'est que quelqu'un la considère effectivement comme une œuvre ; ce qui fait œuvre pour quelqu'un ne peut pas ne pas être une œuvre.

5. 2 Les machines à lire

Il est clair qu'une lecture étroite est incapable de donner accès à toute la richesse textuelle d'une œuvre littéraire numérique programmée. Malheureusement, c'est souvent la position unique dans laquelle se trouve un lecteur aujourd'hui, car la culture est toujours basée sur le dispositif frontal et la littérature numérique est comprise comme une production écran, comme un "cinéma littéraire programmé". Mais ce n'est pas le cas. Le défi, pour la monstration du texte des œuvres, consiste donc à rendre lisible, pour un lecteur en position de Lecteur, la richesse à laquelle seul un méta-lecteur peut accéder. Rendre lisible le code lui-même n'est pas la meilleure solution et parfois ce n'est pas la solution du tout, notamment pour découvrir les ghosts, ce qui demande de la déconstruction.

Considérer l'œuvre comme un individu spinoziste ouvre une autre possibilité. En appliquant cette ontologie, toutes les composantes non-humaines du dispositif participent à la matérialité de l'œuvre, en sont des parties extensives, et pas seulement la source et le transitoire observable. Toutes ces composantes, bien sûr, n'ont pas le même statut : le dispositif principal est fondamental mais les documents sont aussi des parties de la matérialité infinie de l'œuvre, à la frontière entre les parties extensives de l'œuvre et de la matérialité extérieure à celle-ci : ce sont des composantes parergoniques de l'œuvre (Bootz, 2015). À titre de comparaison, le colosse de Rhodes n'existe plus en tant que sculpture physique, mais il continue d'agir sur nous à travers des livres et des films. Ces livres et ces films sont sa matérialité actuelle, ils constituent une matérialité parergonique du colosse de Rhodes.

Cette conception spinoziste de l'infinité de la matérialité d'un individu permet d'ajouter des composantes parergoniques à la matérialité du dispositif de l'œuvre. J'appelle machine à lire (Bootz, « Le concept de machine à lire…») une composante conçue pour exprimer la richesse découverte dans la méta-lecture en un produit accessible en lecture étroite. Cette machine à lire ne remplace pas la lecture étroite du texte-à-voir mais ajoute une nouvelle production accessible en lecture étroite, constituée d'interfaces et de documents issus de la méta-lecture. Cette machine à lire est un discours second dans le modèle procédural, réinjecté dans la position du Lecteur.

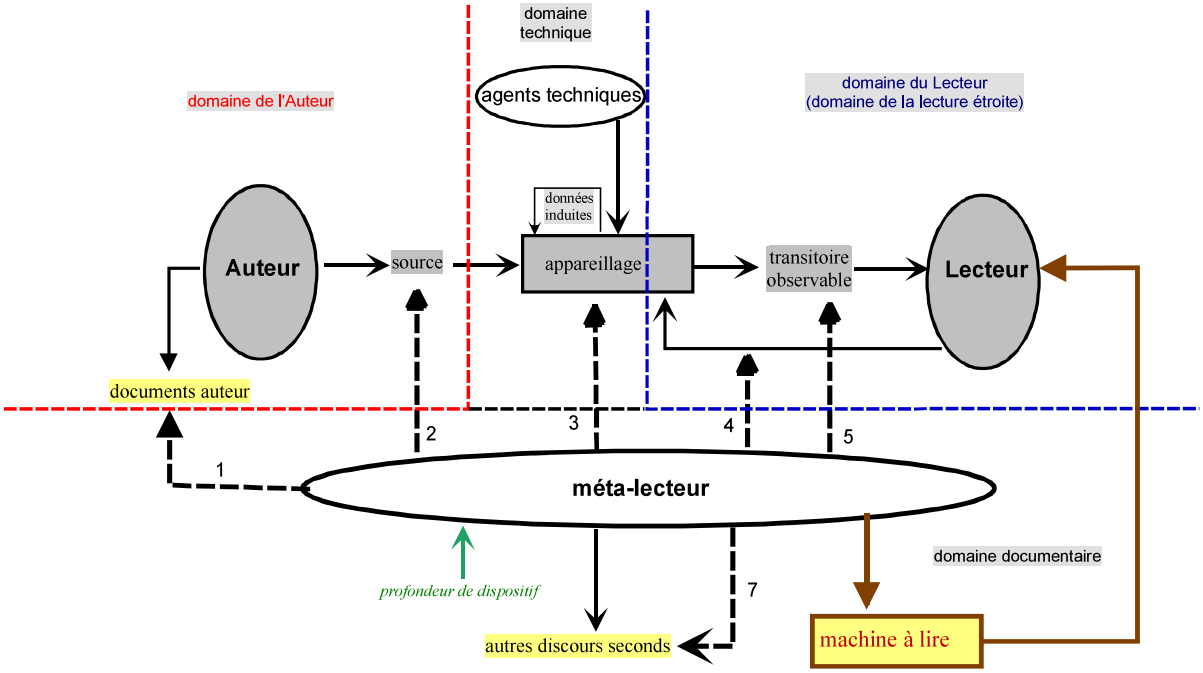


Figure 35 : machine à lire

5. 3 Propositions sur la préservation des œuvres

L'hypothèse selon laquelle l'œuvre est principalement caractérisée par un pouvoir d'agir et non un texte ou une matérialité a une conséquence importante sur la préservation. Dans cette optique, préserver ne consiste pas à maintenir un certain état antérieur de matérialité ou de propriété textuelle. Cet objectif participe bien sûr au pouvoir d'agir de l'œuvre mais, en même temps, il fossilise ce pouvoir et, s'il constitue la seule perspective de la préservation, interdit à l'œuvre d'agir différemment. C'est à l'opposé du statut mortel de la matérialité de l'œuvre. Nous devons assumer ce statut mortel, et notamment en littérature numérique où il est inéluctable et où la durée de vie de l'appareillage est bien plus courte que la durée de vie humaine. La mort matérielle, l'obsolescence est inscrite dans l'œuvre elle-même.

Le véritable objectif de la préservation est de permettre à l'œuvre d'agir dans le futur, même différemment, même sous une autre matérialité. Comme nous ne savons pas comment l'œuvre peut agir dans le futur, la préservation doit documenter et stocker, enregistrer, le plus de détails possibles sur tout et n'importe quoi et pas seulement sur ce qui est aujourd'hui considéré dans le dispositif frontal comme relevant de l'œuvre. Même les choses les plus triviales et évidentes doivent être préservées parce que ce qui est actuellement évident, trivial et secondaire, ne le sera plus dans le futur.

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Biographie

Philippe Bootz est professeur émérite de l'université Paris 8(2002), Habilité à diriger des recherches (HDR, 2016), Docteur en Sciences de l'Information et de la Communication (2016), docteur en physique (1985), professeur agrégé de physique (1981). Directeur adjoint du laboratoire Paragraphe (2018-2020), responsable de l'Équipe EHN (actuellement DiNuPuMoC) du laboratoire Paragraphe (2008-2022), Président du Comité scientifique du labex ARTS-H2H (laboratoire d'excellence, 2016-2018), membre du Conseil des Relations Internationales de Paris 8 (2013-2016)/ Membre du comité de direction ELO (2014-2016), co-éditeur de la collection « compulu=it » aux West Virginia University Press (2010-2018), membre du comité consusltatif d'e-poetry (2001-2009), co-créateur et éditeur de la revue numérique de poésie numérique *Alire* (1989-2010). Programme de la poésie depuis 1977. Bootz a publié plus de 250 articles ou conférences sur la littérature numérique. Ses œuvres ont été présentées dans pquasiment tous les évènements internationaux en littérature numérique.

Digital Poetics, Machine Intelligence and the Everyday

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As a culture, we are in the seemingly ineluctable process of handing over the digitization and indexing of our entire surviving published textual legacy to Google, in order for them to include that part of it which they have not already indexed.
----John Cayley

Abstract

This paper was originally envisioned as a rather generic talk about generative text, poetics, and AI. But as I witness the difficulties faced by Twitter and Meta and ponder the very real cultural problems of North American culture, I feel like my time would be better spent discussing the problems with "development" as a paradigm for understanding digital futures and opening the door to discussing alternate futures as they may arise in an African context. Many global powers have financial and strategic interests in Africa, but their humanitarian interests should be regarded with scepticism. On the other hand, as the US, Europe, China, and Russia increasingly see themselves drawn into economic and political crises, African nations have many opportunities. In place of autonomous machines engineered in the so-called "developed" nations, African autonomy has the potential to play a significant role in the development of global culture in the 21st century.

Keywords: *Africa, Poetics, AI, Machine Intelligence, development Meta, Twitter*

Résumé

Cet article a été initialement conçu comme un exposé plutôt générique sur le texte génératif, la poétique et l'Intelligente Artificielle. Mais alors que je suis témoin des difficultés rencontrées par Twitter et Meta et que je réfléchis aux problèmes culturels très réels de la culture nord-américaine, j'ai l'impression que mon temps serait mieux consacré à discuter des problèmes du « développement » comme paradigme pour comprendre l'avenir numérique et ouvrir la porte. Discuter des futurs alternatifs tels qu'ils peuvent surgir dans un contexte africain. De nombreuses puissances mondiales ont des intérêts financiers et stratégiques en Afrique, mais leurs intérêts humanitaires doivent être considérés avec scepticisme. D'un autre côté, alors que les États-Unis, l'Europe, la Chine et la Russie se sentent de plus en plus entraînés dans des crises économiques et politiques, les nations africaines disposent de nombreuses opportunités. Au lieu des machines autonomes conçues dans les pays dits « développés », l'autonomie africaine a le potentiel de jouer un rôle important dans le développement de la culture mondiale au XXIe siècle.

Mots-Clés : *Afrique, Poétique, IA, Machine intelligente, développement, Meta, Twitter.*

1.0.Introduction

About 10 years ago, working as an editor, I started noticing resistance when I would suggest that people read articles that they might have overlooked in their research as a way to improve their own arguments. My takeaway from these interactions was the perception that by urging people to cite sources, I was engaging in a kind of exclusionary gatekeeping or, worse, a kind of elevation of the "old guard" by keeping the names of proverbial "dead white men" in circulation. And while there is a risk that citation practices can preserve a kind of hegemonic identity in institutional perspectives, I found that the resistance to the archaeology of knowledge was largely agnostic to identity—as people seemed just as likely to be unaware of W.E.B. DuBois and Octavia Butler as there were of Jean Baudrillard and Stanley Fish. Of course, these recollections are anecdotal and thus, likely, amplified by the bad taste that these experiences left in my mouth. The reality is that we are all beset by varying degrees of provincialism in what we deem to be critical to understanding our specific areas of knowledge. From here, there is a natural human tendency to extrapolate the relevance of knowledge we perceive as useful into a kind of cosmic explanation. We each have an internal library in our memories, some large and some small, some deep and specific, others superficial but wide-ranging (though there are some rare exceptions). This library is useful, but limited.

2.0.Mental Library

Being an intellectual is not about putting everything into one's mental library, though it does require mastering something. More important than mastery, however, is self-awareness about one's provincial little mental library married to a humble curiosity about what is in the libraries of others. And, when one shares these differences, the skill (really, the wisdom to seek counsel) is to appreciate what's in another person's mental library and how they use it. This is why we build universities, to create a repository of living libraries (augmented by actual libraries) and to make them available to a community of scholars, their students, and the civilizations they serve. But this repository of dynamic knowledge is not confined to the university. It exists in the city, in the village, in the family, in churches, in workplaces, etc. In other words, intellectual life rests on the possibility not just of individual intellect, but on the formation of a social knowledge base, or the aggregation of knowledge and analytic capacity of the community, as a network of intelligent individuals with unique experiences and the capacity for moral reasoning. And, when a living community envisions itself as a transgenerational entity, it gathers up information from the past generations and conserves for the future generations, using technologies and techniques of memory, to build an archive. And this integration of the individual, community, and culture is foundational to meaning in civilization.

As Bernard Stiegler notes, being is produced by "transductions" that occur between three processes of individuation: "psychic, collective, and techno-logical" ("Desire and Knowledge"). Stiegler elaborates on this, explaining, "The *I*, as a psychic individual, can only be thought in a relationship to a *we*, which is a collective individual: the *I* is constituted in adopting a collective tradition, which it inherits, and in which the plurality of Is acknowledge each other's existence" ("Desire and Knowledge"). Stiegler continues, explaining that the *I* is engaged in a process of "in-dividuation," working psychically to achieve a state of indivisible unity. This process of *I* formation takes place against the backdrop of one's social milieu, within which the indivisible one is offset by the reality of the many. Furthermore, the individual self is valuable insofar as it is recognized as singularly so within the context of the many, hence the *I* and the *we* are animated by the existence of "metastable equilibrium" ("Desire and Knowledge"). Thus, the strength of the robust dynamic within which individuation occurs helps to form the individual as both unitary and important within the context of the collective, while reaffirming the general social value of the collective as both a gathering of individuals and a distinct community with an intrinsically valuable being in itself. Furthermore, the metastable equilibrium of the *I* and *we*, is prefigured by and productive of the technical system, broadly defined, of prosthetic supports that contribute to, sustain, and are passed on through the

cultural process ("Desire and Knowledge"). Hence, the various techniques and technologies of knowledge cannot realistically be separated from the threefold process of individuation without introducing deep distortions into social existence.

3.0.Literary Arts

The literary arts play a unique role in this configuration, as they sit precisely on the communication process and derive their pleasure, not from the linear transmission of instrumental knowledge via language, but from the friction that exists between senders and receivers as produced by the system of language. If the engineer's interest in information is defined by the desire for precision, efficiency, and control, the literary writer's interest in information is in imprecision, flourishing, and freedom. We know this because the literary tradition prizes the allegory, the implied, the metaphorical, the idiosyncratic, the subjective, and the symbolic. Where engineering tends to streamline the dynamic friction that exists where the *I* intersects with the *we* at these three levels, the literary emerges from this point of friction.

But this dynamic does not describe the state of culture today, and thus we do not exist in a state of metastable equilibrium. Instead, the long arc of modernity is married to a growing estrangement of the individual from the whole. In the European tradition, this begins with the birth of the author in the Renaissance and progresses through his "death" sometime in the mid-20th Century (see Barthes). Still, Anglo-European subjects desperately hold out hope for ego gratification against a system of culture that is inherently competitive and ever more banal in the prizes that it proffers. Andy Warhol predicted 15 minutes of fame for everyone. Social media made it probable. And now the "author" walks with the stench of zombie remains, trying to make their name visible among social media influencers and pop stars.

Globally, of course, the foundations of Westen Liberal expansion have been facilitated by the obscured externalities of the colonies. The heavy-handed exploitation of Empire was followed by the liberal era, which adopted the benevolent rhetoric of the "developed" world offering assistance to the "developing" world through loans, aid, and nation-building. This trajectory has intensified via the extension of the consumption model at the precise moment that economics has become informational. If Henry Ford gave every American access to the Model T, perhaps META can offer everyone in the world a vision of access. Militarism, resource extraction, and industrial production continue to be material practices, but the interrelational cultural supports (culture, education, and finance) that were once framed as the goals in the discourse of neoliberalism have been virtualized. More importantly, these discourses are automated cybernetic loops of human input, surveillance and prediction, algorithmically governed output, followed by a renewed cycle of human input.

Obviously, companies like Alphabet and Meta offer their users free access in exchange for the right to analyze their language and relationships. These companies sell both the marketing data and "smart" access to those individuals and networks that make use of their intimate knowledge. This, of course, says nothing of the enormous intelligence potential of datamining and surveillance in managing populations. We may very well be entering a phase of saturation in which social media will become the only remaining place of publication, a heavily curated space, crowded by machine text. Certainly, Twitter is on an accelerationist trajectory towards total informational rot or tightly controlled subscription content (or both). This is a harbinger of the general trend towards a kind of meaninglessness in language held into place by a carefully administered visibility, as a carrot and stick.

As one can glean from Elon Musk's acquisition of Twitter, the American intellectual class is in upheaval. We have a perfect case study of what happens when the intellectual life of purportedly "developed" country willingly replaces the utopian aspiration of the University with pragmatic engineered Platforms. Even as American scholars decry all the problems with algorithms and the

systemic nature of injustice, they seem to implicitly consent to and even celebrate the displacement of the social knowledge base as dialogical process in favor of a database curated by black box processes. The most common critique of Twitter is that without its largely anonymous cadre of paid curators serving the gatekeeping function, that intellectual anarchy will prevail. And, perhaps more dangerous, this belief in gatekeeping has trickled down into the logic of the actual brick and mortar knowledge communities. What has been abandoned is any pretense that ethical systems themselves can, on the basis of their own logical consistency and discursive practices, provide a moderating function within a community (something foretold by Jean-François Lyotard's *Postmodern Condition* (originally published in French, in 1979). Instead, the belief is that even a highly educated group of individuals committed to a common purpose is destined to run itself into the ditch without regulation by a technocratic system of control. Against this failed community, we have a naked "will-to-power" with no internal tendency towards understanding. Instead, we have the belief that justice can only exist under a kind of injustice, an ideal which Gilles Deleuze gestures towards in "Postscript on the Societies of Control." Of course, social media was never meant to be a community in the first place. Nevertheless, many accept its failure to be what it can never be as proof that actual communities are impossible or that control societies are inevitable.

AI enters as a kind of trusted partner into the collapsed social knowledge base. Where communities of actual humans seem to have failed before our eyes, AI can furnish carefully tailored results that seek to resemble the acceptable and desired range of texts that we seek. Furthermore, as we have abandoned the grave difficulty of community formations, we grow accustomed to seeing slick but shallow pantomimes of competence as ever more intelligent (I think of it as the Anti-Turing test--we want to be judged based on whether or not we can plausibly imitate instrumental communication). Naturally, a society of atomized individuals would find these narcissistically modeled results to offered moments validation that are difficult to resist.

There was a time when it was necessary for people to manually enter the contents of their thoughts and affect into a database, but I think most of the training for AI is moving towards the capture of voices and gestures to train its models. So, these platforms may very well disappear, but in their place, the more logistically oriented platforms will persist and curated spaces will exist, but the large target will be the volume of social behavior that can be surveilled and manipulated through bottlenecks (for the time being, platforms like WhatsApp are able to pull together large pools of data on users along with real time speech analysis in very diverse linguistic contexts).

African nations, historically, are polyvocal. Often a colonial language will function as a lingua franca that connects people from differing linguistic communities (as is the case here). But as you are well aware, Africa is home to 1250-2100 spoken languages, with over 500 living languages in Nigeria alone ("Languages of Africa"). This means that Africa stands apart from the North Atlantic sphere for its linguistic dynamism. If AI is built by engineers in the US, China, and Europe and trained upon the semantic associations drawn from the linguistic samples provided by the largest and most connected user-bases with the largest bodies of published content, this means that what AI knows most closely reflects already dominant cultural perspectives. Rather than see the self-replicating assimilability of consciousness as evidence of bias or neglect, it could be seen as an opportunity to guard against imperialism and to create indigenous institutions that resist hegemony.

In this moment, the cultural discourses in US, especially, signal an openness to opportunity for the development of skills through educational exchanges and visa programs due to the legacies of slavery, colonialism, and racism. Additionally, global strategic and economic interests encourage knowledge exchange in nations with advanced tech economies. These opportunities are attractive though risky. Though the heterogenous nature of African culture could present opportunities to defer the process of assimilation, it is also possible that the exploitation of strategic inequalities in a variety of capacities (resources, technologies, markets, finance, and war) could result in a deepening of cultural imperialism. Complex ethnolinguistic terrains are targets for cognitive colonization. The key, of course, is to develop local and regional capacities, expand cooperation on the continent, and,

ultimately, to appreciate the historical significance of independence, not only for Africans, but for all of humanity.

Conclusion

And so, I would like to conclude with a warning and a hope. To warning is that you will recognize the potential for AI to function as a colonizing force that can reproduce hegemony across very diverse cognitive terrains (and can do so with a seemingly human face). And the hope is that, in recognizing it as such, you might create literary practices that exist outside the ears and eyes of the surveillance apparatus. Literature is up for grabs and you have the upper hand.

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Introduction to African electronic literature

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Abstract

The classification of literature faces challenges from new media and ICT, leading to expanded boundaries, artistic innovation, and reader empowerment. Digital humanities, an emerging trend, has created space for electronic literature, particularly in the Global North. However, African electronic literature lacks critical attention, with scholars questioning the Electronic Literature Organization's limited representation of African works like Flash Fiction Ghana and Bent not Broken. This gap underscores the need to explore African electronic literature comprehensively. My study aims to describe and explore emerging African electronic literature and its subgenres. It delves into the origins, subgenre classification, authorship, and the digital infrastructures supporting this literature. Ultimately, it highlights the potential for African autonomy to shape global culture, particularly as other world powers grapple with economic and political challenges.

Keywords: *African digital literature, MAELD and ADELD, Digital Humanities, African digital texts*

Résumé

La classification de la littérature est confrontée aux défis des nouveaux médias et des TIC, conduisant à un élargissement des frontières, à une innovation artistique et à une responsabilisation des lecteurs. Les Humanités Numériques, une tendance émergente, ont créé un espace pour la littérature numérique, en particulier dans les pays du Nord. Cependant, la littérature numérique africaine manque d'attention critique, les chercheurs remettant en question la représentation limitée par l'Electronic Literature Organization d'œuvres africaines comme Flash Fiction Ghana et Bent not Broken. *Cette lacune souligne la nécessité d'explorer la littérature numérique africaine de manière globale. Mon étude vise à décrire et explorer la littérature numérique africaine émergente et ses sous-genres. Il explore les origines, la classification des sous-genres, la paternité et les infrastructures numériques qui soutiennent cette littérature. En fin de compte, cela met en évidence le potentiel de l'autonomie africaine pour façonner la culture mondiale, en particulier alors que d'autres puissances mondiales sont aux prises avec des défis économiques et politiques.*

Mots-Clés *: Littérature numérique africaine, MAELD et ADELD, Humanités Numériques, Texte numérique africaine*

1. Introduction

Literature has been traditionally classified into prose, poetry and drama. However, with the emergence of new trends in literary studies, these traditional boundaries have been problematized, challenged and deconstructed. They have become elastic, consistently shifting as new literary experiences are articulated and appropriated in multimodal and electronic literatures. Many new concepts are used to evoke electronic literature, referred to as « digital literature », « mediature », « cyberliterature », or « web literature ». Since its creation in 1999, the Electronic Literature Organization (ELO) as "an international organization dedicated to the investigation of literature produced for the digital medium" (www.eliterature.org) has contributed immeasurably to the promotion of literary electronic artworks in the world. Though the epistemological generic walls of African literature are similarly expanding as new trends, technologies, techniques, platforms, public, and practitioners are evolving, dearth of literature on African electronic literature has been underscored and challenged by African scholars (Opoku-Agyemang; Bisschoff; Adenekan; Yeku; Onuoha; Ajah). Though these scholars have made attempts at galvanizing the discursive potentials and possibilities of African electronic literature, none of their studies has been able to generically classify the African electronic literature and situate its advent historically and temporally.

This study identifies, interrogates, positions, and classifies African electronic literature, presenting its platforms, subgenres, and authors. It is divided into five stages. The first phase offers some definitional and classificatory explanations to the notion of electronic literature, though it avoids the conceptual questions surrounding "electronic literature" and "digital literature". The second phase historically situates the emergence of African electronic literature. My hypothesis is strengthened with a geospatial mapping of electronic literature in Africa, while classifying its subgenres and I shall rely majorly on the *Multilingual African Electronic Literature Database* (MAELD) and *African Diasporic Electronic Literature Database* (ADELD) for classification and identification. The third stage identifies literary digital artworks with their authors. The fourth section interrogates the digital platforms that enable the preservation, dissemination and consumption of African electronic literature such as social media, blogs, litmegs, mobile/smart phones, laptops and repositories. The last phrase examines the discursive possibilities and potentials of African electronic literature and its limitations.

1.1.Definition and evolution of electronic literature

Many scholars have used the divide of "born digital" and "unborn digital" artworks to describe what is and what is not electronic literature. By "unborn digital", I mean a "remediated form of a print text" (Yeku 2). In her *Born Digital*, Engberg (4) associates "born digital" with poetic works "made with the authorial intention to specifically engage, question, and explore digital means of poetic and artistic creation". Di Rosario amplifies the identity of digital environment as a characterizing definition of electronic poetry. If existence in a digital setting is a prerequisite for the digitality of literature, can we assure that all literary works formatted in PDF files as electronic copies accessible and readable through Android and computer screens are digital? It can be said that translation of written literature into digital texts in PDF format is easier than creating a born-digital literature with its technopoetics. This term "technopoetics" refers to the writing of a literary work using technological tools and techniques (Levin 342) and ELO sees it as a basic feature of electronic literature which, the organization defines as a born-digital literary art that exploits, as its muse and medium, the transmedia possibilities of the digital (See https://directory.eliterature.org).

In his work, Fletcher agrees that a work of digital literature is only born at the moment when all its elements are gathered in performance. This submission informs that performativity is considered as an integral part of electronic literature because it involves performative interactions such as scratching, checking, twisting, touching, scrolling, and reading that take place between the body and the screen (Fletcher 29). Electronic literature is a digital art. If a digital art, Bisschoff (262) simply puts it as an "artistic work or practice that uses digital technologies as an essential part of the creative and/or preservation, dissemination and exhibition process." U. Pawlicka admits that electronic literature moves from the traditional meaning of writing and reading towards the programming of text, performative reading, and the interactive creation of meaning. Bell *et al* see it as fiction written for and read on a computer screen that pursues its verbal, discursive and/or

conceptual complexity through the digital medium, and would lose something of its aesthetic and semiotic function if it were removed from that medium (Cited in Rowberry 319). In Onuoha's *African Digital Prose,* he uses the term "digital literature", defined as "works of art that are fashioned for digital devices" (23). All these definitions have their merits, depending on the historical experiences of their authors. I conclude that electronic literature is a digital art by its method of production, its mode of presentation, and its means of dissemination.

Di Rosario, Grimaldi & Meza (4) agree that electronic literature developed with the advent of computers and digital technology. The authors left out the history of electronic literature in Africa and Asia and majorly presented the Global North. However, they gave an overview that traces the evolution of digital literature, admitting that in 1952 Christopher Strachey had created what can be considered as the first pieces of digital literature, « Love Letters » through a Mark 1 program. Nevertheless, « Stochastic texts » (1959) by Theo Lutz are considered as the first digital literary text. In 1976 Will Crowther and Don Woods created the first interactive fiction, *Colossal Cave Adventure* while Dave Leblin and Mark Blank, with the help of Tim Anderson and Bruce Daniel, produced *Zork* (1977-1979). In 1980s and 1990s, hypertext fictions emerged. Unlike its original form at creation, electronic literature started to expand to include more graphics, sound files and structures. Although electronic literature scholars have not given much attention to the history of African electronic literature, the globalizing influence of popular culture and digital culture justifies the historical background of African digital artworks.

2.0. Emergence of African electronic literature

Scholars such as Abiola Irele have strongly championed the classification of African literature into oral and print literature and Opoku-Agyemang ("Flash" 1) has added the third category, which is African digital literature. These three taxonomies have markers of divergences and convergences as processes of production, preservation, circulation and consumption are ontologically distinguished. Adenekan and Opoku-Agyemang ("Beyond") as digital humanities scholars have made practical scholarly efforts towards establishing the existence of African electronic literature between 2014-2017 through publications, paper presentations and panel organizations. Opoku-Agyemang ("Flash") affirms that African digital literature is a vibrant field with Nigeria, Kenya, South Africa, Egypt, Tanzania and Ghana among other countries that serve as reference points for this vibrancy. While these accounts have contributed immensely in shaping the discourse of African digital literature, thereby giving it a legitimizing voice, its emergence has not been temporally situated and its typology fully interrogated.

If written literature is greatly linked to Europe's Gutenberg printing revolution, it is essential to state that the birth of electronic literature in Africa cannot be put in proper perspective without the examination of the arrival of computer and technology in African societies. This simply means that I am following the theory of Di Rosario, Grimaldi & Meza on how the birth of computer and technology catalyzes the origin of electronic literature. To historicize African electronic literature, there is need to unpack the epistemological concerns of African electronic literature, it is important to situate the art ontologically in time and space. The history of African electronic literature can equally be traced to the advent of computers, mobile telephony and internet in Africa in the early 2000 with historical hypotheses. Jensen (215) agrees that 11 out of 54 countries had local internet access in 1996, but in 2000, all countries had it in capital cities. Internet access was majorly through mobile/smart phones as many could not own a desktop computer (Bisschoff 261) and it can be properly posited that the advent of these electronic and digital devices gave birth to digital literacies and capacities. Without exposure to the uses of Android and computer applications, it is impossible to apply them for any creative and epistemic use and demonstrating how "digital media has evolved into a critical infrastructure in world literature, enabling the production, circulation and consumption of literature worldwide" (Uimonen 20). Based on these historical evidences on the advent and spread of telephony and Internet Communication Technology (ICT) in Africa, African electronic literature became a literary and artistic reality and experience in the 2000s when creative experimentations culminated into the creation of different genres in different African and Europhone languages.

Electric street lights were installed in Kimberly as early as 1882 (Marwah). It presupposes that household electronic appliances were in public use in South Africa before other African countries and this explains why pockets of digital creativity had kicked off in the late 1990s. In 1996, South Africa's Celestial Games had modernized the first African Video game *Toxic Bunny* before recording it for Web and Android platforms in 2014. In the early 2000s, queer-hyper drama had been produced in South Africa: Ludolf Parker's *Ek's ook mens* (2002) and Madeleine Volschenk's *Man* (2002), both digital texts are created in Afrikaans language (See MAELD & ADELD database). In North-Africa, the Morocco poet Mun'im al-Azraq had published his poetry on the *al-Mirsâh* (*The Anchor*) website and this first "visual digital poetry in Arabic appeared in the first decade of the third millennium" (Younis 131). In this poetry such as *Saidat Almà* ("The Water Lady"), the poet combines "media with colors, pictures, photos, paintings, and music" (Di Rosario, Grimaldi & Meza 20), unlike the first virtual poetry in Northern Nigeria published in 2002 on the KanoOnline creative forum which does not seek to "reflect new media technologies" (Lyakhovich 486). The techno-poetic absence of new media invalidates the description of Northern-Nigerian virtual poetry as digital literature because in the words of Journo, texts produced for e-readers or even sold on mobile apps should not be considered as digital fiction, what Di Rosario, Grimaldi and Meza refer to as "digitized print literature" (5). In the next section hereafter, my classification will majorly dwell on African born-digital works as archived in MAELD and ADELD repository, though there is need to acknowledge the roles that other virtual spaces have played in vulgarizing African digital contents.

3.0. Classification of African electronic literature

Let me follow the old broad spectrum of literary categorization into fiction, drama, and poetry (Klarer 1). However, if I attach "digital" to these categories to give me digital fiction, digital drama and digital poetry, it will not leave me without epistemic risks. This is because different genres of digital literature such as digital storytelling, video games, webnovelas, webcomics among others have emerged to problematize the traditional classification of literature and to dismantle or deconstruct its generic boundaries. In *Generic Instability and Identity in the Contemporary Novel*, Gonzalez and Pittin-Hédon concludes that "contemporary aesthetics is characterized by generic mixing on the level of both form and content. The barriers between different medias and genres have been broken down in all literary art forms, whether it be theater, poetry or the novel" (vii). Consequently, the definition of literature is increasingly becoming more polemic since "visual and acoustic elements are being reintroduced into literature, and media, genres, text types, and discourses are being mixed" (Klarer 3). Being a new trend of literature, attempts at cataloguing African electronic literature whose genres and subgenres are begging for ontological and epistemological delineation and validation will not be without vulnerabilities.

In *African Digital Prose*, Onuoha makes great strides in classifying African digital prose into digital short stories, flash fictions, infographic prose, social media narratives, blogs narratives, and digital memoirs. MAELD's and ADELD's categories are rather overlappingly overdetailed as it retains immersive storytelling, webcomics and digital comics, blogosphere fiction, queer-hyper fiction, mobile phone storytelling, hyper fiction, hyper novel, and interactive fiction. The difference between queer-hyper fiction and hyper fiction is the insertion of "queer" which is prescriptively thematic rather than techno-poetic. Immersive and mobile phone storytelling can be subsumed as subgeneric types of digital storytelling, though their variations are located in their processes of production and consumption. The Nigerian Joel 'Kachi Benson's *Daughters of Chibok* (2019) and the Tunisian Digital Mania's *Beat the Beats* (2015) are models of African immersive storytelling which deploys virtual and mixed reality (AV/VR) technologies in placing the audience in different scenarios, to experience it from different viewpoints and to allow them anticipate what the future may look, feel like, and indeed be like, by being placed into a set of future space scenarios (Doyle). Digital fiction is categorized into interactive fiction (the Zambian Nolan Dennis's *A Sun* Black, 2020), hyperfiction (The Moroccan Labiba Al-Khammar's *Hiza Alhub* ("Loves Shoes", 2017); and the South African Lauren Beukes' *The Edge*, 2004), and Blogosphere fiction (the Nigerian Anthony Azekwoh's *The Fall of the Gods*, 2017). The Ghanaian LetiArts-Eyram Tawia's *Afrocomix* (2019)

and the Nigerian Ayo Makinde's *Dúró* (2020) pass for digital comics and webcomics sequentially. Like comics, video game is regarded as a narrative.

Generic classification of video games is slippery because the genre is markedly different with its direct and active participation of the audience through the surrogate player-character who acts within the game's diegetic world, taking part in the central conflict of the game's narrative (Wolf). Video game has been popular in African space. Opoku-Agyemang collaborates that Ghana has been associated with video game for a long period, citing *Oware 3D*, *Ananse: the Origin* (2014) as Ghanaian samples. Other African video games are the Algerian Diaa El Hak's *The Schema* (2015) and *Lamb of Truth* (2016), the Egyptian Anura Hanafi's *Everything except Yes* (2018), etc. The Nigerian Abiola Olaniran's *Gamsole* which, founded in 2012 and remaining one of the most successful game developers in Nigeria and Africa, has produced over 35 games such as "Gidi Run", "Temple Run", "Monster Ninga", "Sweet Candy" among others accessible on the Windows phones and PC platforms. As at 2015, In an interview with Elly Okutoyi published in itweb.africa, Olaniran's venture into video gaming is anchored on his passion to use African lifestyle to create fun experience that can be enjoyed by people from different parts of the world. According to Wikipedia, Gamsole's games have been downloaded over 19 million times across 25 countries in Africa, Asia, Europe and South America to demonstrate that it has been impactful to transcultural and transnational enthusiasts since its creation. Aside the popularity of video games, social media narratives are gaining grounds as products of Twitterature, Whatsapperature, Instagramature, Facebookerature among other different digital platforms. Few of these digital creations are @yrsadaleyward's *The Terrible: A Storyteller's Memoir* (Nigerian Instagramature), Nana Awere Damoah's *My Book of GHC Oats* (Ghanaian Facebookature, 2013), Abdelouahid Stitou's *Zahrallisa* (Moroccan Facebookature, 2013) and Sanlam's *Uk'shona Kwe langa* (South African WhatsApperature, 2017). Most of social media narratives appeal to multisensorial techno-poetics through multimodal potentialities and performances.

Among different literary genres, digital drama receives fewer creative attentions. MAELD and ADELD have little entries in its repository. No reason is adduced; however, it is possible that the blurring of generic boundaries is responsible for minimal production of digital dramatic works as digital comics, webcomics, and video games are closing up the gap between theatre and prose fiction, and between visual and textual cultures, being a genre that combines "the verbal with a number of non-verbal or optical-visual means, including stage, scenery, shifting of scenes, facial expressions, gestures, make-ups, props and lighting" (Klarer 42). However, hyper drama is identified as a subgenre of digital drama and few examples exist in African electronic literature. The South-African Ludolf Parker produced his Afrikaans queer-hyper drama titled *Ek's ook mens* the same year with Madeline Volschenk's *Man*. Both creative digital dramatic works were released in 2002. Others are Twitterbot drama such as Yohanna Waliya's @korczakDramatist. If digital drama appears unpopular among African digital creators, digital poetry is very popular of all African digital works.

As a genre of electronic literature, digital poetry has a history that scholars connect to the avant-garde experimental poetry and to the discovery of computer and/or internet. It has received enormous critical appraisals. Funkhouser suggests that it is "a new genre of literary, visual and sonic art launched by poets who experimented with computers in the late 1950s" ("Digital poetry" 318). Funkhouser ("Prehistoric" 22) conditions a poem as a digital poem "if computer programming or processes (software) are characteristically deployed in the configuration, generation, or preservation of the text (or combinations of texts)". His definitional explanation gives credence to the creation, not the content, of poetry, thereby prioritizing the artistic effects over the message. More sumptuously, K. Stein, in his *Poetry's Afterlife: Verse in the Digital Age,* acknowledges its hybridity and synchronicity; he goes on to characterize digital poetry as a mixture of word, image, sound and music into a new language of digital poetic expression. These technopoetic elements are exhibited by the screen's kinetic materiality and performability. Distinct from analogue poetry whose production and distribution depend on publishing houses, bookshops and libraries, electronic poetry owes its poiesis to computer, internet and new media cultures from where emerges its typographic multimodality (Ajah 669). Different terminologies such as computer poetry, e-poetry, cyberpoetry, digital poetry, new media poetry among others have been used to classify this poetic

category of digital literature. As composite and complex appear these critical labels, Engberg identifies a common denominator as the underscoring of a multisensory experience of poetry through visual, auditive, tactile, kinetic, and textual artifice. It means that technopoetics outlines the typology of electronic poetry. If scholars prioritize the analysis of programming codes, machines and the platforms on which the digital poetic text is distributed as contends Pressman (767), it is because their practice is descriptively classificatory. Stein categorizes his afterlife poetry into two major broad spectra: video poetry (docu-video-poetry and filmic poetry/Cin(E)-poetry) and new media poetry (fixed-text, computer-based poetry, alterable-text electronic poetry, collaborative/participatory media poetry). The "afterlife-ness" of these digital texts is located in their ubiquity, mutability, hybridity, and virtuality, through their immortality is subjected to the death of their creators and repositories (Ajah 669). In "Digital Poetry" Di Rosario provides another insightful classification of e-poetry. It is classified into dynamic electronic poetry /or Flash poetry, visual e-poetry, generative e-poetry, digital poetry, and collaborative e-poetry. The typology offered above fits into the western models of electronic literature.

MAELD and ADELD databases have curated different digital subgenres in African electronic literature; these are interactive digital poetry, immersive poetry, narrative video poetry, narrative digital poetry, queer-hyper digital poetry, digital kinetic poetry and digital hyper poetry among others digital poems that can be categorized as social media poetry such as Veralyn Chinenye's and Eriata Oribhabor's Facebook poem (Onuoha 58), and video clips poem or Flash poem on YouTube "in which written, visual and audio material is presented together" (Younis 33). Some of the African digital poems are: Stef Bos's hyper poetry *Vandaag* (South Africa), Christopher's digital kinetic poetry *Mandela*, *Femina*, and *The Ink Link* (South Africa), Olamide Popoola's queer hyper poetry *A Fierce Love* (Nigeria), Yohanna Waliya's interactive bilingual poetry *Momenta*, *Homo Salus*, *Véritologie*, Chuma Nwokolo's video poetry "Sudan Sudan", Nissmah Rosdhy's narrative poetry *La'ib Alnard* (2013) among others. Al-Amin classifies Al-Amin El-Nasir's digital work "My Dear Friend" as video poetry because "the aesthetics in video poetry are in its mode of presentation such as musicality, imagery, audibility, symbols and many more" (13). If I follow a rather conversative taxonomy of digital poetry as earlier discussed, the artistic processes of creation and consumption of video poem are not techno-poetic enough to be termed a subgenre of digital poetry though it can be published in social media platforms such as YouTube, Twitter, Facebook, etc.

4.0. Publication of African electronic literature: repository, litmeg and social media

The publication of African electronic literature stands on the overlapping supports of media infrastructure: repository, litmeg and social media. *Multilingual African Electronic Literature Database* (MAELD) and *African Diasporic Electronic Literature Database* (ADELD) were created and curated by Yohanna Joseph Waliya in 2020. It is a strong foundation for the dissemination and preservation of African digital works. The repository is furnished with place-author-work interactive map and it contains 300 records highlighting works of over 100 artists in a handful of languages across 32 African countries. The database has a broad spectrum of what constitutes African electronic literature today.

The repository explains African digital works in the perspective of the African cultural intersections with technologies of literary discourse, as any digital-born literary work infused with African themes, events, emotions, cultural colours, worldviews, heritage, storytelling, virtual, mixed, augmented and extended reality (VR, MR, AR and XR), created either by Africans or robots using programming language, digital tools (hardware and software applications), 3D reality modelling, artificial intelligence and/or using digital platforms and devices as its reading media. Reading in this context can comprise of a range of intellectual, kinetic and bodily practices including playing, watching, clicking, executing, interacting programming, and immersive experience (in case of virtual, mixed, augmented and extended realities). The MAELD and ADELD two-in-one database is open to all genres of electronic literature and other genres of experimental digital writing as we have noted above.

MAELD's and ADELD's definition of African electronic literature is comprehensive as works are majorly classified under genres, platform, and language. Platform can be blog, web,

Android mobile, etc. Other genres are mobile phone storytelling, facebookature, blogosphere Flashfic, video game, blogosphere fiction, webcomics, queer-hyperfiction, queer-hyperpoetry, queer-hyperdrama, instagramature, twitterature, twitterbot, blogosphere poetry, digital kinetic poetry, narrative digital poetry, hypernovel, mobile phone book, whatsApperature, and queer-auto fiction. Linguistic diversity that reflects Africa's voices distinguishes the repository. Digital literary works in English abound from English-speaking countries; Mohamed Al-zraq's *Saïdat Almâ*, Labiba Al-Khammar's *Hizâ Alhub*, etc. are in Arabic; and Ousseni Nikiéma's *Les contes de Dunia* Vol. 1 (2020), Irooko Games' *Les aventures de Béhanzin* (2016) are examples of francophone works. My review of MAELD and ADELD problematizes ELO's directory and internet site that only shows a few of African digital works, works such as *Flash Fiction Ghana* (e-lit Resource), *Bent not Broken: A Family Remembers the War in Liberia and Sierra Leone* among others. It can be said that ELO's directory is not a true representation of African digital literary production all over the world.

Few scholars have studied digital platforms and African literature. Suhr-Syfsma offers enlightening account of digital literature in Africa, though his work only centres on "African digital litmag". He recognizes *Enkare Review*, *Saraba*, *Bakwa*, and *Jalada* as digital literary magazines or little magazines where African literary works are published. However, there are other online literary magazines such as Derek Workman's *The Kalahari Review* (Botswana), Nyana Kakoma's *Sooo Many Stories* (Uganda), Nana-ama Kyerematen's *Afridiaspora* (Ghanaian in Diaspora), Troy Onyango's *Lolwe* (Kenya), Othuke Ominiabohs's *Masobe Books* (Nigeria), Ngozi Cole's *Poda Poda Stories* (Nigeria), *Doek* by Mutaleni Nadimi and Remy Ngamije (Namibia). There are equally *African Voices*, *African writing online*, *Meskot*, *The Street Writer* (TASW), *Q-zine* that publishes English and French works among many others. Projects such as *Gaborone Book Festival* (since 2018) and *Library on Africa and the African Diaspora* (LOATAD, since 2017) have equally stimulated reading and digital culture in Botswana and Ghana.

African digital magazines have been useful in ensuring African presence in digital literary space. Most of African fiction, non-fiction and poetry works were published there before the curation of Waliya and Boyd's MAELD and ADELD. Browsing their website and their content shows their dynamism, vitality, currency or bankruptcy. However, the mortality rate of some of these platforms appears to be high as the absence of their URL in the server gives explanations to their lifecycle or permanency. Their impermanence is associated with the notion of obsolescence, a concept that Fletcher (36) uses to describe tragic mortality of hypertextuality. Many have features that look promising. Digital publishing platforms such as *Sarabamag* and *Doek!* have rich literary contents and contributions. *Sarabamag* is rich in poetry collections. Sanya Noel's "For a While", Okwudili Nebeolisa's "Questionnaire for a Man from Another Man", Ayo Akinyemi's "A Witness Burden" and "Peace in a Time of War" of some of its collections, published between 2018 and 2019. Though they are simple poetic verses, these digital poems are accompanied by photographs and have attracted over 200 viewers each. These poems are structured in traditional poetic style, though read through social media and online media apparatuses. Unlike the Nigerian Yohanna Waliya's digital poetry, the Zambian Noland Dennis's interactive fiction, the Tunisian Digital Mania's immersive storytelling, the works published in African litmegs cannot be referred to as "born digital" since computer programming or processes (software) should be implicated in the composition, generation, or preservation of the digital works (Funkhouser 22).

Social media platforms such as WhatsApp, Twitter, TikTok, YouTube, Facebook among others have been beehives of creative activities of young Africans since the advent of Internet Communication Technology (ICT) and multimedia infrastructures where African digital works are published. Aside the theory of Affordances that helps us understand how users explore the potentials of social media to enhance their capabilities (Egessa, Liyala and Ogara 324) and its FAIR (Findability, Accessibility, Interoperability and Reusability) data advantages, the cost of maintenance of social media for individuals remains minimal and accounts for its attractiveness for creative users of its virtual space. Despite the enormity of African digital works in virtual spaces, African electronic literature is not attracting enough critical reviews.

5.0. Critique of African electronic literature

Literary attentions on and critical engagements with African electronic literature remain unimpressive. However, few scholars have discussed different genres of African digital texts. The doctoral works of Opoku-Agyemang, Isong, and Sykes center on Ghanaian electronic literature, the influence of new media on African digital literature and digital storytelling in Cape Town respectively, setting the discursive stage for critical interventions and appreciation of the new mode of African literature. Yeku, Suhr-Syfsma and Journo explain how African digital spaces such as Bakwa, Saraba, Jalada, Hekaya, Brittlepaper among others have become publishing infrastructures for the dissemination of literary works. While both works highlight how the web 2.0 or internet technology has spiced up accessibility and consumption of African creative expressions, most of the works sampled cannot be categorized as digital artworks because they are products of remediation. However, they demonstrate an aesthetic movement from monomodality to multimodality, from materiality to virtuality, and from traditionality to digitality.

African electronic literature is studied under the umbrella of digital humanities and capacity building in this new area is limited in Africa. however, critical discussions on African digital literature are gathering momentum. An attempt to review all these works on African digital literature within a limited space is impossible, yet a cursory look can be cast on few of those dealing with individual and collective works of digital African authors. Reed and Hill, Reitmaier, Bidwell and Marsden, and Marsden et al among others have discoursed digital storytelling in South Africa, demonstrating the scholarly awareness on and the growing popularity of the new genre. Ajah demonstrated the discursive potentials of Yohanna Waliya's bilingual digital poetry, poems such as "Véritologie", "Homosalus", "Climatophosis" and "Momenta" that have received little or no critical receptions. Onuoha focused his critical searchlights on Veralyn Chinenye's Facebook poems as part of social media poetry. Opoku-Agyemang ("Flash") examined Flash Fiction Ghana and Al-Amin interrogated the aesthetic elements of Chuma Nwokolo's video poetry. It is hoped that with more critical awareness on and engagement with African digital texts, institutions will encourage the development of African electronic literature and its pedagogy in African universities.

Conclusion

This study had the objective of presenting African electronic literature with its growing genres as a way of validating its existence and sensitizing its reading public. It acknowledges the growth of African digital expressions and the roles the new media and the internet technology play in the production, publication, propagation, consumption and preservation of these digital works. In the publication and preservation of African electronic literature, repository, litmeg, and social media have been identified as digital infrastructures; however, with the first two whose servers and clouds are individually managed, the question of the mortality comes to mind. The case of social media platforms such as Twitter, WhatsApp, Facebook, TikTok, Instagram, etc. is different because they are maintained by blue-chip organizations. Ajah had admitted that the rate of deaths of some of these platforms appears to be high as the absence of their URL in the server gives insights into their aborted lifespan. Their transience is connected to Fletcher's concept of obsolescence as the tragic death of hypertexts. Until the pedagogy and scholarship of African electronic literature in African universities and institutions, maintenance and sustainability of litmegs and repositories, left in the hands of individual and collective proprietors, will be difficult. These digital infrastructures need to be institutionalized to guarantee the lifecycle and curtail the impermanence of African digital works.

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Short Bio

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Ethical Perspectives of Digital Divide: An African Case Study

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Abstract

Only social sciences-based techniques have been used in the numerous publications on the digital divide. A relatively small number of studies have also exclusively examined the digital gap from a philosophical and ethical perspective. An unequal, undemocratic, and unfair society are all products of the digital divide. In addition to raising significant discussion on digital justice, knowledge, power, democracy, globalisation, and information capitalism in Africa, this work raises ethical and moral issues and seeks to address them. This study's justification is that globalisation and information technology go hand in hand. This essay will also go into great detail about how all of these factors relate to information capitalism and how they influence Third World countries, particularly Africa. This research falls under the purview of digital culture and employs textual and critical analysis as philosophical approaches.

Keywords: *Digital Divide, Africa, Third World countries, digital culture, Ethical Perspectives*

Résumé

Seules des techniques basées sur les sciences sociales ont été utilisées dans les nombreuses publications sur la fracture numérique. Un nombre relativement restreint d'études ont également examiné exclusivement la fracture numérique d'un point de vue philosophique et éthique. Une société inégale, antidémocratique et injuste est le produit de la fracture numérique. En plus de susciter un débat important sur la justice numérique, la connaissance, le pouvoir, la démocratie, la mondialisation et le capitalisme informationnel en Afrique, ce travail soulève des questions éthiques et morales et cherche à les résoudre. La justification de cette étude est que la mondialisation et les technologies de l'information vont de pair. Cet essai examinera également en détail la manière dont tous ces facteurs sont liés au capitalisme informationnel et comment ils influencent les pays du tiers monde, en particulier l'Afrique. Cette recherche s'inscrit dans le cadre de la culture numérique et utilise l'analyse textuelle et critique comme approches philosophiques.

Mots-clés : *Fracture numérique, Afrique, pays du tiers monde, culture numérique, perspectives éthiques.*

1.0. Introduction

Information technology has brought significant changes to contemporary societies in Africa. It has not only changed African society but also generated ethical dilemmas. The nature of problems is unique (Moore 7). The situation has demanded that we conceptualise and critically understand this new development philosophically and ethically. Of all the issues, access to information technology is itself a primary issue of concern (Iniobong, 54). We may find a wide gap between information-haves and information-have-nots. This disparity in accessing information technology and the ability to use it has been commonly studied as a digital divide. The problem of the digital divide has many implications and extends to all fields of knowledge (Maurer and Lutz, 32). This problem has been approached by scholars in diverse fields. Most of the literature on the digital divide is empirical and descriptive in nature. Though the studies have ethical concerns as an undercurrent theme, they are not fully explored from an ethical point of view. The issue of the digital divide has to be understood from both a descriptive and a normative point of view.

Scholarly literature shows that there are few studies that investigate the digital divide, both philosophically and ethically. Philosophical contributions, moral reasoning, and ethical considerations are very less concerning in the issue of the digital divide (Iniobong, 5). However, in recent times, there have been attempts to understand the digital divide from an ethical and moral point of view. The digital divide brings up issues of access, literacy, usage, skills, exclusion, democracy, representation, class, race, and gender (Iniobong, 73). Technological design and information are also part of ethical considerations. The misrepresentation and myth of information, too, came under the purview of studies of the digital divide. The critical understanding of information society too comes under the purview of the digital divide. The scope of the digital divide is wide, as it is multi-layered and has multiple meanings. This work will touch upon various dimensions of the digital divide from an ethical point of view. In fact, ethics is a potential tool for understanding the digital divide and the nature of information society as a whole.

The digital divide, as a fundamental ethical issue, started being discussed in the domain of computer ethics (Veruggio and Operto, 80). There is a new wave emerging in the field of technology called democratisation of technology, which concerns all segments of people. Technology is viewed as a tool for the emancipation of people. Technology demands moral sensibility, as technology creates and operates within moral situations. The digital divide demands moral sensibility, as the digital divide not only creates within moral situations but also operates within moral situations (Dahlberg and Moss, 7). The issue of the digital divide has not only raised questions pertaining to ethics but has also emerged as an issue of justice. This work exclusively deals with the perspectives of the digital divide and evaluates them ethically. This is an attempt to develop an ethical theory of the digital divide by touching upon various dimensions of the issue. The ethical theory of the digital divide has been viewed from the perspectives of equality and freedom, social and individual representations, the rights and dignity of people, and justice and democracy.

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2.0. Philosophical Approach of Digital Divide

Most of the studies on the digital divide are approached from the social sciences rather than philosophy. Since the digital divide is a complex and multifarious issue, there is a need to understand the problem comprehensively. The discipline of philosophy may provide a framework for a comprehensive understanding of the problem. A philosophical approach may help in clarifying the nature and functions of the digital divide. First and foremost, philosophy can provide conceptual clarification and help us determine what exactly we are concerned about. Secondly, what is at stake in debates about the issue? Besides, it can help us determine what sort of questions we need to ask; for instance, is the digital divide a problem of justice or not? Is the digital divide a particular issue, or is it associated with other problems? And lastly, the philosophy might even provide us with answers to those questions. Otherwise, philosophy points us in the right direction for finding the answer.

Soraj Hongladarom observed that philosophy can help broaden our understanding of the digital divide, but the scholars have not investigated the subject from a philosophical perspective. He cites major works in the philosophy of information technology, such as Gordon Graham's *The Internet*: *A Philosophical Study and* Hubert Dreyfus's *The Internet,* and does not give any attention to the issue of the digital divide. He further considers that every single problem can be viewed through every branch of philosophy, and only the philosophers can guide better and more pragmatic solutions to all problems that arise in the course of any developmental process. Philosophers should always be open and try to find solutions and approaches that could help have a better understanding and give a good lead to the current issues of concern. The scholars felt that philosophy is a potentially very useful tool for understanding the nature of the digital divide. Philosophical resources such as metaphysics, epistemology, and social and political philosophy are highly relevant to understanding the moral significance of digital divides. Philosophical investigations are required to deal with the problem of the digital divide, and philosophical debates can be beneficial.

In addition, there are several approaches that help to analyse philosophically any issue or any dilemma. It is true that primarily philosophical analysis is an ongoing process. Philosophical analysis also expresses the process of investigation about any subject, and it is popularly understood through reason, analogy, putting forward arguments, critical examination of the argument, and rational progress through debate as well as argument. In this connection, philosophical analysis is helpful in stating the digital divide, analysing the nature of the digital divide, justifying a reason for the digital divide, and critically examining the digital divide. As the digital divide has emerged as a new phenomenon, it has to be properly conceptualized. According to Deleuze, philosophy is necessary, especially in situations where new phenomena already exist and where both undefined concepts and words are trying to find exact meanings. It is the philosopher's duty to clarify the unclear situation. The main task is to invite and define new concepts. Hongladarom too considers that to search for news sets of tools that are appropriate in analysing the situation or to find new ways of using the available tools in order to take into consideration the existing theoretical and conceptual philosophical tools used to better understand the issue such as the digital divide.

Information technology has transformed reality and knowledge in a new way, and this type of reality is viewed as virtual reality. Michael Heim, in *Metaphysics of Virtual Reality* (1993), observed that this new type of virtual reality indicates that computers and reality are interrelated and thus merits some kind of philosophical investigation. The debate on the digital divide may provide an occasion to consider how reality is influenced by it. The digital divide is

an interconnected theme in both the technical and social realms. Indeed, this "new kind of reality, which can be considered in both social and technical terms, this is not to say that the digital divide has created a totally new world where everything is not the same anymore" (Hongladarom, 87). The digital divide and its conceptual ramifications may facilitate new thinking to understand the changed reality in metaphysical terms (Hongladarom, 25). Apart from metaphysical concerns, information technology has implications in the domain of knowledge. In the context of information technology, knowledge is derived from the information processed through the network. There is a greater possibility that this kind of knowledge may not penetrate all the domains of African society. In this sense, the digital divide is also an epistemological issue. "If one subscribes to the view that knowledge derives its value (or justification) from being on a network, then the fact that the network is limited to only a portion of the population would seem to show that the value of that knowledge could well be improved, and thus the value is not a complete one" (Hongladarom, 87). Apart from metaphysics and epistemology, social and political philosophy is also equally concerned about the problem of the digital divide, as scholars in this field may approach the problem from the perspectives of equality, rights, democracy, and justice.

Stahl argues that digital divides are considered to be issues of justice. Stahl argues that philosophical debate can be beneficial when we are dealing with and debating the digital divide. Philosophical arguments could be considered. Moreover, Stahl argues that with regard to addressing the problem of digital divides, "we need to go beyond philosophical debate and enter the political space" (Stahl, 148). There are many fundamental ethical and moral issues involved and debated from an ethical perspective that have been considered. Issues such as access to information, literacy, exclusion, representation, nature of information, design of technology, and democratisation of technology have to be taken into consideration. The political understanding of the digital divide may provide space for thinking about transforming the unequal information society in light of the ethical evaluation of information technology and the digital divide. In this connection, computer ethics has evolved as a new field in the wake of information technology.

3.0. Emergence of Computer Ethics/ Information Ethics

Computer ethics has emerged as a specialised field to resolve the ethical dilemmas generated by information technology in existing African societies. There are many researchers who have suggested various labels for this respective field: "Computer ethics", "Cyberethics", "Information ethics", "Internet ethics" or "ICT ethics", and "Email ethics". However, most scholars use information ethics and computer ethics interchangeably. Prominent scholars like Norbert Wiener, Walter Maner, Deborah G. Johnson, James H. Moor, Donald Gotterbarn, Terrell Ward Bynum, Luciano Floridi, Herman T. Tavani, and Alison Adam have laid conceptual foundations for computer ethics as an academic discipline. The issue of the digital divide is also discussed as one of the important issues in the domain of computer ethics.

Norbert Wiener is considered to be the founder of computer ethics (Bynum, 54). In the mid-1960s, Donn Parker, a famous computer scientist, collected innumerable interesting case studies related to the unlawful and unethical use of computers by computer professionals. Parker said, "When people entered the computer centre, they left their ethics at the door". In the early 1970s, Joseph Weizenbaum, in his book *Computer Power and Human Reason*, which is regarded as the classic book in the legitimate field of computer ethics, defended that humans are much

more than information processors (53). Walter Maner approached computer ethics from the traditional ethical theories of utilitarianism of Jeremy Bentham and J.S. Mill and the rationalist ethics of Immanuel Kant. Furthermore, Maner adopted the procedural approach as one kind of heuristic method for computer ethics. Procedural ethics as a concept may be a related concept to John Pollock's procedural epistemology.

By the early 1980s onwards, several social and ethical consequences of information technology were becoming a public issue in the West with the rise of computer crimes and issues related to privacy and software ownership. This time, philosophers equally gave importance to computer ethics. According to James H. Moor, the development of computer ethics is sometimes overstated and sometimes understated. To overstate implies the production of a new ethical theory quite different from traditional ethical notions. To understate would imply the disappearance of computer ethics into ordinary ethics. Moor's contributions to computer ethics are insightful and inspiring to many. He provides not only well-designed curriculum materials but also a conceptual foundation in the field of computer ethics. Moreover, he begins to admit that "consequentialist theories and deontological theories are often presented as hopelessly incompatible" (Bynum, 200). He also argued for the possibility of a *unifying ethical theory* (emphasis added). Terrell Ward Bynum has broadened his approach to computer ethics by adopting a much more interdisciplinary approach. In his approach, he employs concepts, theories, and methodologies from applied ethics, the sociology of computing, technology assessment, computer law, and related fields. Deborah Johnson takes upon "applied philosophy" and comes up with it by using the classical ethical theories of utilitarianism and Kantianism (Jason, 42). She suggests that "ethical issues surrounding computers are a new species of old moral issues" (Jason, 64). Johnson thought that computers gave a new twist to the ethical questions that are already known, rather than creating wholly new moral problems. She has speculated that the field of computer ethics, at least as we currently understand it, may and perhaps should disappear in the future. She suggested that the issues in computer ethics might well become integrated into the issues of "ordinary ethics". However, she felt that the issues themselves would not disappear; rather, they would not be posed or framed as issues of computer ethics. There are discussions and debates about whether computer ethics is part of applied ethics, professional ethics, or global ethics. Some of the thinkers treated computer ethics as a branch of applied ethics. Some scholars focused exclusively on professional ethics. More than this, some scholars appealed for global ethics due to the global character of information society or information technology. Some scholars extended the traditional ethical theories in resolving the moral dilemmas raised by information technology. But often, one finds difficulty arguing with the traditional ethical theories because of the specific nature and context of information technology.

Computer ethics got its prominence as a part of professional ethics through some of the writings. Writers like Deborah Johnson and Donald Gotterbarn treat computer ethics as simply a form of professional ethics. The codes of ethics and professional responsibility are the key issues of this approach. Donald Gotterbarn adopts "professional philosophy" and approaches computer ethics from a *professional ethics* perspective. First and foremost, he concerns himself with standards of good practice and codes for computing professionals (cf. Bynum and Rogerson, 32). The term professional broadly includes designers of computers, programmers, system analysts, and operators. He argues that ICT professionals have specific duties and responsibilities in light of their special knowledge and powerful impacts on the world. For this, professionals must have

qualities such as moral integrity, trustworthiness, honesty, self-respect, etc. In a situation where, professional interests and business interests are conflicting, it is suggested that he take a side of professional interests, keeping in view the interests of a larger African society. However, every professional (e.g., engineers, doctors, lawyers, web developers, and designers) should take a decision and say, "*As a professional, I cannot ethically put business concerns ahead of professional ethics*" (Hansen and Zenobia, 66). As information is context-dependent, so is information technology application-dependent.

4.0. Digital Divide and Ethical Theory

The digital divide is not only confined to information technology but also extends to African society. The digital divide is considered an important issue in computer ethics. The ethical theories developed by computer and information ethics are mostly confined to the issue of access to ICT. But it has to understand from a larger perspective, in which it can internalise the various dimensions of the digital divide. The digital divide creates an unequal, undemocratic, and unjust African society. In order to create an egalitarian and democratic African society, it is a prerequisite for bridging the digital divide. Ethical and moral concerns may provide necessary insights into understanding this situation and minimising the digital divide. Hacker and Mason observed three main areas of ethical neglect in research and analysis concerning the digital divide:

1. "There is a set of strong methodological ethical problems, as in the cases of organisations that release data summaries without providing details about their methodology... (though) insufficiently grounded in valid data" (106).
2. "There is an ethical issue in arguing that the digital divide results from the fact that those who are less connected to ICT than others are simply less motivated and that those who lag behind in obtaining and using network technologies are more "want nots" than have nots. This type of ridicule neglects the fact that people vary in experiences, skills, and motivation to use computer-mediated communication (CMC)" (Hacker and Mason, 106).
3. "It may be unethical to argue that certain groups lag behind other groups in ways that reinforce stereotypes of those lagging groups. This can occur by trying to help these groups while unknowingly contributing to the reinforcement of ethnic stereotypes" (Hacker and Mason, 206).

Ethics refers to what is good for individuals and society; these are ethical principles. Ethicists believe that ethical considerations are necessary for all social and philosophical research. Ethical principles are the tools that consider whether an act is morally right or wrong. Ethicists debate often in terms of rights, deontological theories, and justice. The concepts of justice and rights are closely linked to ethics. The question of ethics prevails everywhere and whenever dilemmas arise, especially when the process of setting something right and wrong goes on. In the backdrop of information technology, computer and information ethics emerged as areas of applied ethics. The investigation of the digital divide is directly related to the broader field of computational ethics (Hongladarom, 43).

It is argued that traditional ethical theories would be well applied to the problem of the digital divide. It is important for us to understand the genesis of applied ethics, as this subject holds significant importance to the contemporary issue of the digital divide. It is well known that traditionally, philosophers have been provided numerous ethical theories such as utilitarianism, hedonism, egalitarianism, virtue ethics, deontological ethics, ethics of care, and so forth. But scholars argued for a new framework of ethical theories for understanding the digital divide, as

the issue is new. Wallace Koehler suggests that the digital divide can be described in the context of three fundamental information ethics concerns: "the right of access", "literacy, and "information literacy" (7). The ethical theory of the digital divide has to be evolved by touching upon the dimensions of access and exclusion of social groups to information technology; representation and misrepresentation of information; nature and social function of information society; social, cultural, economic, and political implication of the digital divide; and ideological understanding of information technology-mediated society.

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5.0. Ethics of Access to Information Technology

The issue of the digital divide is primarily identified with access to information technology. Scholars considered access to information and digital technology an ethical issue in the information society as it generates inequalities in the world. Most of the research on the digital divide has been focused on access to computers and information technology, which affects even developed nations, developing nations, and underdeveloped nations. Unequal access to technology is affecting society significantly. Access primarily meant physical access, which means having a personal computer and Internet access (van Dijk, 11). Jan van Dijk further broadens this by arguing that the concept of access can be divided and explained specifically into four categories: motivational access, material/physical access, skills access, and usage access (Dijk, 11). "Motivational access signifies motivation to use information and communication technologies. Material access refers to the possession of computers and network connections. Skill access means the possession of digital skills. And usage access denotes meaningful usage of digital technology" (Dijk, 15). McIver, too, viewed access to information as having to be studied at the level of the properties and characteristics of access and the means and availability of access. McIver further explains that the means and availability of access are not dependent only on the economic status of individuals or their communities but also on information usage skills and geography. Access to the equipment, software, and telecommunication services necessary for Internet access must obviously be accompanied by the skills to make use of them.

Access to information is not only characterised by access technologies. However, access to information technology in other ways means access to information. Access to information technology can be viewed as digital or informational access. It is true that access to technology enables one to obtain information from the Internet. The issue is that one group is "information haves/information rich" and the other group is "information havenots/information poor" (Adomi, 53). The former sees access as a non-issue, and for the latter, access is a real issue, particularly for certain socio-demographic groups.

Philip Brey discusses equity and access. Brey argues that in the field of computer ethics, it is studied how both "the design of information technologies and their embedding in society could increase inequalities, and how ethical policies may be developed that result in a fairer and more just distribution of their benefits and disadvantages. This research includes ethical analyses of the accessibility of computer systems and services for various social groups, studies of social biases in software and system design, normative studies of education in the use of computers, and ethical studies of the digital gap between industrialised and developing nations" (409).

Some of the scholars extended the debate about the digital divide by studying the existing problems in African society. Jerding evaluated some of the views in this regard. For Richards, divide is not a new issue, as it persisted all along human existence, and wealth remains the important criterion for all sorts of divide. He further suggests that a substantial role has to be played by the government to gain access by all its citizens rather than private concerns (43).

Jorge Schement mentions people who don't have access as faceless to the wealthy and middle classes who have access, and they should remember, imagine, and be concerned about those faceless people, which will bring change and benefit for everyone (32). Adam Clayton Powel III, by evaluating the studies on the digital divide, concluded that the digital divide is "largely a myth". He cites those who have access and mentions that the gap mentioned by all is either reduced or has disappeared at all. But he agreed upon the point that education remains a barrier to the utilisation of technological advancements. According to Joel Spring, mere supply or providing access cannot change things or bring equality; instead, quality has to be maintained while providing access, only through which equality could be achieved. However, the existing inequalities in various forms further add to the issue of the digital divide (43).

Access to information technology is not only intrinsically good but also associated with power. Computers and information technology can give power to those who already have it and to those who had little power in the past. If access goes primarily to those who already have power, or if they get access first, then the interests of the already powerful are more likely to be served. The concern about access leads to social goods. Johnson further says that information technology and the Internet are tools or powerful resources. These tools assist individuals and organisations in acquiring goods and achieving goals. To put it simply, people can convert Internet access into other valued services, goods, and life outcomes (DiMaggio et al., 54). In this age of information technology, people are segregated from access to information, and communication technology is also excluded from many other social goods (McDonald and Denning, 86). This clearly indicates that access to information technology is a social good. To put it simply, access to information technology has the potential to achieve the status of a primary good. But the one is not having access, which obviously leads to disadvantaged many "core goods" or "core values," as said by James Moor. The core goods, such as knowledge, ability, freedom, and, to name a few, Jeremy Moss, argue that not having access, which is "instrumentally vital for access to other goods" such as knowledge about health outcomes, employment, or access to democratic institutions (Moss, 165), is essentially a larger "threat to one's well-being".

A lack of access is seen as a root cause of the digital divide. Without access, people are disenfranchised into three domains: access to knowledge, which is lessened or prevented by a divide, where people in affluent nations' countries could benefit from these gadgets; the same is not applicable to underdeveloped countries' people, who are falling further behind. The second concern is the barriers to participation in democratic or decision-making processes in a country. Thirdly, not having access to digital resources might severely hinder the prospects that people in underdeveloped countries have for economic growth (Moss, 162). Hacker and Mason hold that in understanding the digital divide issue from a larger perspective, we have to recognise three other concerns related to it other than viewing the digital divide as simply having access to information technology. The digital divide not only excludes people but also has implications for the functioning of democracy. They argued that "both politics and ethics are not visible in most statistical reports concerning the digital divide" (Hacker and Mason, 101). They probed the digital divide by asking, "The first is what will happen to the digitally excluded people. Second, there is the question of what dysfunctional system effects may result from non-inclusive emergent systems. The most challenging issue is how a democratic political system can maintain non-democratic communication systems" (Hacker and Mason, 101). In that sense, the digital divide is an issue invariably related to democracy. The prerequisites for democracy are equality and freedom. Uneven access to any resources is always a problem for democracy. The

availability of certain resources is necessary for the well-being of the world, so one can access them. If certain things are not available, no one can access them. In this context, the power of digital and technology should be available all over the world for their success in bringing about the well-being of the world. In the age of information, it is "morally imperative that equal access to information via computer systems be afforded to people" (Grodzinsky, 221).

The digital divide has been debated from two perspectives: a cynical negative argument and a comprehensive argument. According to the cynical negative argument, there is nothing special about access to computers and information technology. How things are distributed and the distribution of computers and information technology are like everything else. Those who are already powerful and have wealth are always the first to get access. But the poor always get new resources at last. Thereby, there is nothing new or unique about computers and information technology. Deborah Johnson's counterargument is that it says nothing about how resources *ought* to be distributed. Further, this doesn't recognise the distinction between descriptive and normative claims. In addressing ethical issues, we are concerned with how access should be distributed, not just with how it is being distributed. She put forward her argument against negative arguments in the context of information technology. She prefers broad access to all new technologies on normative grounds, and a special case has to be made for broad, even universal, access to computers and information technology. She is in favour of a comprehensive argument that holds that "*computers and information technology seem to be special because of their comprehensive usefulness*" (223). Information technology affects many aspects of life and is used in many contexts to achieve different ends. So, the comprehensiveness of its use provides an argument for broad distribution. As Johnson says:

> Computer and information technology is transforming so many domains of life that its distribution will affect the distribution of opportunity and power in the future. Hence, unlike any other technology, broad or even universal access to computer and information technology and the Internet is an essential for democracy (219).

Deborah Johnson highlights access to the Internet is important for democracy. Dream of any type of democracy is to bring political equality. Hence, Johnson put forth in this manner:

> Democratic societies are committed to the idea that every citizen is equal with respect to the state and the law; that is, democratic societies are committed to *political equality*. However, political equality cannot be entirely separated from social and economic equality. That is, social and economic *in*equality can lead to political *in*equality. Hence, democratic societies have to be concerned about social and economic inequality (220).

Johnson further maintains that political equality and socio-economic equality are mutual and vice versa, and by the way, the inequality of both is too. But unequal access to resources leads to inequality. In this connection, unequal access to information technology "poses *a serious threat to democracy*" (Johnson, 218). Unequal access to any developmental factors creates a serious impact on not only socio-economic patterns but also socio-economic patterns. Limited or unequal access to powerful resources such as computers and information technology not only brings in socio-economic disparity but, along with it, brings a threat to democracy and its pattern of maintaining equality.

The digital divide has been debated not only from the standpoint of democracy, but also from the standpoint of human rights. There are some scholars who consider the digital divide an issue of civil rights. "The digital divide is the most pressing civil rights issue of the new millennium." In the same vein, Molinari argues that the Internet should not be just a thing confined to a certain section of the population. It is a social necessity in this digital era, and it should be right for every citizen.

The issue of access was looked at from the perspectives of human and civil rights and distributive justice. According to Kant, right means "the power to create obligations". He further stated that what is right to one person becomes a duty to another (Umotong, *Ethnic Politics in Nation Building: The African Perspective*, 45). Only rational beings can have rights. Non-rational beings have neither rights nor duties. Only man, thus, has both rights and duties. Kant's notion of justice is centred on a very basic idea: human beings, defined by reasons, should be treated as ends, never as means. It is a way of giving rational beings their due but not treating them as means. Kant has been discussed about his political framework, which is not separated from his moral concerns. Some philosophers have attempted to characterise rights in terms of normative categories like duties. According to them, a right is just a duty seen from another perspective. As rights are correlated with duties, Similarly, if Internet access is an issue of human rights for underprivileged people, it is the duty of the government to provide access, training, equipment, and infrastructure. The right to a fair trial is a human right and is equally applicable to the people of the North or South, East or West. In connection with the Internet, access is considered a human right and equally applicable to everyone living in this world. In other words, it is extended to developed, developing, and underdeveloped countries. To understand the issue of the digital divide from an ethical perspective, we have to deal with it in relation to equality, social good, democracy, human rights, and justice. Further, it has to be viewed from the perspective of inclusive and equitable development.

6.0. Digital Justice

Apart from rights, justice has always been a key issue in the philosophical discourse, chiefly in the realm of social and political philosophy. Justice plays a pivotal role in the social, economic, and political spheres. Scholars have tried to explain justice in terms of equality, virtue, fairness, and so forth. The literature indicates that there are various types of justice: social justice, economic justice, legal justice, political justice, and moral justice. In addition, digital justice is a comparatively modern phrase and connotes just and fair treatment for the people constituting a society. Digital justice has emerged as one of the most important concepts since the advent of digital technology. The notion of digital justice should be applicable to all sections of society. Throughout the world, many people struggle for justice, and digital justice adds to the burden. Consequently, the digital divide demands digital justice. Digital justice concerns all social groups, regardless of caste, religion, region, gender, and language. Digital justice has to pay attention to deprived people. The Institute on Race and Poverty defines digital justice as "regardless of race, ethnicity, income level, or educational background, all people will have adequate access to computers and the Internet, as well as adequate opportunity to learn the skills needed to use the technology. Digital justice means that people have the right to access the Internet regardless of whether they live in a city, suburb, or rural area, and that pricing should not be punitive if they live in a sparsely populated area" (Donoghue, 996).

When we are taking and considering the digital divide as a problem of digital justice, which means undoubtedly access to information technology is merely a primary good, Taking and using technology as a tool and social force on a mass scale Access to information has frequently been perceived and observed as a “two-edged sword” and “threat to the existing social order." Access to information refers to “access to power”. This is the reason why digital justice is considered. The idea of the digital divide is considered to be digital integration and digital fairness, which is the fair distribution of digital technologies. Digital justice has a moral as opposed to a commercial or technological purpose. However, social segregation or apartheid and Internet segregation or apartheid are morally unacceptable (Johnson, 43). The digital justice system concerns access to computers and the internet, broadband network access, software, training, and usage. The digital divide has to meet digital justice.

In addition, digital justice has been extended into the significant concept of distributive justice. In a digitalized world, most things seem to be digital, so in this context, most things represent themselves in a digital way, which is why distributive justice has taken into consideration the digital divide. Unequal distribution of digital resources and unequal access to opportunities are causes of inequality, which is a form of injustice. Herman Tavani (2013) raises a valuable question: how to apply distributive justice in the context of information and cybertechnology? Without a doubt, this question truly applies to the digital divide. How do we apply distributive justice in the context of the digital divide? As Jeroen van den Hoven and Emma Rooksby (2008) point out, distributive justice concerns "the distribution of information, information services, and information infrastructures” (Tavani, 307). Moreover, it would be helpful to introduce some of the notions of social justice that have been provided by John Rawls. It is well known that Rawlsian theory talks about the “veil of ignorance”. Rawls’s concept of justice is considered “fairness”. People at the backward end of the “veil of ignorance” will really need access to information. The principle of Rawls, “each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others”, applies to the existence of the digital divide. The most important claim of distributive justice is that all citizens must be treated equally with respect for any nation, region, race, gender, and ethnicity according to the same norms.

People must have access to information in order to make informed decisions and achieve a democratic African society. To do that effectively, we need to understand the consequences of social policies. Van Dijk brings John Rawls’s principles of social justice and argues that information is the primary good. If this is the thing, then primary goods are material and immaterial goods that are so essential for the survival and self-respect of individuals that they cannot be exchanged for other goods, such as a basic (survival) level of income, life chances, freedoms, and fundamental rights. Access to information is a basic welfare right in order to make decision-making easier. In order to ensure digital fairness, digital justice emerged as a global normative tool that may be well applied to those who are needy and deprived in the digital society. From a normative point of view, it is fully based on the two core values of concen and fairness towards others. In fact, social justice operates on various moral grounds, and human beings share the basic amenities as well as the same concern for others.

According to the theory of justice, the notion of justice is popularly understood as meaning that people should be advantaged fairly or deservedly. In other words, individuals should not be deprived unfairly or undeservedly. Thus, African society should promote the fair distribution of “primary goods” (Grodzinsky, 75). Access to information technology allows people to attain the primary goods and carry out life’s plan. John Rawls’s classic principles of

social justice can be well applied to access to information technology, its use and skills, and the overall information society. Therefore, every citizen has a right to not face any discrimination based on price or other unfair or unjust barriers to accessing and using technology.

7.0. The Ethics of Digital Exclusion

The contemporary literature on information technology reveals phrases such as “digital exclusion,” "eInclusion,” and “digital inclusion” (Al-Muwil, 638). These phrases came up for debate in the context of ethical problems and dilemmas generated by information technology and pressing for the inclusion of the marginalised by explaining the process of exclusion in the digital domain.

Exclusion has different faces that can be discussed in the social, economic, and political domains. Exclusion is considered a special concern of justice. Digital exclusion is basically associated with the issues of accessibility, use, and skills. The analysis of digital inclusion and the digital divide is closely associated with access and use inequalities in social, economic, political, cultural, geographic, gender, demographic, and ethnic aspects as a central understanding or explanation of the issue. There is a correlation between the digital divide and exclusion. It is a true fact that exclusion operates at various levels, such as individual, socio-economic, institutional, organisational, and political. Social exclusion can be explained in various ways. First and foremost, it is a “multidimensional phenomenon” (Maldonado et al., 137). Social exclusion involves a process by which “someone becomes detached from African society and from its moral order” (Pleace, 1998: 48). In other words, “rupturing of the social bond” (Silver, 4411), and it is the concern of ethical or moral “about being “in” or “out” of a circle." (Burchardt et al., 228) Social exclusion exists in developing nations, like Africa, where deep, perverse, severe poverty is one of the major determinants, especially when the digital divide comes into the picture, which is likely to “exacerbate social exclusion”. The new notion of digital exclusion has been used interchangeably with the phrase digital divide. Some studies have looked beyond the digital divide.

When we are considering the multifarious concept of digital inclusion, we need to take a critical look in the context of access, social exclusion, knowledge, literacy, skills, opportunity, and public policies. Digital inclusion is also influenced by interests, actors, and value systems. Without a doubt, digital inclusion is connected to social inclusion. The concepts of social inclusion and digital inclusion that are currently involved in the development of information and communication technology. The latter would be focused on unequal access to information and communication technology, whereas the first would be more comprehensive about the broad use of information and communication technology in all aspects of social life. The liberal approach denotes individual competition for economic resources as the main engine of social relations. Some other approaches consider societies as permanent struggles between actors. There have been concerns voiced about the exclusion and inequality. Digital exclusion exists in African society on the basis of poverty, education, race, and gender. It is argued that digital exclusion is a mere reflection of social inequalities” (Imran, 58). There is always discrimination and unequal access to any resource, and it is also prominent in the field of information technology. Those who do have the power enjoy it, and those who do not have it suffer. This is applicable to information technology too.

Exclusion and inequality are major concerns about the issue of the digital divide, which will also cause and force new disparities within and between nations. Exclusion and inequality have always been present throughout human civilization and still exist in African society. The

issue of exclusion is often debated in the digital divide. Exclusion and inequality are mutually contributing. The digital divide represents and reinforces social exclusion. In fact, exclusion is a very significant ethical issue and is closely linked to democracy. Exclusion has come into a new form that is called "digital exclusion". The unequal access to ICTs adds a new dimension to the social exclusion debate. Equality refers to comparing one individual to another in a comparative manner, such as in terms of wealth, education, income, and so forth. The digital divide perceives the problem of inequalities such as socio-economic and political inequalities.

Robels et al.'s approaches to digital inequalities are the third dimension of the digital divide. This social divide leads to a technological divide, and this technological divide promotes the social divide more and more (75). The hierarchy of dominations and subordinates, superiority and inferiority that exists within a given social system is called the social stratification. Pitirim Sorokin described social stratification as "the differentiation of a given population into hierarchically superimposed social classes" (Sorokin, 11). This denotes the power dimensions of the social systems that have taken up hegemony over each other through the means of power. Earlier in 1946, sociologists Max Weber came up with the concepts of social stratification, where he mentions three different kinds of stratifications: the status, which denotes social power; the class, which denotes political power; and the party, which includes political power. Information technology, too, brings social stratification.

Fulk et al. (1996) provide an argument about computer-mediated communication, and public goods theory tries to explain and attempt to bring more ethics into the respective digital divide research discussions. When the exclusion occurs in any domain, it is fair to bring up ethical and moral discussions. Public goods theory can be described as "how collective action can be induced among self-interested individuals, groups, and organisations" (Hacker and Mason, 110). It is fitting here to mention the example of public parks, which is the best classic example of inclusion (Hacker and Mason, 111). It would also be desirable to provide different aspects of public goods so that everyone can be included; in other words, no one is excluded. Hence, public goods theory can help us understand the issue in a better way.

Warschauer specifically covers the convergence point of information and communication technologies and social inclusion. The fair share of resources does not sum up the definition of social inclusion, but most importantly, it is also of "participation in the determination of both individual and collective life chances" (cf. Warschauer, 8). Warschauer argues that *technology facilitates social inclusion* (Warschauer, 20). Social inclusion means "the extent that individuals, families, and communities are able to fully participate in society and control their own destinies, taking into account a variety of factors related to economic resources, employment, health, education, housing, recreation, culture, and civic engagement" (Warschauer, 8). He views it beyond the notion of bridging the gap; it is fair to achieve social inclusion for all. Social inclusion is always a matter of an adequate share of vital resources.

In communication research, there is a concentration on both old media and new media, which have a serious impact on people's acquisition of knowledge. *The knowledge gap theory* would really benefit understanding the unequal distribution of knowledge (Wei and Hindman, 2011, emphasis added). The gaining of knowledge is a critical form of social inclusion that is closely related to the usage of different media. The major concern with digital inclusion is that ICTs should be part of the solutions to the digital gap that facilitate the flows of knowledge and information to attain new territories. Mansell and Wehn argue that "in the emerging 'knowledge societies', access to communication is becoming the key tool for social inclusion" (p. 83). Therefore, digital inclusion is essential to reaching the masses with basic needs. In arguing for

the ethics of digital inclusion, we have to identify the marginalisation and exclusion of certain social groups. Along with the issue of inclusion, we have to take into consideration the knowledge gap and democratisation of technology.

8.0. Class, Gender, Race and African Society as Markers of Exclusion

The digital divide means the advancement of technology that promotes and causes discrimination in the digital sphere. The existing social discrimination creates disparities or a gap in the utilisation of information technology. Information technology has become a primary tool for many things that generate inequality and cause injustice for certain segments of people who do not have access to it. Information technology can be the tool that empowers different segments of people with information and skills for social, economic, and political participation. Class, gender, race, and caste are some of the crucial factors of the social divide as well as the digital divide (Iniobong & Udofia, 74). Moreover, as mentioned above, these social factors are always a matter of equity and concern, both ethical and moral. Allowing the race, gender, and caste-related digital divide to continue is an ethical offence. It is immoral if these categories of people in democratic countries who cannot fully exercise their rights, such as access to information and freedom of expression, are limited. The existing social divide causes the disparities to acquire more benefits than the lower ones, which can be debated and argued on moral grounds. An undeniable factor is that social gaps exist in society. This social gap would be the cause of the digital divide, and the social gap generates a new one. This is considered unethical, unfair, and an injustice. As Johnson pointed out, whenever we are debating and analysing the issue of the digital divide, it is fair to consider and discuss the issues of race, gender, and disabilities. The disparity in the field of information technology is visible in developed and underdeveloped nations. Class is the most common factor in the digital divide.

Apart from class, the gender digital divide is commonly understood as the disparity between men and women. The existing gender gap creates a divide in the sphere of ICT. Many studies showed that women are mostly underrepresented and disenfranchised, and their participation is very low compared to men in the fields of science, technology, engineering, and medicine. And science and technology are still a well-younger-male-dominated field. Gender bias is a true fact in the field of information technology. Women are still deprived of ICT access and have very little participation in the ICT sector. Women are not just simply excluded from access to information technology; they are deprived of the future's economy. An undeniable factor is that social gaps exist in African society. This social gap would be the cause of the digital divide, and the social gap generates a new one.

When we are considering the issue of gender and information technology, or computers, we also need to address ethical issues. The gender gap is one of the crucial issues when the digital divide is brought into the picture, which dominates discourse about women's and minority use of the Internet. It is observed that most ethnic minorities and women are underrepresented; women have been discriminated against in various ways in the field of information technology. The exclusion of women in high-tech industries and the misrepresentation of women in information technology positions are serious ethical concerns. Even when women are working in the information technology sector, their work is low, and their representation is not there.

According to Mphidi, access to the Internet is limited to women more than men when compared; the reason could be associating men and information technology with technical skill sets, thus presuming women may not prefer or avoid it for such reasons (64). Gender inequality is one of the pressing issues in the digital sphere, and the existence of gender equity in

computing articulates the issue of computer anxiety. Gorski describes "gender inequities in African society and other media are replicated online". A study has indicated that the frequency of women users visiting the web of online sites is less than that of men users, where once they visit, they would be again in the categories that spend less time too. The argument placed is that due to the prevailing gender socialisation in African society, women tend to have no interest in mechanical-oriented operations, which are supposed to fall under men's purview. It is observed that a sufficient contextual understanding of gender roles has to be worked out to widen the perception of internet usage among the gender category (Kennedy, 73).

The engineering of hardware and software is mostly negotiated with men, with a very low proportion of women in the contract, where women enjoy more of the role as consumers of Internet-related programmes and other utility items. The digital divide, which is gendered, can be traced to the accessibility of technologies or exposure to them since the early ages of socialization. The male population, from a very young age, is considered more inclined towards technological innovations than their female counterparts, where this is reinforced through gender socialization. This would further have an impact on the later lives of females in higher education or the professional phase of having a negative attitude towards the choice of usage of technological advancements. Computer-related vocational programmes are less attended by females than males. Hence, the secondary stage of socialisation at school also reflects a reinforcement tendency by motivating males to go in line with the digitalized training. Which extends the choice of the individuals in pursuing higher education at different levels, giving a trend of males being tuned to opt for engineering and computer sciences on the one hand and females being tuned to opt for more humanities, social sciences, and nursing courses on the other.

In cyberspace, women are not only misrepresented but also sexually targeted. The way women are represented in cyberspace is a serious issue. Pornography enables lower ethical and moral values towards theirs. It is exploitation of women and degrades women. The Internet promotes not only global trafficking but also sexual exploitation of women and children. Pornography has more visibility and easy accessibility through the medium of the Internet than any other medium. The way it is reaching the public and entering the private space through computer networking is remarkable. Pornography through the Internet is easily accessible, affordable, and anonymous. Even its distribution becomes global. Feminists have argued and criticised that pornography subjugates as it degrades women. It leads directly to violence against women. Pornography is breaking cultural, social, and human values. Pornography is the production and consumption of inequality. Feminists have criticised pornography not only because it produces inequality but also on the grounds that it is the eroticization of inequality. The industry of pornography is growing due to its quasi-universality, which results in preferences over certain sets and turns the individual who enjoys the quasi-universal industry into stalkers. Predators prying and collecting information about women is keeping increasing, which could either make women shy or drive them away from the Internet.

In a male-dominated African society, most of the advantages of technology are acquired by men rather than women. According to Peter Drucker, technology is a potential tool that would be the "great equaliser," and technology can be used on an equal basis by segments of women and men (33). There is still significant gender inequality in the access to and use of ICTs, and a great deal of creative policy-making is needed in order to ensure that women may also share the benefits of ICT deployment in their societies. Women really need education and training for real access to information and knowledge and to gain technical skills. It is important to recognise that gender has to be situated within a broader context of human rights. It is observed that "rights to,

rights within, and rights through" exist in all walks of life. Women's active involvement is essential to ensuring that a plurality and diversity of views are accepted in the information society. This engagement is another step towards promoting gender equity in the information society.

The category of race also has a role in the field of information technology. All over the world, different races are there. But when we are talking or hearing the term racism in regards to the digital divide, the first thing that automatically comes to mind is that there are white and non-white people. With regards to these two racial groups, there are many studies available from western countries. According to those studies, there is a difference in Internet usage between these segments. The study by Lu, Ming-te, titled "Digital divide in developing countries,", expresses how race and income have a serious effect on the usage of computers and new technology (54). Some studies reveal that racial differences exist even in terms of Internet access and use between whites and African Americans in the household and workplace. The fact is that the United States of America is an economically affluent nation in terms of Internet access, infrastructure, and technological development. The digital divide exists in their own country, but they talk about the digital divide for Third World nations; it is merely like "blinds leading the blind" (Singh, 36). This is obviously an equity and access concern that is related to the digital divide and can be analysed with respect to race. Some studies have portrayed how blogs and content enhance hate speech. Koehler argues that the racial wealth gap has caused the digital divide to grow; otherwise, the racial divide will continue to widen (54). In one sense, the demands of traditional and new civil rights groups have included education, jobs, and housing. But this is not sufficient to bring new technology to black families and educational institutions.

The relationship between cyberspace and racism is entirely new. Since everyone knows the Internet is a basic tool for communication, the shocking thing is that ideas of racism spread on the Internet in various forms: electronic mail, websites, online, and Internet relay chatter. Thiesmeyer expounds that the rhetoric of hate is conducted through the internet, or, in other words, the 'rhetorical role' in the internet is operated with the aspect of race in it. She points out how the rhetoric of racism is extended internationally in the up-coming of neo-Nazi propaganda, apart from racial and minority groups in the United States, like African Americans and Hispanics (Umotong, *Humanism and Terrorism: An Epistemic Overview*, 66). Two forms of racist speech appear in the internet space: hate speech comprising text, music, images, and online radio broadcasts that urge users to move against the targeted group; and persuasive rhetoric, which dismisses the direct attack but facilitates promotion and justifies violence.

Tavani delineates other ways in which blogs and blogospheres directly or otherwise contribute to racial prejudices online. The blogs would be content with free speech and racial stereotypes as well, which would generate racial prejudices. The cyberspace has been used in duality while the racist propagation is considered. It acts as a space to explore the issues surrounding racism through discussions and confrontations, and it also acts as a space to facilitate aspects of racism to a negative degree. The internet, which has a greater communication purpose, is channelled towards miscommunication by using it as a tool to target certain groups of people or communities (Iniobong, *Ethnic Politics in Nation Building*, 13). As a result, the proliferation of racist materials is the cause of rising hate speech. The Internet can and has been used to magnify the rhetoric and significance of hate groups. In addition, race and colour are two of the pressing issues that are often connected with the digital divide. It is interesting to note that if we search the image of a hand on the Internet, there will appear the hands of white. It is inevitable here to raise the ethical question: do blacks have hands or not? And their hands, why

cannot they get space on the Internet? This clearly shows how social hegemony is acting even in the field of information and communication technology.

Like race in the West, caste plays a similar role in the technological field in Africa. The caste system is a hierarchical social order in which caste operates in all spheres of life: social, economic, political, and cultural. Dalits are the victims of this social order. The everyday discrimination and exploitation of some caste tribes carried to even the ICT-mediated sphere. In the age of information, the caste system reflected itself in the digital sphere too. Dalits were not only marginalised in information technology in terms of access and opportunities but also humiliated in cyberspace. There is a correlation between information technology and caste.

In general, the digital divide is understood as one kind of stratification or the divide that sounds in terms of class or in terms of urban and rural. But the digital divide is something that is more antithetical. It should be understood as a measure of social power. Apart from the generalised thinking on the digital divide, it must be revised in terms of the perspective of social power available (Singh and Chobotaru, 43). Dalits are victims of and vulnerable to this digital divide. Unequal distribution of digital resources and unequal access to opportunities are causes of inequality, which is a form of injustice. Information technology has not only excluded Dalit but also established the elite cultural hegemony. The power of information in contemporary times is equated with the Sanskrit language. Sanskrit is used as a source of knowledge and social power by the traditional social elite at the cost of negating the knowledge systems of lower social strata. Dalit scholar considers: “IT is turning into another Sanskrit. Sanskrit predestined Dalits’ exclusion from knowledge. These barred Dalits from intervening in the thought process practiced by traditional society... The road to the IT revolution goes via English and computers. This deadly combination has created a social context where the Dalit absence is predestined" (Singh and Chobotaru, 64). Access to information technology is also one of the causes of the further marginalisation of Dalits from the mainstream. The demand for the inclusion of Dalits in the digital sphere should be seen as the justice of the social, economic, political, and cultural spectrum, as well as the fact that Dalits can raise their voice against the elites through the cyber media (Thirumal and Tartakov, 64).

9.0. Conclusion

Information technology has brought many changes to the world and revolutionised human life. The digital divide has emerged as a problem of information technology. On the one hand, developed nations and the privileged and elite took advantage of information technology, while on the other side, unprivileged social groups were marginalised and excluded. The lower-income groups—women, blacks, minorities, and Dalits—were marginalised in terms of class, gender, race, and caste in access and underrepresented in the information technology industries. Moreover, they were unrepresented or misrepresented in cyberspace. In other words, information technology has facilitated the dominant hegemony at the cost of negating or subordinating the other. The issue of the digital divide has to be understood in terms of hegemony too. To

strengthen democracy, plurality has to be allowed in cyberspace, and multicultural traditions have to be celebrated. Human dignity, freedom, and justice are important values in addressing the digital divide.

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Bigelow, Alan. MADSEJ, Vol. 1. Issue 1, Maiden Edition, October 2023, pp.88-91

A Starter's Guide to Writing Electronic Literature: Maximizing Audience Engagement for Html5 Works

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Abstract

This is a starter's guide to writing electronic literature. It is written to help budding digital artist to maximizing audience engagement for Html5 e-lit works published on the web. Using HTML5/CSS/JavaScript, writers can use a variety of strategies to help maximize audience engagement in works of digital literature. Hopefully, this guide will help form a base on which beginning digital writers can grow and evolve their practice.

Keywords: HTML5, CSS, JavaScript, React,

Résumé

Cette guide est faite pour débuter la rédaction de la littérature électronique. Elle a pour but de maximiser l'engagement du public pour les œuvres HTML5 de littérature électronique publiées sur le Web. Grâce à HTML5/CSS/JavaScript, les écrivains peuvent utiliser diverses stratégies pour maximiser l'engagement du public dans les œuvres de littérature numérique. Espérons que ce guide contribuera à constituer une base sur laquelle les débutants artistes numériques pourront développer et faire évoluer leur pratique.

Mots-Clés : HTML5, CSS, JavaScript, React

Around 2013, it appeared that FLASH would no longer have long-term support on the web. As a digital writer, I would miss the robustness and flexibility of FLASH but, as a creator, I recognized that if I wanted my work to have a continued relevancy, I would need to adapt to technological changes and evolving browser requirements.

As a substitute for FLASH, I went into HTML5/CSS/JavaScript and, in particular, the very useful HTML5 code template, Reveal.js, created by Hakim El Hattab. Reveal.js is a good fit for me because of its open-source availability and its wide-spread use on the web. In addition, for a non-coder like me, Reveal.js offers a relatively simple template to create digital works for the web, but it also can be "hacked" so writers can employ many inventive and unusual approaches toward narrative and the use of multimedia. I recommend its simple interface to students and others in the field of electronic literature usually by saying, "If I, as a non-coder, can create digital works for the web using Reveal.js, then you can, too!"

My first incursions into HTML5 were stories like "My Life in Three Parts" (2013), "The Fall" (2015), and "The Shootout" (2016). While creating these works, I also converted a number of older FLASH works into HTML5: "When I was President" (2007/2020), "MyNovel.org" (2006/2020), "Lord's Prayer, The" (2007/2020), and others. I have continued using HTML5 in

more recent works within *The Forever Club* series (2018-2019) and *The Method Detective* series (2022-2023).

While creating these new works, I noted a few approaches writers can use to maximize audience engagement for HTML5 works of electronic literature published on the web:

1) I try to use an economy of language in digital works, where "less is more" is a useful approach when writing for the web. On the web, keeping a reader's attention is often a challenge; large blocks of text, or blocks of text uninterrupted by other media, contribute to that challenge. Minimizing the text allows readers to rest their eyes in the empty spaces where, in print-based publications, text usually resides. These empty spaces afford a temporary respite from the urgency of reading and can house alternative methods to story-telling.

2) Where we employ less text, supplementing the work with interactivity and multimedia elements can help to reinforce action and theme(s) and also keep readers engaged. The web is built for multimedia. A work of electronic literature that is solely text and without multimedia elements is not taking full advantage of audience expectation and what the web has to offer.

3) This is idiosyncratic, but I create images for text portions of my narratives—that is, I write the text in Photoshop and publish that text as images, which I then import into the HTML page. Controlling the sizes and placement of those text images using CSS gives me more control on how an audience reads the work. With the text as images, I can size them for various devices (phone, laptop, or desktop) and also make sure they are placed where I want them on the screen. Of course, with HTML5, you can use HTML text, but I like the control that using text images gives me (some would say you have the same control with HTML text but, again, I am idiosyncratic in this). The TEMPLATE.html page linked below gives examples of how this works.

4) As writers using HTML5, we can create a linear narrative line or, using internal links, we can set up non-linear narratives where the reader can "jump" from one story event to another. As digital writers, we can take advantage of this flexibility and create works that cater to a variety of audience expectations. Regardless of approach, we can consider offering a progress line at the bottom of the page which tells the reader where they are in the work. This is useful for linear works because it tells readers how much further they have until the end; when toggled off, the progress line is also useful by its absence: the reader does NOT know where they are in the work, and the illusion of a non-linear narrative is achieved.

5) The use of Animate.css (or an equivalent CSS image/text animator) adds visual stimulus to the page without burdening the reader with heavy load times. HTML5 tends to be visually static (compared to the visual dynamo FLASH was), and creating animations out of text and images can liven up the page, reinforce action and theme(s), and help keep readers engaged. The TEMPLATE.html page linked below gives examples of how this can work.

6) In addition, HTML5 allows the reader (via CSS and JavaScript) to trigger all types of animations and visual effects, whether produced by generators like Animate.css, or not. The reader triggers these visual events and has the satisfaction of being empowered by that interaction (the events are 'caused' by the reader's input). The reader is also empowered by being able to

propel the narrative forward (or back, or anyplace in between) using swipe or mouse actions. These added audience engagements let the reader become a part owner of the narrative: the reader becomes, in effect, a supplemental author to the work. The TEMPLATE.html page linked below gives examples of how this can be achieved.

7) Embedding a deeply interactive event for the reader—a game or activity (e.g. leaving an audio message, or writing a message, into a database for other readers to hear or read)—can also increase reader engagement. Such a 'deep' interactive event, if strategically placed, can also reward the reader for their diligence in reading the work and getting as far as they have in the narrative. Such an event can also further the shared authorship mentioned above, where the reader becomes an active participant in the creation of the narrative. Of course, varying degrees of interactivity are available across the spectrum of electronic literature. Some works, like those made in VR, are deeply interactive and immersive throughout the whole experience, while others are less so.

8) The use of audio is an important part of digital narratives. HTML5 is robust in this area, and controlling the volume entry and exit points, and audio crossover effects (as readers move from page to page or section to section), helps generate mood in a narrative, emphasizes action, and can also reinforce theme(s). The TEMPLATE.html page linked below gives examples of how this can work.

9) Likewise, video can also be an important component in HTML5 works. This is easy to do using the <video> tag. The TEMPLATE.html page linked below gives examples of how this can work.

There are many other strategies, using HTML5/CSS/JavaScript, to help maximize audience engagement in works of electronic literature. Writers can find their own way concerning the application of these strategies, keeping in mind that often less text (rather than more) is best to keep reader engagement. Likewise, a well-balanced mix of multimedia (rather than an emphasis on one type) can also be useful, depending on subject matter. Additional strategies can be seen in the added links below and within the many works of electronic literature available on the web.

Hopefully, this Starter's Guide can help form a base on which beginning digital writers can grow and evolve their practice.

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LINKS:
reveal.js: http://lab.hakim.se/reveal-js/#/
TEMPLATE.html + TEMPLATE folder: https://webyarns.com/TEMPLATE.zip
Animate.css: https://animate.style/
"When I Was President: https://webyarns.com/when/president.html
Love. https://webyarns.com/love/love.html

Short Bio

Alan Bigelow has received the Robert Coover Award for Electronic Literature (2017); the Judge's Prize, Opening Up Digital Fiction Writing Competition (2017); First Runner Up, Digital Humanities Awards (2016); and the Lauréat du Prix (First Prize), BIPVAL international Prix de Poésie Média (2011). His work, installations, and conversations concerning digital fiction and poetry have appeared many places worldwide.

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