

A Research-Based Method for Presenting Information

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Objective

The objective of this paper is to show how information can be organized and presented graphically so that users can access and understand it more readily than the same information written in conventional prose. The method being used for this demonstration is Information Mapping[®]. In this paper, I will take an actual market research document prepared by the pharmaceutical company, Novo Nordisk Canada, and turn its content into “Mapped” information. This will allow us to see the distinct differences between a document written to be *read* and a document written to be *used*.

The Original Research Paper

The original research paper is pictured on the next page. It is written with neutral-looking text organized into paragraphs of grey boxes and includes only two imprecise headers to define what the topics are about. This approach to writing was originally defined by Aristotle in his book on rhetoric, the rules of spoken and written argument. These rules have been modified, refined, and added to over the years and passed down as the way to write and put our thoughts, ideas, and information – such as market research – into a format communicable to others.

Modern theorists call this approach “Language Arts for Personal Response”, or LAFPR. LAFPR writers structure their material into sentences and paragraphs that are meant to be read. The writer crafts prose in a narrative style to catch and hold the reader’s attention and take them through a logical, progressive argument, leading to a conclusion. In well-written documents, the reader should get “caught up” in the prose, reading it from beginning to end before they can grasp the whole argument or understand any of the details within that argument. A key device in such narrative prose is suspense, or the withholding of information - parcelling out bits and pieces of information at a time, prodding the reader to read on to discover the next point.

And that’s the whole problem: these documents must be *read*. But, of course, we don’t actually read them; we scan and skim them, trying to isolate specific topics or details that we need to understand at any given point in time. And we often return to these documents many times over to extract different details. This is very time-consuming and inefficient.

The basic unit of information in these types of documents is the paragraph. Aristotle insisted that paragraphs be about one unified idea, written in a coherent style, and introduced by a topic sentence to set the reader up, with the only physical demarcation an indent. The result is a grey rectangle of indistinguishable text.

But the paragraph, as a unit of information intended to communicate, is far too vague. Different types of paragraphs are not clearly delineated. In fact, many writers just keep writing until they feel they should start a new paragraph, at which point they insert an indent. Topic sentences are often too vague or, indeed, only implied (which is often the case in particularly “literary” writing). This was fine for Aristotle, but too much science has subsequently developed and left the paragraph behind. It just doesn’t work in rigorous, quality-control situations. Yet, as the attached example illustrates, we still rely on the outmoded, inefficient paragraph.

Canadian Market Assessment

1. DISEASE STATE OVERVIEW

Type 2 diabetes is a major and growing health problem with a rapidly increasing prevalence. Diabetes is thought to have a prevalence of 3.6% of the Canadian population with Type 2 accounting for approximately 90% of those patients. NNCI estimates that there are just over 1 million diagnosed Type 2 diabetics in Canada and an additional 550,000 undiagnosed patients. There are approximately 640,000 aboriginals in Canada and this population is known to have a high incidence of Type 2 diabetes. The estimated prevalence within this population is 10% overall, with reports of up to 40% in some areas.

Type 2 patients suffer from insufficient insulin secretion, reduced insulin sensitivity and increased hepatic glucose output leading to hyperglycemia. High blood glucose levels lead to immediate problems such as thirst, blurred vision, fatigue and infections. Longer term complications are mainly macrovascular disease, increasing cardiovascular morbidity by 2 - 3 times and increased mortality compared to the background population. The microvascular late complications such as retinopathy, neuropathy and nephropathy also contribute to the overall morbidity.

The objectives of diabetes treatment are to lower high blood glucose levels, relieve acute symptoms and prevent the development of late complications. The results of the DCCT provided evidence that keeping blood glucose levels close to normal can delay the onset and slow the progression of complications in patients with Type 1 diabetes. Other studies suggest that this may also apply to Type 2 diabetes.

What are these paragraphs about? There is no advance organization to preview the content for the reader.

2. TREATMENT OF TYPE 2 DIABETES

The initial approach in the treatment of Type 2 Diabetes as recommended by the CDAB Guidelines is the prescription of diet and exercise therapy. Upon failure to achieve the desired blood glucose levels, monotherapy with oral anti-diabetic agents is initiated. The usual approach is to start most patients with a sulphonylurea (SU) although obese patients may start on a biguanide. If monotherapy fails to achieve or maintain glycemic targets, it is common for physicians in Canada to add another class of oral antidiabetic agents to a patient's treatment. The most common approaches are to add a biguanide to SU therapy or vice versa depending on the initial monotherapy. The revised CDAB Guidelines planned for release in late fall 1998, are expected to now also include recommendations for the use of combination therapy, using either SUs or biguanides with insulin. As a result, we expect combination therapy to increase in the future.

It is believed that about 30,000 Type 2 patients are using a combination of insulin and oral agents and that 145,000 patients are on insulin alone.

This paragraph describes the series of treatments for Diabetes 2. Yet nothing in how the paragraphs are presented indicates that; the reader must read the paragraphs to identify what they are about.

Complex sentences and the use of passive voice hinder easy comprehension.

The entire page is a "wall of words" that buries a lot of facts and details in a narrative prose style that hinders clear communication.

The Alternative: LAFI, or Structured Writing

There is an alternative: Language Arts for Information, or writing structured to communicate information that need not be read but rather can be used. LAFI generates documents that are laid out to be scanned and skimmed so that users can readily extract and quickly understand any topic within them.

The form of structured writing I will demonstrate was developed in the mid 1960s by Robert E. Horn, a researcher at Columbia and Harvard Universities. He developed a taxonomy of information that categorizes all information into modular units presented with a set of graphical presentation modes visually reflecting the essence of what each information chunk means. Horn called his methodology Information Mapping and it is now in use around the world in many languages and by many government and corporate organizations.

Starting Point: Cognitive Principles

Horn's starting point was cognitive psychology: how does the brain naturally process information? If we can understand that and apply it to our information, then we can present information so that it is pre-digested for the brain, or brain-ready.

The first thing Horn discovered, when applying cognitive principles to documentation, was the inefficiency of the paragraph. It just does not provide what the brain needs. Indeed, the human brain intuitively breaks up paragraphs and sentences into pieces of information that it can process. Horn's premise: the writer should break up the information in the document rather than the readers in their brains. Bottom line is, if the writer doesn't chunk it, the reader must and the reader might not do so in a way that accurately reflects the purpose of the content.

But how do we measure the size of a manageable unit of information? Horn based this measure on the capacity of our short-term memory: seven-plus-or-minus-two – or no more than nine - items in any information chunk, based on George Miller's famous research into short-term memory. Any chunk of information that exceeds this chunking limit of 9 cannot, by definition, be processed by the brain. More than 9 items and the brain overdoses and items start to fall out of our short-term memory, making it cognitively impossible to understand the content or grasp the entire topic. This is inherent in our own hard wiring. Horn called this the Chunking Principle.

Horn further stipulated that each of these chunks should only contain information related to one precisely defined idea. In short, we cannot mix our apples and oranges in the same chunk without confusing the reader. We need to isolate apples from oranges in separate chunks. We cannot focus our thinking otherwise. This Horn called the Relevance Principle.

Next, Horn devised the Labeling Principle, based on research by D.P. Ausubel, among others. Label each relevant chunk of information to "advance organize", or preview, the content within each chunk. The user knows, before they read anything, what each chunk is about and does not waste time reading material just to figure out what it's about and whether or not it's relevant to them. It also allows users to skip those topics not immediately pertinent to them. As well, a page title must precisely define the purpose and content of the document.

Let's see what happens to the original Novo Nordisk research paper once we apply these first three cognitive principles: Chunking, Relevance, and Labeling. The next page breaks up the original paragraphs into five labelled and relevant chunks. It's important to emphasize that Relevance must be applied rigorously – only one specifically defined idea in each chunk. Otherwise, it is impossible to develop a label that clearly focuses on what each chunk is about. And the label, highlighted and isolated on the left, allows the user to quickly scan to any given topic. Usability is thereby increased.

The precise title accurately previews the content.

Type 2 Diabetes: Canadian Market Assessment

Each of the topics in the original paragraphs is pulled out and isolated in separate chunks.

Prevalence

Type 2 diabetes is a major and growing health problem with a rapidly increasing prevalence. Diabetes is thought to have a prevalence of 3.6% of the Canadian population with Type 2 accounting for approximately 90% of those patients. NNCI estimates that there are just over 1 million diagnosed Type 2 diabetics in Canada and an additional 550,000 undiagnosed patients. There are approximately 640,000 aboriginals in Canada and this population is known to have a high incidence of Type 2 diabetes. The estimated prevalence within this population is 10% overall, with reports of up to 40% in some areas.

Type 2 symptoms and complications

Type 2 patients suffer from insufficient insulin secretion, reduced insulin sensitivity and increased hepatic glucose output leading to hyperglycemia. High blood glucose levels lead to immediate problems such as thirst, blurred vision, fatigue and infections. Longer term complications are mainly macrovascular disease, increasing cardiovascular morbidity by 2 - 3 times and increased mortality compared to the background population. The microvascular late complications such as retinopathy, neuropathy and nephropathy also contribute to the overall morbidity.

Treatment objectives

The objectives of diabetes treatment are to lower high blood glucose levels, relieve acute symptoms and prevent the development of late complications. The results of the DCCT provided evidence that keeping blood glucose levels close to normal can delay the onset and slow the progression of complications in patients with Type 1 diabetes. Other studies suggest that this may also apply to Type 2 diabetes.

Treatments

Labels clearly identify each topic for easy scanning and quick retention.

The initial approach in the treatment of Type 2 Diabetes as recommended by the CDAB Guidelines is the prescription of diet and exercise therapy. Upon failure to achieve the desired blood glucose levels, monotherapy with oral anti-diabetic agents is initiated. The usual approach is to start most patients with a sulphonylurea (SU) although obese patients may start on a biguanide. If monotherapy fails to achieve or maintain glycemic targets, it is common for physicians in Canada to add another class of oral antidiabetic agents to a patient's treatment. The most common approaches are to add a biguanide to SU therapy or vice versa depending on the initial monotherapy. The revised CDAB Guidelines planned for release in late fall 1998, are expected to now also include recommendations for the use of combination therapy, using either SUs or biguanides with insulin. As a result, we expect combination therapy to increase in the future.

Breakdown of treatments among patients

It is believed that about 30,000 Type 2 patients are using a combination of insulin and oral agents and that 145,000 patients are on insulin alone.

Next: From Cognitive Principles to Information Types

So far so good, but we're still forced into reading grey rectangles of text that are really nothing more than labelled paragraphs made up of sentences. But the sentence, as a unit of information, is relatively imprecise. A sentence can say something in as many different ways as there are writers and each writer expresses the same thing differently based on their personal writing styles. That leaves the content open to interpretation by the reader and interpretation is the antithesis of clear, precise communication.

So how we can present content that is more precise, with no room for interpretation except for the one that reflects the writer's intention and the reader's need?

Horn's response is embedded in his Integrated Graphics Principle, which requires that we present information graphically. Cognitive psychology claims that our brains can more readily digest, understand, and retain information that is presented graphically. In short, our brains love visuals. Or, a picture is worth a thousand words. And these graphics must provide a precise representation of what the content means that is not open to interpretation, so that the meaning derived is exactly the same no matter who writes it or who reads it.

But how do we develop a strict, research-based discipline for turning textual information into graphical formats?

First, we need to understand precisely what each information chunk *means* for the user. How is the reader going to *use* this information so we can design it to visually reflect that purpose? To address these questions, Horn developed his information taxonomy, typing all information into six categories based on how readers use information.

Horn's six information types are Fact, Principle, Procedure, Process, Structure, and Concept. Each is unique and separate, serving a distinct purpose for the user. They cover off virtually *all* information and answer the fundamental questions users have on any topic.

We apply these information types to any content in order to develop a focused, purpose-driven list of topics that answer all user questions. In the case of the Novo Nordisk research paper, we examine the original content and identify what each topic is as an information type. On the next page, we see that each chunk represents either Fact (not surprising in a market research document) or Process.

Type 2 Diabetes: Canadian Market Assessment

Prevalence

FACT

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Type 2 symptoms and complications

PROCESS

Type 2 patients suffer from insufficient insulin secretion, reduced insulin sensitivity and increased hepatic glucose output leading to hyperglycemia. High blood glucose levels lead to immediate problems such as thirst, blurred vision, fatigue and infections. Longer term complications are mainly macrovascular disease, increasing cardiovascular morbidity by 2 - 3 times and increased mortality compared to the background population. The microvascular late complications such as retinopathy, neuropathy and nephropathy also contribute to the overall morbidity.

Treatment objectives

FACT

The objectives of diabetes treatment are to lower high blood glucose levels, relieve acute symptoms and prevent the development of late complications. The results of the DCCT provided evidence that keeping blood glucose levels close to normal can delay the onset and slow the progression of complications in patients with Type 1 diabetes. Other studies suggest that this may also apply to Type 2 diabetes.

Treatments

PROCESS

The initial approach in the treatment of Type 2 Diabetes as recommended by the CDAB Guidelines is the prescription of diet and exercise therapy. Upon failure to achieve the desired blood glucose levels, monotherapy with oral anti-diabetic agents is initiated. The usual approach is to start most patients with a sulphonylurea (SU) although obese patients may start on a biguanide. If monotherapy fails to achieve or maintain glycemic targets, it is common for physicians in Canada to add another class of oral anti-diabetic agents to a patient's treatment. The most common approaches are to add a biguanide to SU therapy or vice versa depending on the initial monotherapy. The revised CDAB Guidelines planned for release in late fall 1998, are expected to now also include recommendations for the use of combination therapy, using either SUs or biguanides with insulin. As a result, we expect combination therapy to increase in the future.

Breakdown of treatments among patients

FACT

It is believed that about 30,000 Type 2 patients are using a combination of insulin and oral agents and that 145,000 patients are on insulin alone.

And then: From Information Types to Presentation Modes

Once we have analyzed the information based on its purpose for the users, then we can apply the most powerful aspect of the Information Mapping method: a set of graphical presentation modes. Horn found that there are “best ways” of presenting each of the 6 information types, that each has a set of implicit rules and guidelines around graphics, grammar, and syntax that reflect what they mean. Horn took what was implicit and codified it all as a set of explicit presentation modes.

Each of the 6 information types has a series of presentation modes that best represent what that information type means. Different kinds of Fact information are presented by a different set of Fact presentation modes. The same for the other 5 information types.

As writers, then, once we have identified a topic and its information type (*what* we need to say), then we have a set of presentation modes that predetermine *how* we can say it. So the two fundamental questions every writer faces – *what* do I need to say and *how* am I going to say it? – are both answered before a single word is written. In fact, the writing is virtually predetermined and all guesswork is removed.

The other virtue of this method is that teams of writers can generate documents with exactly the same look, feel, and style because they are all using the same presentation modes. This eliminates the imprecision of the sentence and variations among writing styles; every writer says the same sort of thing in exactly the same way.

Returning to our Novo Nordisk research paper, we can now take each of the labelled chunks and rewrite them using Horn’s set of presentation modes. The next two pages illustrate how the document appears once this task is completed.

Type 2 Diabetes: Canadian Market Assessment

Prevalence

Type 2 diabetes is a major and growing health problem with a rapidly increasing prevalence. This table summarizes its prevalence in Canada.

A series of related Facts with a consistent set of sub-factors requires a Fact Table.

Disease	% of Population	Details
General Population		
Types 1 & 2 diabetes	2.6%	-----
Type 2 diabetes only	2.24% (90% of diabetes incidence)	<ul style="list-style-type: none"> • 1 million diagnosed • 550,000 undiagnosed
Aboriginal Population		
Type 2 diabetes	<ul style="list-style-type: none"> • 10% of overall population of 640,000 • 40% reported in some areas 	

Type 2 symptoms and complications

This table summarizes the symptoms Type 2 diabetes patients suffer and the complications to which these symptoms lead.

A cause and effect Process requires a 2-column table written in complete sentences.

These Type 2 symptoms....	Lead to these complications:
<ul style="list-style-type: none"> • reduced insulin sensitivity • increased hepatic glucose output 	hyperglycemia.
high blood glucose levels	<p>immediate complications of</p> <ul style="list-style-type: none"> • thirst • blurred vision • fatigue • infections <p>long-term complications of</p> <ul style="list-style-type: none"> • macrovascular disease, such as retinopathy, neuropathy, and nephropathy • increasing cardiovascular morbidity by 2 to 3 times • increased mortality compared to the background population.

The table chunks the information into an easily scannable format.

Treatment objectives

A series of related Facts needs to be a bulleted list written as a sentence.

The objectives of diabetes treatment are to

- lower high blood glucose levels
- relieve acute symptoms, and
- prevent the development of late complications.

Very spare prose that is

- direct
- scannable, and
- easy to retain.

The results of the DCCT provide evidence that keeping blood glucose levels close to normal can delay the onset and slow the progression of complications in patients with Type 1 diabetes. Other studies suggest this may also apply to Type 2 diabetes.

Treatments

The linear Process needs a Process table with an embedded cause and effect table for what happens in Subsequent treatments.

The label and table tells the reader what it's all about *without* them having to read it.

This summarizes the treatments of Type 2 diabetes recommended by the CDAB.

Treatment	Description						
Initial	Prescription of diet and exercise.						
Subsequent	This summarizes the subsequent treatments taken.						
	<table border="1"> <thead> <tr> <th>WHEN...</th> <th>THEN this treatment is initiated:</th> </tr> </thead> <tbody> <tr> <td>diet and exercise therapy fail to achieve the desired blood glucose levels</td> <td> monotherapy with oral anti-diabetic agents, usually starting with either a <ul style="list-style-type: none"> • sulphonylurea (SU), or • biguanide for obese patients. </td> </tr> <tr> <td>monotherapy fails to achieve or maintain glycemic targets</td> <td> another class of oral antidiabetic agents, most commonly the addition of either <ul style="list-style-type: none"> • a biguanide to SU therapy, or • vice versa when biguanide is the preceding therapy. </td> </tr> </tbody> </table>	WHEN...	THEN this treatment is initiated:	diet and exercise therapy fail to achieve the desired blood glucose levels	monotherapy with oral anti-diabetic agents, usually starting with either a <ul style="list-style-type: none"> • sulphonylurea (SU), or • biguanide for obese patients. 	monotherapy fails to achieve or maintain glycemic targets	another class of oral antidiabetic agents, most commonly the addition of either <ul style="list-style-type: none"> • a biguanide to SU therapy, or • vice versa when biguanide is the preceding therapy.
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Future	Combination therapy, using either SUs or biguanides with insulin. Note: The revised 1998 CDAB Guidelines are expected to include this recommendation.						

Breakdown of treatments among patients

A series of related Facts with consistent sub-factors requires a Fact Table.

This table summarizes the NNCI estimates of which treatments are being used among Type 2 diabetes patients.

Treatment	Estimated Number of Patients
Combination of insulin and oral agents	30,000
Insulin alone	145,000

And finally: The Accessible Detail Principle

And finally, applying the Accessible Detail Principle ensures that all users, no matter how diverse, can find what they need in any document. Audience analysis might uncover users who already have a great deal of knowledge on the topic while other users may know very little and require a high level of detail. Yet the single document must be used by both.

Chunking the information into carefully labelled and relevant blocks allows different users to scan for and access only the topics they need. Knowledgeable readers use the labels to hop, skip, and jump through the document and “drill down” to what is new to them, while novice readers can work their way through all the information. Both audiences get what they need and neither wastes any time.

Elements such as an introductory Purpose block clearly articulates what the document is for and helps advance organize all readers. Paper-based navigation devices, such as informing the user that this topic is *continued on the next page*, and repeating the page title with “Continued” on the next page, instantly orient users. No matter how many pages in the document or how many interruptions in reading it, users can quickly reference what they are reading about and where they are in the document.

The final Mapped version of the Novo Nordisk research paper appears on the following two pages.

Type 2 Diabetes: Canadian Market Assessment

Add a Purpose to state explicitly what is otherwise implicit. A very direct, simple statement tells the reader upfront what this is about.

Purpose The purpose of this document is to summarize the state of Type 2 diabetes in Canada, including its prevalence and treatments being used.

Prevalence Type 2 diabetes is a major and growing health problem with a rapidly increasing prevalence. This table summarizes its prevalence in Canada.

Disease	% of Population	Details
General Population		
Types 1 & 2 diabetes	2.6%	-----
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Add *Continued on next page* to orient the reader.

Continued on next page

Type 2 Diabetes: Canadian Market Assessment, Continued

Treatment objectives

The objectives of diabetes treatment are to

- lower high blood glucose levels
- relieve acute symptoms, and
- prevent the development of late complications.

Add **Topic Title, Continued** to orient the reader.

The results of the DCCT provide evidence that keeping blood glucose levels close to normal can delay the onset and slow the progression of complications in patients with Type 1 diabetes. Other studies suggest this may also apply to Type 2 diabetes.

Treatments

This summarizes the treatments of Type 2 diabetes recommended by the CDAB.

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Conclusion

The original document was a wall of words made up of grey, indistinguishable rectangles of paragraph text.

Our end point is a series of well-defined information blocks that are clearly labelled and presented in a graphical way that visually reflects their purpose.

The difference between them is this: the information is now “mapped”. What we’ve done is “translate” a LAFPR, or a conventional, narrative document that must be read, into a LAFI, or “Mapped”, document that visibly structures the information so it can be used. Which is preferable?

The concept of “mapping” information is to give content this kind of visible structure, to reflect in the layout and graphical display what the content is about and what it means. The notion of “mapping” information is why Horn called his research-based methodology “Information Mapping”.

For me, the most difficult aspect of writing this paper is that I needed to write it at all instead of “mapping” it; it would have taken me approximately half the time to map it. And for you, the reader, you’ve had to read it all; it makes no sense to you otherwise. Now, go back and try to find specific points I’ve made in the body of this paper without having to search through and re-read large passages of it. So your ability to use and re-use this document, therefore, is limited and inefficient. The mapped version would have taken significantly less time for you to “read” and going back to reference specific points within it would have taken no time. Which is preferable?

I’ve only been able to touch on the highlights of Information Mapping in this paper and provide you with a high-level introduction. The details of applying the principles, of analyzing information using the information types, and developing the content using presentation modes requires a far more intense and detailed understanding of all aspects of this very rigorous methodology. Nevertheless, you can hopefully take away a clear sense of the difference between conventional, narrative prose and this alternate, structured form of mapping information. And above all else, that you are now aware that there is an alternative.