HOW CAN UNITY OF CONTENT BE OBTAINED FROM THE DIVERSITY OF EXPRESSION; FROM SYMBOLISM TO CONNECTIONISM

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Abstract

Adopting a symbolic paradigm, reading can be considered as an act of communication leading a reader to intentionally build in his mind, from the perception of printed symbols and from the aid of non-verbal elements, a substance of content similar to the one the writer wanted to express by means of a verbal written message. Nowadays we see that the **strictness** – typically signalized by the **staticity** of mental representations (symbols) and the **seriality** of the information process (classical artificial intelligence) – with which the symbolic paradigm explains the cognitive processes of the reading process in our mind clearly contrasts with the **flexibility** – characterized by the use of dynamic "ad hoc" configurations obtained by means of **parallel distributed information** among the interneural connections – with which the connectionist paradigm tries to explain the sequence of processes (hidden units in our brain) interpolated between input and output data. In a connectionist paradigm, reading consists of constructing, in the brain of the reader, a network of synaptic connections as answers to individual stimuli and experiences. It follows that the new text built in the reader's brain, even keeping the cultural unity, will show diversities reflecting the way each reader experiences the world. The diversity in communicative acts can more easily be noticed in a translating

activity where the challenge of the translator is to cause the reader of his translation to build up a meaning as close as possible to the content configurated in the writer's brain where the original text has been elaborated.
Keywords: Unity and diversity in reading - reading/writing connections - translating process - connectionism

Introduction

Graphic communicative acts assume the existence of two distinct components: content and expression. Content corresponds to what somebody wants to express: the meaning. Expression is the sensorial reality representing the object of this meaning. These two elements, content and expression, establish a semiotic function (Hjelmslev, 1961) responsible for any linguistic activity. Every written text – the message of communication – is the graphic expression of a content; it does not carry content or meaning within itself. This message becomes the mediator between the communication partners: the writer and the reader. The content is not found in the text; it exists in the brain of the writer – in the form of ideas or thoughts – and it will be constructed in the brain of the reader. What we want to highlight in this paper is the fact that every reader reads the same text in different ways, constructing the meaning not exactly as it exists in the brain of the writer but giving it the interpretation according to the prior knowledge engrammed in his own brain. This explanation stems from the way connectionism views the acquisition and the processing of knowledge: as synaptic changes between neurons. As the same content can be expressed in different manners and/or within different environments, the unity of content can be obtained from diversities in expression. This fact is remarkably instantiated in translating activities where the mediator between the initial writer and the final reader is responsible for inducing the reader to construct a content as similar as possible to the one vehiculated by the writer (Poersch, 1996). First, **reading** is analyzed as simultaneous recalling and learning processes, processes based on subtle changes in neural synapses and that correspond to

comprehension. Second, **translating** is considered as a succession of reading and writing activities where the translator is the mediator between an initial writer and a final reader. In this translating activity, the unity of content must be maintained during the whole trajectory beginning from the writer, passing through the translator, and ending with the final reader. The writer of the source text and the reader of the target text are intermediated by the translator who becomes the first reader and the second writer.

Reading: a simultaneous recall and learning cognitive process

We consider reading as an act of communication leading a reader to intentionally build in his mind, from the perception of printed symbols (bottom-up) and from the aid of non-verbal elements (top-down), a substance of content similar to the one the writer wanted to express by means of a verbal written message.

The construction of meaning during reading is processed on the basis of three kinds of data: data effectively expressed in the text (explicit), data presupposed or inferred from the text (implicit), and data related to the situation of production, to the context (ultraplicit).

Reading can be analyzed from three view points: 1- as a physiological act (visual perception and recoding, activities that require linguistic awareness); 2- as a cognitive process (decoding, a problem-solving process that requires intelligence and prior knowledge); as a final product (comprehension, a product that can be evaluated by means of instruments of measure).

The **strictness** – typically signalized by the **staticity** of mental representations (concepts and frames) and the **seriality** of the information process (classic artificial intelligence) – with which the symbolic paradigm explains the cognitive processes of the reading process in our mind clearly contrasts with the **flexibility** – characterized by the use of dynamic ad hoc configurations obtained by means of parallel

distributed information among the interneural connections – with which the connectionist paradigm tries to explain the sequence of processes (hidden units) interpolated between the input and the data in our brain.

Such fixed structures are too inflexible and cannot adapt readily enough to the demands imposed by an everchanging context of the environment. Instead, a minimally organized knowledge system is assumed here in which structures are not prestored, but generated in the context of the task for which they are needed. An associative net with positive as well as negative interconnections serves this purpose.

Reading is comprehension

According to Kenneth Goodman (1976), the **primary** purpose of reading is comprehension, comprehension understood as a meaning building device that, on the one hand, activates given information whilst, on the other hand, integrates new information into given information (Haviland & Clark, 1974; Garrod & Sanford, 1977). As to **secondary** purposes, we can list: being informed, getting formation, requesting, entertaining, and so on. In such a view, **acquiring knowledge** would integrate the secondary purposes.

Both procedural and declarative knowledge, engrammed in neural networks, is activated or constructed in one's brain. Such knowledge is stored in our memory as neural connections. Whenever perceptual data (input) act on the stored information without establishing new connections, the output corresponds to an **activation** of connections. There is no new knowledge; rather, there is a **recall** of already existing information. However, when some information which does not correspond to any previous connection is processed, it must be **integrated** to existing knowledge, setting up new connections. The product (output) of that neural process will be responsible for building up new knowledge (**learning**).

Bearing in mind what has been stated in the precedent paragraph, one is forced to substantially change the initial statement on knowledge acquisition as a secondary or transcendent aim of reading. The acquisition of knowledge is integrated to the comprehension process

itself; it is part of constructing meaning. Comprehending means both activating given information (**recalling**) and integrating new information (**learning**). Therefore, reading means comprehension, i.e., **recall and learning**. Such twofold process is inherent to reading (Poersch, 1999).

Reading comprehension consists, thus, of constructing meaning (the thought the writer intended to convey) as a result of parallel distributed processing of knowledge coming straight from printed material – explicit information -, indirectly from knowledge taken from the text, by inferencional or pressupositional processes – implicit information –, and from other kinds of knowledge derived from production or reception situations – ultraplicit information (Poersch, 1994, p. 169) – which includes the previous knowledge on a given subject matter.

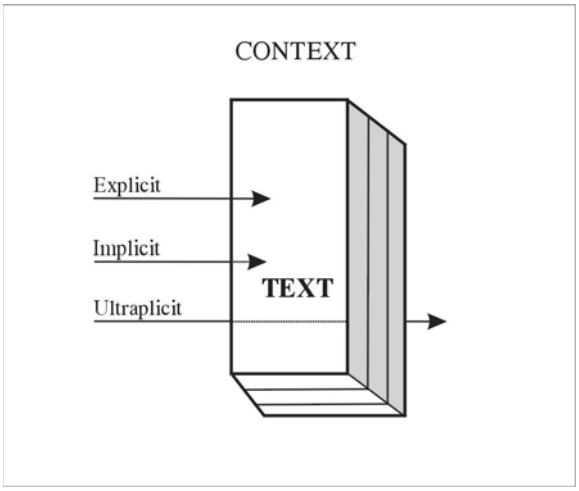

Figure 1. The deepness of meaning.

In fact, the text is nothing but a mediator between the poles of written communication: the source (the writer's brain) and the target (the reader's brain). The text does not carry meaning; rather, it is the trigger device to activate and/or construct this meaning. This highlights

the fundamental importance of the role the previous knowledge plays in the comprehension process.

Reading can be analyzed under three distinct ways. First, as – an organic **activity – ,** involving visual perception of graphic symbols and phonological recoding which entails the knowledge of the graphic system . Second, as a cognitive **process**, such as decoding and problem solving, processes that require prior knowledge both about the language and about the world. Third, as a final **product** assessed by means of a range of behaviors like test taking, problem solving, practical activities execution, and speech acts production.

Reading in a connectionist approach: learning means changing neural synapses

The basic unit of brain is the neuron. The main features of the human brain are its extreme plasticity, total flexibility and striking speed, apart from its capacity to operate with a great deal of stimuli at the same time – **parallel distributed processing** (Rumelhart & McClelland, 1986). Neurons vary considerably according to their sizes, shapes, functions and relations; their tripartite structure is what they have in common: the cell body (nucleus), the axon, and the dendrites. The **axon** is the channel through which a neuron communicates with the others. The **dendrites** are branches from the cell body acting as receptors of information coming from other neurons through the **axon**. The site where a neuron and a dendrite meet – where the interneural connection happens – is called **synapse**.

It is postulated that the brain has to change the strength of its synapses to acquire knowledge; learning, besides reinforcing synapses, causes the existing neural networks to get rearranged. The neurons adjust the strength of their synapses during the information processing. Hence, knowledge acquisition is related to subtle changes in neural connections (synapses).

Every single input is a sort of stimulus. If this piece of incoming information finds an answer, i.e., an internal path already set, it is said that an activation (a **recall**) has occurred; this is not new information, hence, it does not correspond to learning. Conversely, if a path is not tracked down, this new information will have to be integrated into

existing knowledge. It is necessary to open a new path to establish a new connection. Knowledge is acquired; a **learning** process is set up.

Comprehension means recall and learning

Reading consists of constructing meaning – **content**, in Hjelmslev's (1969) terminology – from a text (**expression**). It consists of transforming – with a communicative goal – a discrete string of **language** units (letters, words, sentences), serially presented, into an analogic reality, as if it were instantly photographed (thought). Such reality represents the continuum (either a map, a picture, a drawing, a sketch) of a set of frames, of facts, of ideas or of arguments.

Hence, the comprehension process is fundamentally inserted into the **thought/language** relationship. That relationship permeates both reading and writing, although following opposite directions: from thought (content) to text (expression) – in writing – or from text to thought – in reading.

Reading comprehension requires the explanation of how to shift from a digital, discrete reality (text) to an analogic, continuous one (thought). Such transformation cannot be explained by means of a serial processing of abstract and fixed symbols stored in mind, but rather by a parallel distributed processing of flexible and fine-grained constituents (Smolensky, 1988) engrammed across neural networks (**brain**), where **mind** is nothing but such neural functioning.

Meaning is built up as follows: the text supplies data which are perceived by the eyes; the optic nerve transmits these perceptions to the brain. It is in the brain that the data coming from the text, along with the data previously stored, start to be processed. As knowledge means synaptical connections, if input data find the path or the connection onto other stored data, these stored dada are activated: we say that **recall** occurs and the previous synapses are reinforced. If the input data do not find a previously trailed path, they have to be integrated into some already stored data. That integration consists of setting up a new connection; in other words, it means **to learn**. Then this knowledge becomes part of the prior knowledge and both are used to process the remaining part of the text.

Although such processing is serial, that is, it is processed as the way the text is read, each stage in this process is the answer for an endless number of stimuli operating in parallel. When the reading is completed, the reader recalls the content as if it were an "ad hoc" photograph of all the connections established. In recalling the content of the text, the most strongly embedded information comes first, followed by the content not so strongly connected. If someone wants to summarize a text, he/she will have to follow an inverse path; he/she has to make the information discrete and present it in a text that corresponds to the gist, to the kernel of the entire original text.

Translation: a succession of reading and writing activities

Reading and writing: cognitively convergent processes

If we look at the processes of reading and writing from a purely physiological point of view, we conclude that they are operationally distinct processes. However, upon a careful examination of the cognitive operations involved in reception and production activities, it can be postulated that they are closely related processes, i.e., convergent aspects of the same cognitive process (Bracewell, Frederiksen & Frederiksen, 1982).

From this cognitive approach, reading is a selective process based on the reader's ability to choose the smallest and the most effective number of necessary cues to make right guesses from the very beginning (Goodman, 1976). On the other hand, when a writer sets out to convey an idea, he has some expectations in relation to what he wants to write. So, reading becomes the "reflected image" of what takes place in writing (Oller, 1973). More detailed investigations into this idea of reception and production being integrated linguistic processes suggest that a reader identifies what he reads by comparing it to some internal representation which has been constructed according to the rules usually applied to writing.

In understanding a written text, it is the text structure that supports the construction of meaning, in the same way as with writing where the text

structure is the major conveyor of a conceptual structure or a mental scheme. The reader must use the structure of the text to build or infer the writer's conceptual structure, as the writer must produce a text that can support the reader's inferences upon the underlying conceptual structure. Thus, the nature and the complexity of a discourse structure is fundamental both for the understanding and for the production of longer written texts.

On the other hand, the connections between reading and writing are also established by the sociopragmatic aspects which see the act of linguistic interaction as the result of a cooperative enterprise (Haviland and Clark, 1974). Both writer and reader must agree on certain conventions. The writer inserts all the cues the reader expects to find in the text so that the meaning intended by the former can be constructed by the latter. Although this association can be analyzed from different perspectives, it is appropriate to keep in mind that the arrival point for reading is the starting point for writing: the meaning (the substance of content). The output of writing constitutes the input of reading: the written text.

From these observations, one can suppose that, among other things, writing is the result of hypotheses about **the reader and his reading**, and that reading in its turn, is the formulation and evaluation of hypotheses about the writer and his writing, as proposed by Goodman (1976, 1991), Smith (1983, 1989) and Poersch & Amaral (1989).

The translator as a mediator between the initial writer and the final reader

This paper reports on an investigation of the reading/writing connections instantiated in the translation process. Translation is considered as an intellectual activity in which the translator needs to re-express content that has been constructed from a written text; it has the well-defined communicative function to try to establish the best possible equivalence with the source text (T1). Within this perspective, translation must be considered as a sequence of reading and writing activities; it is understood that the translator's performance in reading in the source language, and his performance in writing in the target language affect the quality of the translation in different degrees.

The act of translating, which is extremely complex, is essentially made up of two central processes: the understanding of the original, source text (T1) and the construction of the final, target text (T2). Delisle (1984) adds a third one: justification. In this process, the translator analyzes T1 in comparison to T2 to ascertain that the equivalence faithfully restores the input meaning (M1) of the first writer (W1) in a possible reader (R2) of T2. The translator places himself in the position of a possible reader of the text produced, and verifies if this reader can construct a meaning from this text, equivalent to what the original author wanted to convey.

The translator places himself in the center of the cognitive process of translation (Figure 2) as a **reader and as a bilingual writer** (Hatim and Mason, 1990, p.223).

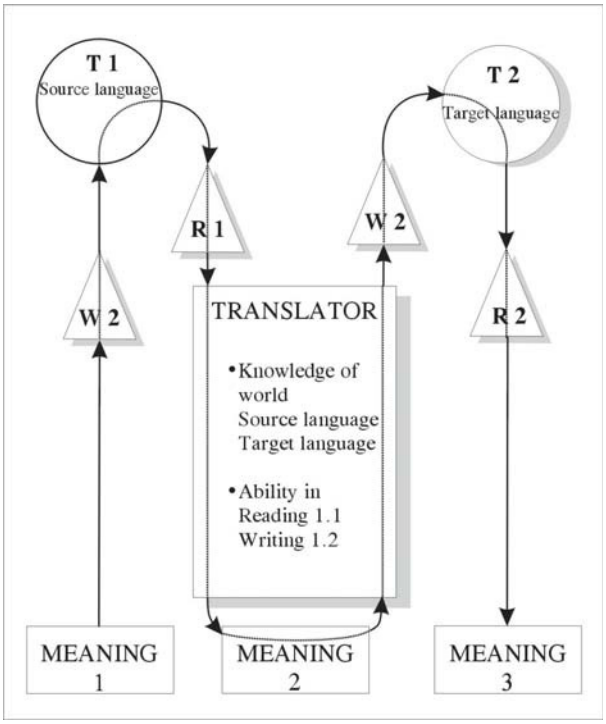

Figure 2. Cognitive model for the translating process

The translation act can thus be seen as composed of both data and processes. The central participant is the translator himself who is supplied with prior knowledge, possesses T1 as input, and T2 as output. With T1 as input, he is a reader (R1); with T2 as output, he is a writer (W2). The substance of content or meaning (M1) of T1 is in the mind of the original writer (W1); an equivalent meaning (M2) must be constructed in the mind of the translator. In this process, T1 (in that source language) constitutes the input for an output (M2) which is constructed in the mind of the translator.

M2, in turn, becomes the input for a new output which is T2 (in the target language). This T2 becomes the input for the final reader (R2) construct a new meaning (M3) as output. The translator has, therefore, a very serious commitment: he has to enable the final reader (R2) to construct meaning in his mind which is the most equivalent possible to the meaning that existed in the mind of the original writer (W1).

The translator as reader and as writer

As a mediator between the initial writer (W1) and the final reader (R2), the translator is an initial reader (R1) and a final writer (W2). As a reader, he must be able to construct, in his mind, the meaning understood by the writer. As a writer, he must be able to construct, from T1, a T2 in a target language that enables the final reader to construct a meaning equivalent to the one the W1 wanted to convey. This reader (R1) and this writer (W2), incorporated in the role of the translator, make up a reader and a writer who are clearly distinct from a common reader (R2) and a common writer (W1).

As a **reader**, he reads the text with different objectives and strategies. First, he must read the text to derive the general idea from it; he must construct the semantic macrostructure and search for general understanding. After that, he re-reads the text, part after part, checking each part against the whole in order to construct the microstructures coherently with the macrostructure. Finally, he tries to express these microstructures in the target language as he produces T2. As R1 and W2 are the same individual, the semantic macrostructure constructed

in R1 is equivalent to the macrostructure that guides the construction of T2. A reader-translator is still different from a common reader in that the former handles a text which has not been written for him directly, since he does not belong to the linguistic community of W1. Lastly, a reader-translator approaches a text with different mediate goals, although the immediate goal, i.e., comprehension, is the same. While the common reader approaches the text to search for information or pleasure, the reader-translator approaches it to produce another text, i.e., he decodes it in order to re-code it. Since the translator uses the information – which would normally be the result of the process of reading – as input to the process of translation, the processing will probably be more complete and more deliberate than with the common reader.

If we examine the translator as a **writer**, we can say that, on the one hand, he is subject to the same limitations as the writer of his own text; on the other, he is even more restricted than the latter.

In any circumstance, writing consists in using graphic symbols of a given language to express ideas, concepts, real or imaginary facts, for an interlocutor who is absent at the moment the text is produced. As opposed to what happens with a common writer, the translator has no freedom to make decisions on content or expression, as these textual elements are given to him. The translator's job is to re-express the meaning of the message and, whenever possible, the form the author of the source text has chosen to compose it.

It is evident that, as he reformulates the written text, the translator creates a new communication act starting from the existing one. As he recreates it, he must keep in mind that content and expression have not an exact correspondence in the different languages. As he postulates the equivalence of ideas, the translator must avoid inferences that might generate semantic, syntactic, and also pragmatic distortions.

Translation is, thus, a challenge for the translator. While the **common writer** does not have to dissociate thinking from verbal expression when he uses his mother tongue, the **translator** has to go through the graphic signs of the foreign language before he apprehends the concepts. This mediation takes the spontaneity of expression from

him, as it requires more awareness in the analysis of the structures in the source language, as well as in the choice of equivalents in the target language. In fact, as receptor of a text which has not specifically been written for him, the translator behaves as an observer of the textual world of the source text. As **reader**, he has to construct a model of the meaning as intended in the source text and make decisions about the probable impact of the final text on the aimed readers. As **writer**, the translator functions in a different sociocultural environment, and must attempt to reproduce his interpretation of the meaning given by the author of the source text so as to accomplish the intended results in the readers of the target text (Hatim & Mason, 1991, p.91).

Findings of a research

As the translator is sequentially a reader and a writer, he must be able to display the characteristic abilities required by the operations of these activities: as reader, he must be able to construct the meaning from the T1; as writer, he must be able to graphically reconstruct this meaning in the target language.

As translation is a mediating activity between two interlocutors, in which the translator performs the roles of both the reader and the writer at one time, one can assume that the quality of translation is influenced by the reading and writing abilities of the translator. It seems logical that the more improved these abilities, the better the quality of translation. From the general hypothesis, that reading and writing are closely related in the translation process, the following operational hypotheses can be put forth:

a. The overall performance in reading and writing (R+W) positively correlates to the quality of translation (T); r (R+W)T > . 45

b. The performance in reading (R) and writing (W) is differently related to the quality of translation (T), leading to the assumption that one ability exerts a stronger influence than the other; r RT # r WT.

The variables under consideration in these hypotheses are the quality of translation (T), the reading comprehension in the source language (R) and the writing performance in the target language (W).

To verify the quality of translation, 24 students of a course of English as a Foreign Language were given two authentic expositive texts of about 350 words for a translation into Portuguese. Reading comprehension was verified through multiple-choice tests (a total of 20 items) on three short texts. These tests were selected from TOEFL (Stanley, 1988). Performance in writing was verified through the average score obtained from the production of two expository texts in the target language, for which the theme, aim and target reader were defined in advance.

All data (**Table 1**) were statistically treated; the correlation coefficients (**Table 2**) were calculated including the several variables in question: the quality of translation (T), the reading comprehension in the target language (R) and the writing skill in the source language (W)

Table 1. Scores obtained in reading, writing, and in translating activities

Variables

Subjects	Reading	Writing	Translation
1	3.9	7.2	5.4
2	4.3	6.8	5.8
3	4.3	6.0	6.2
4	3.8	6.6	5.6
5	4.1	5.4	6.2
6	3.6	7.0	5.9
7	2.3	6.0	6.2
8	2.6	5.4	6.1
9	3.2	6.1	5.3
10	2.9	7.2	5.9
11	2.3	8.2	5.3
12	2.9	4.7	4.8
13	4.0	6.2	5.8
14	3.6	7.2	4.6
15	3.1	6.8	6.0

16	4.3	7.4	6.9
17	3.8	4.3	3.7
18	3.5	4.1	5.3
19	2.7	5.5	5.5
20	3.6	6.2	6.3
21	4.2	8.6	7.4
22	3.7	5.6	5.5
23	4.1	6.9	5.2
24	1.4	7.2	4.5

Table 2 correlation coefficients

Correlated variables	**Coefficients**
r WT	.3480*
r RT	.5208**
r (R+W) T	.5339**

The operational hypotheses were evaluated by means of these correlation coefficients. One can see that reading comprehension (R) and writing skill (W), not only taken individually but also added together (R+W), are positively correlated to the quality of translation (T). These same data (rRT = . 5208, rWT = .348) allow the analysis and corroboration of the second hypothesis: reading (R) and writing (W) variables differently influence the quality of translation, due to the fact that reading has a slightly higher correlation coefficient than writing, as far as quality of translation is concerned.

The research here reported provides empirical arguments to support the theory that the quality of translation is significantly, however moderately, influenced by the performance in reading in the source language and by the performance in writing in the target language.

Unity and diversity in the construction of meaning

The text is a discrete (graphic) representation, the expression of a content, an analogic representation configured in the writer's memory. The reader does not build up its meaning exactly according to the writer's prior knowledge; but instead, according to his proper knowledge about the world and according to the situational communication context, that is, the context in which the reader interacts with the text. The text itself does not carry any meaning. The meaning is in the writer's brain and it is reconstructed in the reader's brain during reading.

Thus, reading also consists of constructing another text based in the reader's idiosyncrasies and his cultural environment. It was mentioned earlier that prior knowledge is not stored in fixed symbols (cultural productions); rather, it consists of a network of synaptic connections as answers to individual stimuli and experiences. Thus, it follows that the new text built during reading, even keeping the cultural unity, will show diversities reflecting the way each reader experiences the world.

It is in this approach of reading processing that the importance of the reader having knowledge about the way the writer sees the world, about the writer/reader relationship, and also about the knowledge of the world involved in every communication act is grounded. Such kinds of knowledge have a major importance in making the reader's text, in building meaning as close as possible to the meaning underlying the writer's text. That meaning, which goes far beyond the explicit and implicit meaning, is called **ultraplicit**, a meaning situated far beyond what is clearly stated in the text or what is written between its lines.

The diversity in communicative acts can more easily be noticed during the act of translating (Poersch, 1996), when the source-text (text 1) is the expression of the content (meaning 1) of the writer (writer 1). The translator is, at the same time, reader 1 and writer 2; he builds up meaning 2 from the clues offered by the writer in text 1. Meaning 2 serves as an input for the production of a new text (text 2). As every

translation is directed to another reader (reader 2), text 1 acts as an input to cause this reader to build up a new meaning (meaning 3). Meaning 3 – despite the translator's effort to make it sound as close as possible to meaning 1 – certainly will be different from the previous meanings, as a result of the distinct prior knowledge of every participant in the translating act.

The challenge of the translator is to cause the reader (reader 2) of his translation to build up a meaning (meaning 3) as close as possible to the content (meaning 1) in the writer's mind (writer 1) who produced the original text (text 1), which served as the source for the translation.

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