# Theoretical Issues in the Computational Modelling of Yorùbá Narratives

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**Abstract**

Developing a coherent computational model for narratives across multiple cultures raises the question of the components and structure of a framework within which African narratives can be conceptualised and formalised. It is well known that narratives are influenced by cultural, linguistic, and cognitive factors. We identify and define entities, elements, and relations necessary for the adequate description of Yorùbá narratives. We also discuss these theoretical issues in the context of designing a formal framework that is amenable to computational modelling.

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## 1 Introduction

This position paper addresses some of the important theoretical issues relating to the computational modelling of *Yorùbá* narratives. A major challenge we encountered in our ongoing research project [11] on the computational modelling of African folktales is the accurate formal description of the events composing the narratives. The main challenge relates to how to account for some concepts, spatial and temporal relations, and processes that are particular to African and *Yorùbá* culture. We think that the computational representations of narratives should correspond to the mental models formed by the people when communicating and comprehending events in the story. These mental models underlie the conception, process, and purpose of narratives embedded in the cognitive make-up of the people. It is well known that each African tribe has a unique culture and language and hence unique world-view. We think that the cosmology of a culture influences its world-view. Therefore narratives cannot be considered in isolation from the cultural environment from which they emanate. We need to address the question of how African narratives can be conceptualised and formalised in a computational model. Addressing this question subsumes other fundamental questions such as: is there a universal formal modelling framework for narratives? If the framework elements and relations are different, what features characterise this difference? Are these characteristics influenced by the cultural, linguistics, and cognitive factors? If the elements and symbolism of narrative are universal, casting narratives in a computational model should be constant across time and culture. We think that this is not the case as we consider narrative to be a creative work of art communicated by way of language and heavily influenced by culture. The thesis of this paper, therefore, is that an accurate computational model for narrative must necessarily account for formalisable aspects of the cosmology of the culture that produced

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the narrative. Our motivation for this work is suggested in [4, 12, 13] and summed up in the following quotation from the symposium paper by Lakoff and Narayanan [10]:

> Narratives exploit the shared cognitive structure of human motivations, goals, emotions, actions, events, and outcomes. Computational models of narrative must therefore be capable of modelling these shared human understandings [10]

To argue our thesis, we explore the structure of narratives from the perspective of the *Yorùbá* cosmology.

## 2 Fundamentals of the Yorùbá cosmology of narratives

There are several fundamental concepts that are distinctive to the Yorùbá world view. They underpin the framework for understanding the dynamics of the Yorùbá narratives through time and space as well as some of its enduring philosophies. These concepts are expressed in words, images, signs, and actions used in narratives. We demonstrate our thesis through a critical analyses of Yorùbá folktales narratives.

### 2.1 Concept of being

The Yorùbá cosmology recognises three states of being: (i) the ancestors, (ii) the living and, (iii) the yet to be born (see Figure 1). A being can exist in two forms: the tangible (physical) and the intangible (spiritual) [1, 7]. This *three states dual existence* (TSDE) [6], concept is pervasive in Yorùbá narratives. The spiritual form of a living person or being, is considered to be the most powerful as it controls, coordinates, and determines everything that the physical form manifests. For example, the Yorùbá concept of *orí* (head) comprises *orí inún* (inside/intangible head) and *orí òde* (outside/tangible head). The *orí inún* is sacred and an object of worship while the *orí òde* is a tool for interacting with the physical world. This concept applies to other parts of the human body, particularly the eyes, legs, and hands.

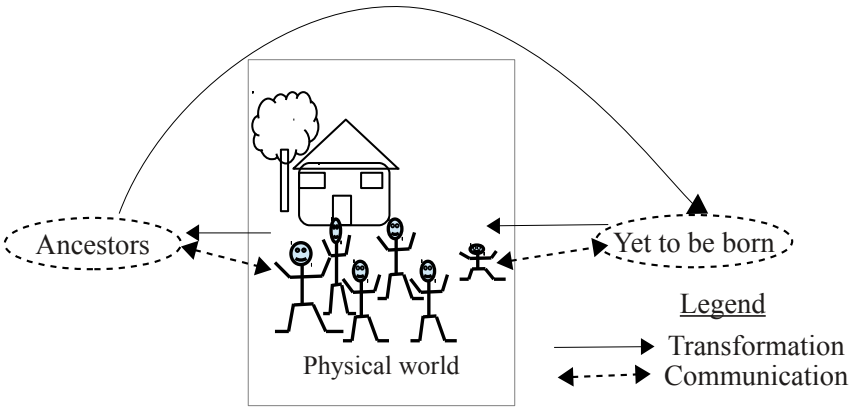


**Figure 1** Two world concept in Yorùbá narratives.

### 2.2 Origin

The origin of Yorùbá narratives are *communal*. Some narratives are associated with occupations: e.g., *Ìjálá* [14] are the chants of hunters; *Ìyẹ̀rẹ̀* are the chants of Ifá priest; *Oríkì* is a cultural praise poetry specific to an individual, a particular family, or linage. Even

in these cases, individual authorship is never claimed though an individual may introduce ideas, contents, and forms that account for the peculiar circumstance and situation into the narratives. This authorship model imposes a requirement for flexibility on the framework for the formalisation of concepts and structure in the design of a computational model for Yorùbá narratives.

## 2.3 Terminologies

Some amount of difficulty arises when a non-native reads a Yorùbá narrative text. The source of this difficulty is the use of culturally bounded concepts and terminologies which are evident in the use of language. A place to start this discussion therefore is to explain, as much as practically possible although perhaps not exactly, some of the concepts and terms necessary to comprehend the fundamentals of Yorùbá narratives. The meaning and use of words for days, months, seasons, numbers, proper names, possession, and relations, to name but a few are deeply rooted in the Yorùbá's cosmology [1, 2]. The meaning of the majority of these terms are often misconstrued with their English equivalents, particularly in translations. Some popular examples drawn from the home domain are listed in Table 1. The Yorùbá *ẹbí*, for example, does not have an exact equivalent English word. A word that is often used as equivalent is *family*. The Yorùbá *ẹbí*, unlike the English *family*, refers to the extended blood relatives and its members, most often, include the ancestors and those yet to be born. This use of the concept of *ẹbí* in a narrative will make sense only when interpreted within the context of the TSDE philosophy. Also, the meaning of most terms for expressing relations in Yorùbá narratives are only logical and permissible within the Yorùbá cosmology. The relation Ìyàwó (*wife*), for example, is used to refer to a woman married into an *ẹbí* (family), in contrast to the English concept of a woman legally married to a man. That is why it is not uncommon, and semantically correct, to read in a narrative that a woman refers to another woman, as *'my wife'*. A formal computational model of Yorùbá narratives must make it possible to express and adequately represent these concepts.

**Table 1** Comparison of Concepts in Yorùbá and English.

| Ser. No. | Term | English meaning | Yorùbá meaning |
|---|---|---|---|
| 1. | Family | Nuclear and extended | *Ẹbí* applies to the extended family. Members include the ancestors and the un-born. |
| 2. | Marriage | Union between two individuals male/female | Union between two extended families (*ẹbí*) |
| 3. | Wife | A woman married to a man | A woman married into a family (*ẹbí*) |
| 4. | Husband | A man married to a woman | A man assigned by the family (*ẹbí*) to take care of a woman married into the *ẹbí* |
| 5. | Body parts | Only the physical or tangible | The physical (tangible) and non-physical (intangible). The concept of duality of being applies |
| 6. | Child | A biological offspring | Any offspring in the family *(ẹbi)* |
| 7. | Mother / father | Female/Male parent | Female/Male ancestors living or dead |

### 2.3.1 Computational model

Within the context of the world view discussed above, we define *computational model of narrative* as the *creation* and *manipulation* of symbols with the aim to describe and communicate past or evolving events. The symbols in this case are labels that represent the entities in a narrative. These include those that describe the character and the props as well as all other elements or entities in the narrative. The manipulation of symbols is a process that specifies states and defines the events and state transitions in a narrative. In this case the plot of a narrative corresponds to the *algorithm* or *heuristics* of a computation process. This can be formally described within the context of reasoning about action based on ontology of the narrative domain [9].

### 2.3.2 Knowledge

The most appropriate definition of knowledge in the context of the world view expressed above is *"that which is acquired when information is applied"*. When a piece of information is subjected to practice, the experience resulting from that practice becomes knowledge. To know, therefore, is to perceive and personify a piece of information. This definition seems to differ from some Western definition of knowledge. of knowledge. In the Popperian cosmology [15], for example, knowledge is regarded as an object independent of knowing. Underlying that cosmology is a three world model. Popper called world-1 the physical world, world-2, the world of mind, and world-3, human knowledge expressed in its manifold forms. He opined that the growth of human knowledge could be said to be a function of the independent evolution of the three worlds. In that context, knowledge is considered an object that is independent of knowing. Structurally, this model contrasts with the four world model proposed by Ọdẹ́jọ́bí [5] which is more suited to the concept of knowledge in Yorùbá narrative. What is clear here is that, the narrator has a mental model of something, real or imaginary, that he wishes to communicate. The aim of the narrator is to generate a transcript that facilitates the transfer of that mental model to the audience as accurately as possible. A challenge to this simple model of narrative knowledge is the counter-factual aspect of Yorùbá narratives, for example, situations where animals can be portrayed as exhibiting some characteristics of humans (e.g., marrying, talking, etc.), which are also, incidentally, found in many other cultures in the world. The representation of such counter-factual expressions and reasoning associated, side by side, with factual knowledge, is a challenge to current fact-based computational models of narrative.

### 2.3.3 Time in Narrative

In the Yorùbá cosmology, time is not defined in absolute terms but in relations to events. For example, people use phrases such as 'the last yam festival', 'the last moon' and 'when sun rises' in describing their experiences and planning their activities. Inclusive counting is used in date and time reckoning [16]. Terms such as *before*, *now*, *next day*, *later*, etc. are implicitly reckoned using inclusive counting. Interestingly, we are able to link this ordering to aspects of repeated motion in nature, such as the movement of the earth about its axis and around the sun. Logic can be used to relate the spatial and temporal dimensions into a coherent narrative, though the logic of sequence does not guarantee coherence of a narrative [8, 3].

## 3 Conclusion

A computational model of narrative must be sensitive to the peculiar logic and relations of the cultural domain in which it is operating. Therefore a single general-purpose (one-size-fit-all) mechanism is not sufficient. The character of the elements, relations, actions and events in a narrative are a function of purpose and world-view of the narrator. We also think that it is necessary to reach a balance between the language of computing, which is mathematical, formal and precise and the language of narratives which is linguistic, informal, and imprecise.

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