A METHOD TO STRUCTURE INSTRUCTIONAL AND INFORMATIONAL CONTENT TO PROVIDE ENRICHED MULTIPURPOSE AND INTERACTIVE MULTIMEDIA DELIVERY

System Components of the Invention

Abstract: A method of shaping digital information into a format adaptable to meet requirements of an individual user includes the steps of providing substantive information content (Content, Figure 1), creating presentation structure (Structure, Figure 1) for the information, and time based enabling parameters for delivery (Temporal Information, Figure 1) through any of several media; and creating a number of hyperlinks between elements of the substantive information content, the time based enabling parameters and the presentation structure.
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
A METHOD TO STRUCTURE INSTRUCTIONAL AND INFORMATIONAL CONTENT TO PROVIDE ENRICHED MULTIPURPOSE AND INTERACTIVE MULTIMEDIA DELIVERY

BACKGROUND OF THE INVENTION

1. Field of the Invention:
   The present invention relates generally to the field of information presentation through various forms of media. More specifically the present invention relates to a method of organizing digitalized information into a format adaptable for presentation through any of a plurality of media and adaptable for requirements of the individual user. The method includes the general steps of providing substantive information content in digital form; creating time based enabling parameters in digital form for accessing the substantive information content; creating structure for the information and for the time based enabling parameters for delivery through any of numerous media; and creating a number of hyperlinks between elements of the substantive information content, the time based enabling parameters and the presentation structure.

2. Description of the Prior Art:
   Information content has long been developed in many forms for conveying the information to the masses. The forms this content has taken include print, moving pictures, video recordings, audio recordings, the spoken word, drawings and still photographs. With the advent of the computer and digital technology, much of that content has been digitalized and either converted from its original form into a digital and computer ready form or has been developed and captured from the beginning in digital form. While this digital revolution was happening, the progress in digital delivery media was left behind until the predominance of the World Wide Web, or Internet, became a reality. As a result, much content is generated that combines all information together to create a single instance of that content coupled to the delivery mode such as a CD-ROM, a linear movie, etc. What we have today is a hodgepodge of content which is tightly coupled to the delivery medium and requires a complete re-transformation even when the content is the same but the delivery medium or the purpose for delivery is different. What is needed is a method by which a single “super content” (as described and defined below) can be used for multiple delivery
means, multiple and different application purposes, and multiple media. The invention
described here is a method by which the content can be generated without taking into
consideration the delivery medium, and then all the contributing elements can be built as
attributes to the content by the characteristics that are inherently part of the content
objectives, delivery and design.

It is thus an object of the present invention to provide a method of organizing
digitalized information to create what will be referred to as super content, which can be
multi-purpose, multi-delivery medium capable, and which permits the separation of content
from delivery medium, and which permits the generation of content with multiple purposes
and applications independent of a specific application.

It is another object of the present invention to provide such a method in which the
super content, becomes the base for any application and delivery of that content, whether
the application is known ahead of time or developed later by implementing new structures,
temporal information, and optionally by adding hyperlinks and new content.

It is still another object of the present invention to provide such a method which
includes provision and use of either static or dynamic temporal elements in the same way as
structures are provided and used, such that these temporal elements can generate new
structures and temporal relationships.

It is finally an object of the present invention to provide such a method which is
adaptable not only to presentation through the many existing media, but is potentially
adaptable to presentation through future media forms as well.

SUMMARY OF THE INVENTION

The present invention accomplishes the above-stated objectives, as well as others, as
may be determined by a fair reading and interpretation of the entire specification.

A method is provided of shaping digital information into a format adaptable for
presentation through any of several media and adaptable for to meet requirements of an
individual user, including the steps of providing substantive information content in digital
form; creating time based enabling parameters in digital form defining temporal
relationships among content elements for accessing the substantive information content;
creating structure for the information and for the time based enabling parameters for
delivery through any of several media; and creating a number of hyperlinks between
elements of the substantive information content, the time based enabling parameters and the
presentation structure.
The method preferably includes the additional step of creating individual user requirement input programming which locates and accesses the substantive information content through the number of hyperlinks and which selectively extracts and reorganizes elements of the substantive information content, the time based enabling parameters, the presentation structure and the number of hyperlinks to conform to the individual user requirements. The method preferably includes the additional step of placing a dynamic program element within the structure, and optionally includes the additional step of placing a dynamic program element within the time based enabling parameters. The dynamic program element preferably includes applets.

The method preferably includes the still additional steps of using the dynamic program element to generate new content sub-elements; using the dynamic program element to generate new hyperlinks; using the dynamic program element to generate new content sub-elements; using the dynamic program element to generate new hyperlinks; using the dynamic program element to find all instances of specific content; using the dynamic program element to find all instances of specific elements of text; using the dynamic program element to find all instances of specific elements of recorded voice; using the dynamic program element to find all instances of specific elements of recorded images, and using the dynamic program element to find all hyperlinks between presentation foils and video containing animated images of a talking person.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Various other objects, advantages, and features of the invention will become apparent to those skilled in the art from the following discussion taken in conjunction with the following drawings, in which:

FIGURE 1 is a schematic representation of the four elements, namely content, hyperlinks, structure and temporal information tied together and interactively adapted by the present method.

FIGURE 2 is a schematic representation as in FIGURE 1, where the method is specifically applied to a lesson, showing in broken lines the combining of the four elements into adaptable super content.

FIGURE 3 is a representation as in FIGURE 2, wherein the four elements are combined to construct a moving picture with one of several possible endings.
FIGURE 4 is a representation as in FIGURE 2, where the four elements are combined to construct a lesson with carrousel.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

Reference is now made to the drawings, wherein like characteristics and features of the present invention shown in the various FIGURES are designated by the same reference numerals.

First Preferred Method

Referring to FIGURES 1-4, a method is disclosed of organizing digitalized information into a format adaptable for presentation through any of a plurality of media and adaptable to meet requirements of the individual user. Fundamental digital elements implemented in performing the method include: (1) a set of digital content elements which can include video, audio, text, images, graphics, voice, animation, and/or any multimedia in digital form; (2) a set of hyperlinks defined over, between or among any of the content elements recited above; (3) a set of static or dynamic structure elements which defines the set of digital content elements and hyperlinks that are used to create an instance in this set called a “structure”. This structure can be designed to be dynamically interactive, or static, based on an a-priori set of static and dynamic parameters driven by data structures or small computer programs known as applets (e.g., JAVA™ applets) or both. The structures can also generate new structures; (4) a set of temporal relations which define scheduling, timing relation among all elements, duration of segments of elements, duration of availability, recursiveness, periodicity, cyclical patterns, and any and all time related aspects of using the above three sets of elements. The temporal information and relations can be designed to be dynamically interactive or static based on an a-priori set of static and dynamic parameters driven by data structures or applets or both. The temporal relations and information can also generate new temporal relations and information.

The resulting structure with all its temporal definitions is termed “super content”, which comprises the scope of all that is captured. The content elements and the hyperlink elements can be static; however, the structure is not only a definition that can be static but
can also by dynamic (i.e. instead of just a data structure as in programming, it can also consist of "programs" such as Java applets, that are dynamic in nature and can generate new sub-structures). The temporal elements could also be static or dynamic and can be dynamic in the same way as structures such that they can generate new structures and temporal relationships.

Thus intra-relationships are provided inside the four types of elements. Inter-relationships are all generated from the dynamic element such as applets in the structure. The temporal relationships optionally generate new content sub-elements, or new hyperlinkettes that could become part of the content or hyperlink element database. For example, a text finding, voice finding, image finding applet routine may be provided that helps a "structure" find all instances of a specific content, and similarly a hyperlink finding applet routine (e.g. finding for use all hyperlinks between presentation foils and the video that has a talking head) may be provided. The primary objective of this method is to permit the super content to be the base for any application and delivery of that content, whether the application is known ahead of time or developed later, by implementing new structures, temporal information, and optionally by adding hyperlinks and new content.

The method preferably includes the general steps of providing substantive information content in digital form; creating time based enabling parameters in digital form for accessing the substantive information content; creating structure for the information and for the time based enabling parameters for delivery through any of many media forms; and creating a number of hyperlinks between elements of the substantive information content, the time based enabling parameters and the presentation structure.

Additional general steps include those of placing a dynamic program element within the structure; placing a dynamic program element within the structure; placing a dynamic program element within time based enabling parameters defining temporal relationships among content elements; using the dynamic program element to generate new content sub-elements; using the dynamic program element to generate new hyperlinks; using the dynamic program element to find all instances of specific content; using the dynamic program element to find all instances of specific elements of text; using the dynamic program element to find all instances of specific elements of recorded voice; and using the dynamic program element to find all instances of specific elements of recorded images. The dynamic program element preferably takes the form of applets. The following examples illustrate the method through specific applications.
Example 1

Educational curricula for kindergarten through twelfth grade is traditionally contained in textbooks and is organized in chapters which are delivered in classrooms by teachers as lessons. As a result, students learn concepts, do homework and exercises, take tests, do research projects, perform laboratory and field experiments and, having learned the material, receive some grade measurement to assess their degree of learning. Today, all of these activities are separate and structured by each instructor with different degrees of efficiency, dedication, reinforcement, and more importantly a degree of competence. The method described in this application permits the same content plus additional content, plus additional hyperlink information, plus additional structural relationships for the content with hyperlinks, plus a temporal enabling and scheduling mechanism that can all be combined together in multiple ways to deliver one or more “constructs” from the same elements to suit multiple media delivery options or multiple delivery and “purpose” functions suited to the delivery and the recipient of the end product. Using the same example of curriculum, the content might be a lesson, the purpose might be review for homework, the additional content might be the video recording of the presenting teacher, the hyperlinks are all the instances related to the topic in the homework plus all the defacto links used for the review of the material related to the homework exercise.

Example 2

A second example application is to movies having multiple endings. The content is generated ahead of time with the multiple endings and all the hyperlinks are built to suit multiple ending selections (interactive or a-priori) from the viewing audience. Besides multiple endings, the same movies can be enhanced to have multiple selectable camera views which are also selectable in an interactive or a-priori way. The content is all generated with the richness of multiple viewing angles (i.e. multiple cameras) as part of the content generation. The hyperlinks can be designed at any time. The structure of presentation can be selected from several a-priori designed structures that determine content selection (e.g. movie endings, a PG version instead of an R version), camera angles, or temporal characteristics (e.g. scheduled showings, time of day presentations or availability according to selected movie structure according to movie rating.)
Example 3

Another example is training content that contains video, a presentation, text from the video, audio from video, and hyperlinks that relate everything together, a structure which defines specific structures that use the other content, and temporal information which defines modes of delivery associated with the structures.

Example 4

The same method described in this application can be applied to web-sites that can contain dynamic or static content and can be driven by different structures and temporal information. Today’s web-sites, just like most digital or digitalized content, are tightly coupled to their delivery method and consistently have one single structure. The method proposed here permits web-sites to be dynamic sources of content with multiple formats which can be automatically tailored to have the following features:

- a home page that can be a-priori customized to the time-of-day at which it is being delivered;
- a home page that can be a-priori customized to the requestor of information;
- web-site content whose organization, page structures, hyperlinks, and presentation screen styles can be tailored to the requestor or the time of day or both when they are requested; and
- web-site content that can be constantly updated, not only in content, but also in hyperlinks, structures, and temporal information.

Example 5

e-Publishing is a new and very active nascent market area with great potential. However, today most e-Publishing is just a soft version of the hard copy printed version of publishing in that the e-Published copy of the document is one instance of the content but in soft form. With the “super content” method developed in this patent application, one can use all the elements (content, hyperlinks, structures, and temporal information) to create customized versions of the content for different customers as driven by the customer profiles and interests in the given e-Publication. For example, a training manual can be tailored to the specific level of training according to the requirements of a user or company that is buying the manual in the e-Publishing form. Thus, the user answers a few questions that are part of the e-Publishing web-site, and the answers drive the selection of the right structural elements that drive the proper selection of content and hyperlinks that put together a soft version of the manual that will be delivered to that buyer.
More comprehensively, beyond static structures as described above, the manual could be structured to be interactive and the structures to be dynamic, such that the manual is tailored for sale to a corporation where multiple types of users with multiple levels of expertise can use this e-Published content interactively according to their level of expertise.

Example 6

Along the lines of e-Publishing and e-Media, the availability of content for trial, for pilots, for limited time deployment (e.g. for software application programs as well as for copyrighted content such as video, music, novels, etc.) of content can be implemented with the “super content” elements (content, hyperlinks, structures, and temporal information) described in this application. One example is the rental of videos or CD records by delivering them to customers in soft copy form. The movie or CD audio is delivered digitally as “super content” that contains the right structures and temporal information with applets that, when run by the proper application, enable the video or the CD audio to be played and copied onto multiple media (even CD ROM for use in the car) and then delivered to be played only for the period of time that is permitted as per the rental period. Copy protection can be provided in addition, but due to the temporal nature of the playback enabled by the “temporal information” applets, copy protection would be unnecessary for most content applications.

It should be clear that the present invention is not a reinvention of CD ROMs, it should be clear that movies with multiple selectable endings are not being reinvented. Yet what is and what is not is based on the fact that the present invention is a method by which any and all of the above instances can be structured without specifically having a delivery medium or a specific purpose defined ahead of time and can be structured based on all the raw elements of the content. One instance of using that set of raw elements is identified for any one time or repeated use in some medium (i.e. CD-ROM, an interactive session, a scheduled broadcast session, a scheduled broadcast interactive session, etc.).

As these examples demonstrate, the present method creates “super content” which can be multipurpose, multi-delivery medium permitting the separation of content from the delivery medium, and permitting the generation of content with multiple purposes and applications independent of specific application.

While the invention has been described, disclosed, illustrated and shown in various terms or certain embodiments or modifications which it has assumed in practice, the scope of the invention is not intended to be, nor should it be deemed to be, limited thereby and such other modifications or embodiments as may be suggested by the teachings herein are
particularly reserved especially as they fall within the breadth and scope of the claims here appended.
I claim as my invention:

1. A method of assembling digital information into a format adaptable for presentation through any of a plurality of media and adaptable to meet requirements of an individual user, comprising the steps of:
   
   providing substantive information content in digital form;
   
   creating time based enabling parameters in digital form for enabling access to said substantive information content;
   
   creating presentation structure for said information and for said time based enabling parameters for delivery through any of a plurality of media;
   
   and creating a plurality of hyperlinks between elements of said substantive information content, said time based enabling parameters and said presentation structure.

2. The method of claim 1, comprising the additional step of creating individual user requirement input means which accesses said substantive information content through said plurality of hyperlinks and which selectively extracts and reorganizes elements of said substantive information content, said time based enabling parameters, said presentation structure and said plurality of hyperlinks to conform to the individual user requirements.

3. The method of claim 1, comprising the additional step of placing a dynamic program element within said structure.

4. The method of claim 1, comprising the additional step of placing a dynamic program element within time based enabling parameters defining temporal relationships among content elements.

5. The method of claim 3, wherein said dynamic program element comprises applets.

6. The method of claim 4, wherein said dynamic program element comprises applets.

7. The method of claim 3, comprising the additional step of using said dynamic program element to generate new content subelements.
8. The method of claim 3, comprising the additional step of using said dynamic program element to generate new hyperlinks.

9. The method of claim 4, comprising the additional step of using said dynamic program element to generate new content subelements.

10. The method of claim 4, comprising the additional step of using said dynamic program element to generate new hyperlinks.

11. The method of claim 3, comprising the additional step of using said dynamic program element to find all instances of specific content.

12. The method of claim 3, comprising the additional step of using said dynamic program element to find all instances of specific elements of text.

13. The method of claim 3, comprising the additional step of using said dynamic program element to find all instances of specific elements of recorded voice.

14. The method of claim 3, comprising the additional step of using said dynamic program element to find all instances of specific elements of recorded images.

15. The method of claim 3, comprising the additional step of using said dynamic program element to final all hyperlinks between presentation foils and video containing animated images of a talking person.
SYSTEM COMPONENTS OF THE INVENTION

FIG. 1
FIG. 4

CONTENT

HYPERLINKS

STRUCTURE

TEMPORAL INFORMATION

LESSON WITH CAROUSEL
# INTERNATIONAL SEARCH REPORT

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : G06F 17/30  
US CL : 707/104,100,200  
According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 707/104,100,200

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG (COMPSCI, PATENTS, EECOMP)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>US 5,752,029 A (WISSNER) 12 May 1998, Col 6- Col. 12</td>
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<td>US 5,748,956 A (LAFER et al.) 05 May 1998, Col 4 and Col. 5</td>
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<td>US 5,724,605 A (WISSNER) 03 March 1998, Col. 7-11</td>
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<td>US 5,555,407 A (CLOUTIER et al.) 10 September 1996, Figure 4</td>
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[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
  *A* document defining the general state of the art which is not considered to be of particular relevance  
  *E* earlier document published on or after the international filing date  
  *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
  *O* document referring to an oral disclosure, use, exhibition or other means  
  *P* document published prior to the international filing date but later than the priority date claimed

**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**X** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**Y** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

**A** document member of the same patent family

Date of the actual completion of the international search: 31 OCTOBER 2000

Date of mailing of the international search report: 27 NOV 2000

**Name and mailing address of the ISA/US Commissioner of Patents and Trademarks**

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