

Design of Information Sets

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Abstract

After a short introduction and a discussion of the concepts *verbo-visual communication* and *design*, this paper deals with “design of information sets”. In design of information sets the designer makes certain information available for different groups of people. An information set may be a book, a paper, a poster, a symbol on a signpost, a webpage, and many other information products. In each case the designer may have clear intentions and objectives with the information content. However, it is always up to the interpreter to conceive or misconceive the available information, to use or not use it, to use or misuse it.

Traditional *graphic design* is a kind of *all-purpose-design* in various media. A generally accepted view is that graphic design may be described as the art and craft of bringing an aesthetic, functional and organized structure to groups of diverse elements. These elements may be headings, texts, lists, pictures, captions, and tables. Graphic design is also used in other, more specialized areas, where the intentions and objectives with the designs vary. To some extent the “information-related” design disciplines are similar. However, there are also some important differences between them.

In *persuasion design* the main objective is to persuade the receiver, or rather the “interpreter of the message”, to *buy a product or a service*, or to change his or her behaviour.

In *information design* the main objective is to provide information material that the receiver may need in order to be able to *perform a specific task*. This kind of information material makes everyday life easier for the people who need the information.

In *instruction design* the main objective is to provide courses or learning materials needed by the learners in order to *learn something* and construct, or develop knowledge within a specific area.

In this paper I suggest that we introduce some new concepts and new terms. We need them in order to group areas of knowledge within *design of information sets* according to the designers’ main intentions.

1 Verbo-visual communication

In addition to radio, television, books, newspapers, and magazines, vast amounts of information are distributed and made available in the form of advertising throwaways, posters, placards, photocopies, and webpages. The traditional view is that communication takes place when a sender conveys one or more messages to

one or more receivers. The sender successfully transfers a message to the receivers with the help of different media. It is indicated here that the sender is the active part, and the receiver is a more or less passive part (Figure 1).

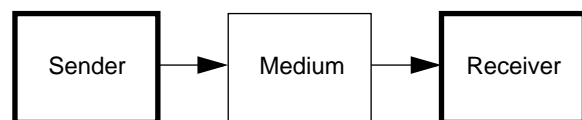


Figure 1. The traditional view is that communication takes place when a sender conveys one or more messages to one or more receivers. Here the focus is on the *sender* and on the *receiver*.

However, the receiver is often not at all a passive part in communication. In fact several different activities are involved when an intended message is communicated from a sender to a receiver, then interpreted and understood. An expanded communications model better show the different activities involved when an intended message is produced, communicated, received and processed to an internalized message (Pettersson, 1997).

Hall (1980) developed the encoding – decoding model. Here the sender is an *encoder* constructing “meaningful” texts, such as an information material. The receiver is a *decoder*, and is assumed to accept, negotiate or oppose the intended meaning with the text. Hall emphasized the paradigm shift to earlier traditions. During the 1990s there has been a change in reception analysis from a focus on interpretation and decoding to a greater concern with practice and use of information (Hagen, 1998). This development has been described as a change from decoding to viewing context (Morley, 1992). We can see the sender as an *information provider*.

In each case the sender, or the designer, may have clear intentions and objectives. However, it is up to the individual *information interpreter* to actively conceive or misconceive the information, to use or not use it, to use or misuse it. This view is specially valid for information sets that people make available to an unknown audience, e.g. on the Internet and the WWW. Here it is usually not possible to know much about the people who search for, and use the information that they may find (Figure 2).

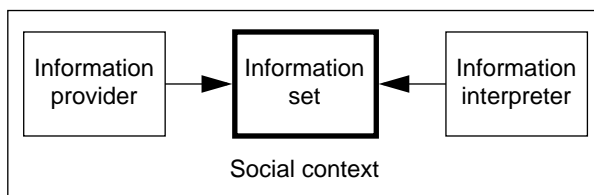


Figure 2. An information set model. An information provider makes one or more information sets available for people who need the information, information interpreters. Here the focus is on the *information set*.

2 Design

The term *design* is related to the latin word *designare*, to mark out, define; *de-*, out, from + *signare*, to mark (Little, 1965). In *The Concise English Dictionary* (Hayward and Sparkes, 1984) the word *design* is defined (p. 303) as: “*v.t.* To contrive, to formulate, to project; to draw, to plan, to sketch out; to purpose, to intend; to appropriate, to devote or apply to a particular purpose; to point out, to specify, to appoint. *v.i.* To draw, esp. decorative figures. *n.* A plan, a scheme; a purpose, an object, an intention; thought and intention as revealed in the correlation of parts or adaptation of means to an end; an arrangement of forms and colours intended to be executed in durable material; a preliminary sketch, a study; a working plan; the art of designing; artistic structure, proportion, balance etc.; plot, construction, general idea; artistic invention”. (Here *v.t.* means verb transitive, *v.i.* verb intransitive, and *n.* noun.)

In the *The new Shorter Oxford English Dictionary on Historical Principles* (Brown, 1993) the general meaning of the word *design* is defined (p. 645) as: “plan and execute (a structure, work of art, etc.); fashion, shape; make a preliminary sketch for (a work of art, etc.); make drawings and plans for the construction of production of (a building, machine, garment, etc.)”.

In *The New Websters Dictionary and Thesaurus*

(Ottenheimer, 1991) the word *design* is defined (p. 110) as: “*v.t.* draw the outline of; to plan; *v.i.* to purpose; *n.* sketch in outline (esp. in architecture): a pattern (as in wallpaper, printed cloth, etc.); scheme or plan; purpose”.

In connection with a discussion on “instructional message design” Fleming and Levie (1993, p. x) noted that the term *design*: “refers to a deliberate process of analysis and synthesis that begins with an instructional problem and concludes with a concrete plan or blueprint for a solution.”

On its WWW-homepage the *International Institute for Information Design (IIID)* defines the word *design* in the following way (1997): “Design is the identifying of a problem and the intellectual creative effort of an originator, manifesting itself in drawings or plans which include schemes and specifications.” The IIID definition may probably be used for most kinds of design, where the coordination of eye, hand, and brain is essential to the way the painter, sculptor, architect, and designer creates.

However, Mijksenaar (1997, p. 14) argued that in view of countless earlier failures, an attempt to determine just what constitutes design would seem to be a precarious and impractical undertaking, and likely to throw up more questions than answers.

Based on the above lexical definitions and on practical design activities we may distinguish between several *design concepts* such as (1) design processes, (2) design activities, (3) design areas, (4) design levels, (5) design perspectives, and (6) final designs.

A *design process* includes the development from a concept or an idea to a final product. Steps in the design process may be called *design activities*, such as (1) conceptual design, (2) embodiment design, (3) detail design, and (4) design reviews. Another view was presented by Shadrin (1992, p. 29) who discussed design based on the following seven process steps or “constants” as a system for problem-solving: (1) design activity (What is the problem?), (2) analysis (What is the purpose and function of the design?), (3) historical reference (How was it done before?), (4) visual communication (How can I communicate my idea?), (5) skills (What skills do I need for this design?), (6) technology (How will the design or product be made?), and (7) evaluation (Is this the best solution I can come up with?). The design process includes cognitive as well as practical activities.

Main *design areas* or fields of design knowledge are listed below (in alphabetical order):

- Apparel design

- Architecture
- Ceramics design
- Communication design
- Costume design
- Craft design
- Editorial design
- Engineering design
- Environmental design
- Exhibition design
- Fashion design
- Fine arts design
- Furniture design
- Glass design
- Graphic design
- Image design
- Industrial design
- Information design
- Instruction design
- Instructional message design
- Interaction design
- Interface design
- Interior design
- IT design
- Landscape design
- Light design
- Molecule design
- Package design
- Poster design
- Manufacturing design
- Mechanical design
- Persuasion design
- Service design
- Text design
- Textile design

Some of these design areas partly overlap other disciplines, and there are probably even more design areas.

The concept *design levels* includes areas such as: design of projects, design of processes, design of tools, design of products, and design of systems.

Design perspectives include views such as: theoretical, craft, manufacturing, technical, and users.

The (final) *design* represents the outcomes of each specific design process, such as products, services, processes, and systems. On a theoretical level the intention of the overall design process might be the same regardless of the specific design area.

Today's motto in design is very much: "function can take any form". According to Mijksenaar (1997, p. 15) this phrase is an adaptation of the famous: "form follows function" which can be traced back to the American

sculptor Horatio Greenough, who had used it in *Form and Function*, written in 1851.

3 Graphic design

People have been designing, planning and executing information sets and messages in all times. According to Lester (1995, p. 168) the designer W.A. Dwiggins was the first to use the term *graphic design*. This was in 1922. During his career he worked on more than 300 book designs. Although we may not think about it, the practice of graphic design is as old as recorded history, and we see the results of graphic design every day. We see books, cards, exhibitions, magazines, newsletters, packages, papers, posters, signs, tickets, and many other products.

Often graphic design is thought of with regard only to the print medium, but it is also used in several other media. Hurlburt (1981, p. 22) defined graphic design in the following way: "Graphic design is an umbrella term that covers a broad range of printed and projected images. Its three principal functions are to *persuade*, to *identify*, and to *inform*." Advertising is generally regarded as the means for persuasion, although at times its purpose may also be to identify or to inform. Corporate identification focus on identity, but corporate literature will often inform, and corporate advertising may also have a persuasive aspect or purpose. In package design the function is also to *protect* the content within the package.

Hightower (1989, p. 7) noted that graphic design is a ubiquitous presence in our daily lives that can engage and inform us or simply add to the visual morass of contemporary culture. Important and unimportant messages are graphically communicated throughout the day, every day. Mullet and Sano (1995, p. 9) noted that whereas art strives to express fundamental ideas and perspectives on the human condition, design is concerned with finding the representation best suited to the communication of some specific information.

According to Friedman (1989, p. 10) the taint of commerce has relegated graphic design to the status of a "second class" discipline in the academic realm. The discipline needs to adopt more theory. However, at present there seems to be few theoretical foundations for graphic design. Much of the work is apparently based on intuition, and on some fundamental principles.

Today a generally accepted view is that *graphic design may be described as the art and craft of bringing a functional, aesthetic, and organized structure to groups of diverse elements*. These elements may be headings, texts, pictures, captions, tables, and even sounds and motion in motion pictures, on television, and on computers.

Modern *visual graphic design* has its roots in the rational, functional aesthetics that evolved in traditional graphic design over the centuries for the print media, and are now used in *industrial design*, as well as in *architecture*.

In contrast to traditional graphic design, now the most fundamental design technique is *reduction*. Today an “elegant design” must be reduced to its essential elements and each element reduced to its essential form (Mullet and Sano; 1995, p. 38). It is generally accepted that good design is *simple, bold, and direct*. It ensures that significant design elements will be noticed by removing insignificant elements wherever possible.

Hurlburt (1981, p. 22) noted that: “Terms like information design, visual communication, and even graphic design are so broad in their connotations that it is impossible to use them accurately to describe specific functions. The term *information design* is often used to cover all of the areas of two-dimensional design that are nonpersuasive. Many design schools use the term as a dividing line between ‘commercial advertising’ and more ‘respected’ forms of graphic design. This is not a completely accurate application of the term. Some design that is concerned with ‘worthy’ causes such as health, safety, and welfare may be persuasive as well as instructive, and a reasonable proportion of advertising is informative.”

In my view, graphic design may be seen as a kind of “all-purpose design”. Many graphic designers work in “persuasion design” (section 4), as well as in “instruction design” (section 5), and in “information design” (section 6). Graphic design is a natural, and vital part of these design areas.

4 Persuasion design

I use the term *persuasion design* as an umbrella term in order to bring related persuasive areas together. Persuasion design can be seen as an evolving area of knowledge. It is interdisciplinary and includes main aspects from *planned communication, persuasive communication, advertising, and propaganda*. Modern graphic design and communication studies are important to persuasion designers. Persuasion design comprises studies on carefully planned information activities, where the goals are related to some kind of change in the behaviour of the receivers. Receivers are typically asked to *do something*. Ads may ask people to vote, go to church, or stop smoking. Often the intention is to persuade them to buy a specific service or product. While advertising presents positive images, propaganda often creates negative images. Propaganda reinforces our prejudices and feelings regarding events, groups of

people, or products.

Bettinghaus and Cody (1987, p. 1) noted that *persuasion* is an important part of the daily life of every human being. What we eat, what we wear, whom we listen to, what music we prefer, what church we go to, and whom we will vote for in the next election are all affected by persuasive communication. In fact, persuasion is used so frequently and is so pervasive in our daily lives that we often fail to recognize when we are using persuasive communication, as well as when we are exposed to it.

Moriarty (1991, p. 5) sees an *advertisement* as a conversation with a customer about a product. “It gets attention, it provides information, it tries to make a point, and it encourages you to buy, try, or do something. It tries to create some kind of response or reaction. It speaks to the heart as well as the head.” Advertising is also a form of mass-communication, which is much more complex than a regular conversation.

People in the advertising business tend to think about the *advertising process* as a traditional communications model. The advertising process involves a source or a sender (the advertiser), encoding (the professional in advertising), a representation with a message (the advertisement) and one or more channels (the selected media), noise (various obstacles), receivers (listeners, readers, viewers), decoding of the message (understanding), and feedback (the viewer’s responses).

The *elements* of an advertising *message* are the words, the pictures, the music, the sounds, the characters, the setting, and the action itself. The *structure* is the way the elements are combined to create an effect of a coherent message. In order to influence others, the senders must exchange information, accurately transmit their messages and intentions, and identify and understand the habits of the receivers.

As a result of successful persuasion design the selected receivers will get new views, opinions, emotions, reinforced attitudes, beliefs, a willingness to buy, apprehensions or prejudices. As a minimal condition, to be labeled as persuasive, a communication situation must involve a conscious attempt by one individual to change the attitudes, beliefs, or behaviour of another individual or group of individuals through the transmission of some message (Bettinghaus and Cody, 1987, p. 3).

Persuasion designers work with all kinds of verbal-visual representations (lexi-visual, audio-visual, and multi-visual) and with all media. Sometimes persuasive messages are adopted and presented at the same time in several different media.

5 Instruction design

I use the term *instruction design* as an umbrella term in order to bring related areas together. Instruction design can be seen as an evolving area of knowledge. It is interdisciplinary and includes main aspects from several areas dealing with *instruction* and *learning*, but from different perspectives, and with different emphasis. Within each area the various definitions and descriptions have changed over time, which is sometimes confusing.

5.1 Audiovisual instruction

Today the term “audiovisual instruction” is more or less obsolete, and not often used. It is only mentioned here for historical and evolutionary reasons. De Vaney and Butler (1997, p. 4) argued that within any discipline, the construction of knowledge and its subsequent cultural practice is always elusive. Yet, within each field there are specific early primary and secondary texts that have been authored and received over time. If carefully read, these texts can yield voluminous information about the formation of a specific field, such as who the founders were, which discourses influenced their communications, and to whom and with what authority they spoke at the time. It is, however, not always easy to find those early primary and secondary texts, and it is not always easy to pinpoint a date or even a specific person as the founder of an academic field.

According to De Vaney and Butler (1997, p. 6) the objects of study, the basic concepts of audiovisual instruction, and the notion of audience had been circumscribed already in the period between 1918 and 1941. During this period the area of audiovisual instruction for students was promoted by interested educators, librarians, school administrators, film makers, radio programme designers, textbook producers, and other media enthusiasts.

World War II research in instruction and training indicated that films were good at teaching facts, and adequate at developing attitudes. The texts of the late 1920s and early 1930s were mainly concerned with operation of machines in public school classrooms. The audiovisual scholars of the 1920s and most of the 1930s followed prevalent theoretical and methodological trends in educational psychology.

World War II created an enormous instructional problem. Thousands of military personnel had to be trained rapidly to perform thousands of specific tasks, critical to their own survival and the war effort. Agencies within the armed services produced a large number of *instructional media*, like instructor’s manuals, filmstrips, slides, audio recordings and also motion pictures.

We might say that audiovisual instruction has evolved

into educational technology and further into instructional technology. Saettler (1968, 1990) wrote a detailed history of educational and instructional technology and noted the emergence of the new role of the *instructional technologist*. During the process of creating military training films, this specific role emerged as distinct from that of the *subject matter expert* and the *technical expert* in film making. The need for a professional who could contribute expertise in education to the knowledge of the subject matter expert and the technical expertise of producers was clear to the military staff. The basic *instructional team*, with (1) designer, (2) subject matter expert, and (3) producer working together, was conceived during World War II.

5.2 Educational technology

For many people the term *educational technology* is just another name for instructional media or audiovisual aids. But it is not. Only a small portion of educational technology is concerned with audiovisual aids. It is the word technology that causes problems, because it has different meanings. Technology includes the systematic study of *technique* as well as the *application of science* to the solution of practical problems. *Educational technology is concerned with making instruction more effective and more efficient*. Members of this profession recognize that while educational technology is a dynamic emerging area, it is still seeking a definition. The various definitions and descriptions have changed over time, and people within this area have not yet reached an agreement.

In their extensive overview, *Voices of the Founders: Early Discourses in Educational Technology*, De Vaney and Butler (1997, p. 3) concluded that while academic audiovisual and educational technology programmes started in the 1950s and proliferated in the 1960s, the intellectual groundwork for this area emerged already in the late 1920s and peaked in the 1940s with the capstone event of programmatic and extensive World War II research.

Morgan (1978, p. 143) dated “the origin of educational technology from the work of B. F. Skinner and others on programmed instruction”. Skinner’s research into operant conditioning and animal learning led him to suggest that human learning could be maximized by the careful control of reinforcement for desired behaviors (Skinner, 1953). It was Skinner’s elaboration of the theory of reinforcement and his advocacy of its application to learning that established the *Programmed Instruction Movement*. What began with an emphasis on audio-visual communications media gradually became focused on the systematic development of teaching and

learning procedures which were based in behavioral psychology.

According to Dieuzeide (1971, p. 1) *The National Academy of Engineering's Instructional Technology Committee on Education* described educational technology as the "body of knowledge resulting from the application of the science of teaching and learning to the real world of the classroom, together with the tools and methodologies developed to assist in these applications." The *Association for Educational Communications and Technology* (AECT Task Force, 1977, p. 164) concluded that educational technology "is a complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning."

Ericson (1998) concluded that educational technology is as wide as education itself. Currently, major fields contributing to educational technology are cognitive psychology, social psychology, psychometrics, perception psychology, and management.

5.3 Instructional technology

With roots in the use of audiovisual media and audiovisual instruction during World War II in training and teaching, and research on educational technology, the term *instructional technology* was introduced in the 1960s. According to Dijkstra, van Hout Wolters, and van der Sijde (1990) the term *instructional technology* was introduced in order to give a description of methods and procedures of instruction used to promote the acquisition of knowledge and cognitive skills, mainly in classrooms and other formal learning situations.

As previously noted the role of the *instructional technologist* and the basic instructional team, designer, subject matter expert, and producer, was conceived already during World War II (Saettler, 1968, 1990). The problem is that even these terms have different meanings for different people.

The Commission on Instructional Technology (1970, p. 19) defined instructional technology in two ways: (1) as "the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard", and (2) as "a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction." The Commission on

Instructional Technology concluded that the purpose of instructional technology is to make education more productive and more individual, to give instruction a more scientific base, and to make instruction more powerful, learning more immediate, and access more equal.

Gentry (1987, p. 7) discussed different definitions of instructional technology, and concluded that it could be defined in the following way: "The systemic and systematic application of strategies and techniques derived from behavior and physical sciences concepts and other knowledge to the solution of instructional problems."

From 1953 the name of the scholarly journal published by the *Association for Educational Communications and Technology* (AECT) was *AV Communication Review* for 25 years. In 1978 the title of the journal was changed to *Educational Communications and Technology – A Journal of Theory, Research, and Development* (ECTJ). In 1989, *ECTJ* and the *Journal of Instructional Development* (JID) were consolidated and merged into *Educational Technology Research, and Development* (ETR&D). It is since then the main publication of the AECT. In 1994 AECT published the following definition: "Instructional Technology is a field dedicated to the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning." Gagné (1987) and Anglin (1991) provided overviews of instructional technology.

All these examples show that this area is still diverse and is seen in different ways by different people. It may be concluded that instructional technology can be viewed as a subset of educational technology. However, it can also be seen as an outgrowth and evolution from educational technology.

5.4 Instructional design

Heinich (1970) concluded that a unit of programmed instruction was, in fact, a small *instructional system*. In 1974 Gagné and Briggs introduced the term *instructional design*. They showed the influence of cognitive psychology on the description of different types of learning, and on the analysis of the learning task. Glaser (1978) showed that the study of acquisition of complex human behaviours in formal instructional settings will contribute both (1) to the theory of knowledge acquisition within the science of cognition, and (2) to the *technology of instruction*.

In 1982 Heinich, Molenda, and Russell (1982, p. 9) defined the term *instruction* as: "Deliberate arrangement of experience(s) to help a learner achieve a desirable change in performance; the management of learning,

which in education and training is primarily the function of the instructor.” Later (p. 19) they defined *technology of instruction* as: “the application of our scientific knowledge about human learning to the practical tasks of teaching and learning.”

Briggs and Wager (1989) published a handbook of the procedures for the design of instruction. Here the central focus is on the *design of instructional materials*, whether print or non-print. Thus the book is mainly written for the instructors who want to learn how to (p. v): “develop pre-designed, *materials-centered* instruction, as distinct from *teacher-centered* instruction.” Today, however, it may be time to focus on *learner-centered* instruction rather than materials- or teacher-centered instruction.

In 1990 Warries defined instruction as (p. 3): “Bringing about by means of a well-defined method, that, under given conditions, a learner within a system, will reach a predefined goal.”

According to Fleming and Levie (1993, p. x) Reigeluth (1983) defined *instructional design* as “the process of deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course content and a specific student population.” Later Reigeluth (1987) applied the appropriate models and theories to the design of lessons.

In 1993 Wileman defined instructional design as (p. 112): “the process of planning lessons based on learning objectives.”

Reigeluth (1983, 1987) defined three types of main variables in instructional design. These variables are (1) methods, (2) outcomes, and (3) conditions. When a designer is to solve an instructional problem, he or she will use the available knowledge about the system and the conditions at hand, and vary the method variables in such a way and toward such values that the desired outcome is achieved.

Instructional design as well as *technology of instruction* may be seen as outgrowths from instructional technology if they are to be described as different areas. The study of pre-designed, materials-centered instruction, whether print or non-print, makes instructional design very important and interesting for information design scholars, as well as for persuasion design scholars.

5.5 Instructional message design

Fleming and Levie (1978) specified that the term *instructional message design* refers to the process of manipulating, or planning for the manipulation of, a pattern of signs and symbols that may provide the conditions for learning. It is assumed that practitioners in this domain can be more effective if they make use of

appropriate generalized research findings from the behavioural sciences. Here the term *instruction* refers as well to classroom contexts as to more informal contexts where attitudes, concepts, and skills are communicated.

In the *The new Shorter Oxford English Dictionary on Historical Principles* (Brown, 1993) the term *message* is defined (p. 1752) as: “brief communication transmitted through a messenger or other agency; an oral, written, or recorded communication sent from one person or a group to another.” Please note, that it is implied here that the message actually is *received* by the interpreters.

The influence of cognitive psychology on instructional message design was further developed by Gagné, Briggs and Wager (1988), and by (Dijkstra et al. 1990). According to Fleming and Levie (1993, p. x): “A ‘message’ is a pattern of signs (words, pictures, gestures) produced for the purpose of modifying the psychomotor, cognitive, or affective behaviour of one or more persons. The term does not imply any particular medium or vehicle of instruction”. In principle the term is valid for all media.

Instructional design theories provide principles for the design of instruction. In a few cases they intend also to provide teachers with prescriptions. During the last two decades design models and theories of instruction have become important for the work of professional instructional designers. Although design theories frequently refer to descriptive theory and propositions, their main function is to guide the designers on how to design and how to produce courses and lessons.

The *International Visual Literacy Association* (IVLA) was established in 1968 to provide a multidisciplinary forum for the exploration, presentation and discussion of all aspects of visual communication and their applications through the concept of visual languaging, visual literacy, and literacies in general. The *Journal of Visual Literacy* (JVL) is the official scholarly journal of IVLA for presentation of theory and research in this area. For the first seven and a half years the title of the journal was *Journal of Visual Verbal Languaging* (JVVL).

We can note a paradigm shift from the old and traditional focus on teaching to a focus on learning. In summary, the main function of *audiovisual instruction*, *educational technology*, *instructional technology*, *instructional design*, *technology of instruction*, and *instructional message design* is to guide the professional designers on how to design and how to produce courses, lessons and materials *intended for learning*. There seems to be no major difference between these areas, and they are all closely related to *information design*. The various instructional areas are, however, more narrow than information design.

6 Information design

In the age of information we have an ever increasing need for computer-based learning, computer interfaces, directories, educational materials, exhibitions, forms, graphic symbols, hypertext systems, instructional materials, lists, maintenance information, manuals, multimedia products, non-fiction books, on-line help for managing computer-based systems, procedural aids, product descriptions; public information systems in hospitals, museums and transport systems; reference books, road traffic signs, system descriptions, tables, technical reports, tickets, webpages, and other kinds of information materials. These are all examples of *information utility goods* that we need in order to perform our tasks at work. We also need an increasing amount of information materials during our leisure time, in order to be able to handle things like new cameras, cars, CD-players, computers, and computer software. *Thus a well designed information material makes everyday life easier for people, and it grants good credibility to the senders or sources. One view is that information design turns data into information.*

6.1 Workability

Marsh (1983) discussed the term *communication design* for “messages that work”. He made a clear distinction between an *artistic approach* and a *design approach*. These two approaches differ in their goals. Marsh commented that the artistic approach strives for *perfection*, while the design approach strives for *workability* in a cost-effective context. The design approach minimizes the need for rewriting and editing by careful planning of the work.

The two approaches result in vastly different final products. The artistic approach tends to judge success by whether the product feels right and whether the critics like it or not. The design approach judges its success by whether the product achieves the objectives as specified by measurable performance objectives, within the specified resources and situational constraints.

In addition, the School of Design at Carnegie Mellon University (1997) has defined communication design “as the effective presentation of ideas and information by means of type and image, whether in the traditional medium of print or in the new digital medium that supports interactive computer displays, multimedia communication technology, and information systems”. Also here the focus is on *workability*.

Information design can be hard to define, and often goes by other names. In my view (Pettersson, 1998a, 1998b, 1988c) information design may be defined in the following way: “*In order to satisfy the information needs*

of the intended receivers information design comprises analysis, planning, presentation and understanding of a message—its content, language and form. Regardless of the selected medium, a well designed information material will satisfy aesthetic, economic, ergonomic, as well as subject matter requirements.”

Today information design (ID) is found (1) in *graphic design* (informative layout, lexi-visual layout, the third language, visual presentation, and communication design), (2) in education and teaching, or rather *instruction* (use of audiovisual media, educational technology, instructional technology, visual literacy, instructional design, and instructional message design), and (3) in architecture and engineering, or rather *construction* and production (technical illustration, technical writing, visual presentation, and technical communication). Here people have recognized the need for clear and distinct presentation and interpretation of information.

6.2 Interdisciplinary

Information design is indeed an interdisciplinary area of knowledge, and as far as I have been able to find out it encompasses influences and facts from more than fifty established disciplines and areas of research (Pettersson, 1998 a,b,c). In these three papers the main areas of research are divided into the following six groups with “base disciplines”. Also other groupings are possible.

1. **Language disciplines** such as drama, graphic design, linguistics, rhetoric, semiology, verbal languages, and visual languages. (Graphic design is often seen as an art subject. However, from an information design perspective the language aspects of graphic design are more important than the art aspects.)
2. **Art and aesthetic disciplines** such as aesthetics, computer graphics, film and cinema, illustration, photography, television and video.
3. **Information disciplines** such as computer science, information processing, and information science.
4. **Communication disciplines** such as communication theory, education technology, information technology, information theory, media studies, instructional technology, instructional design, instructional message design, journalism, and planned communication.
5. **Behavioural and cognitive disciplines** such as cognitive science, didactics, information ergonomics, pedagogy, psychology, sociology and their subareas. The study of attention, perception, cognitive skills, and memory are especially

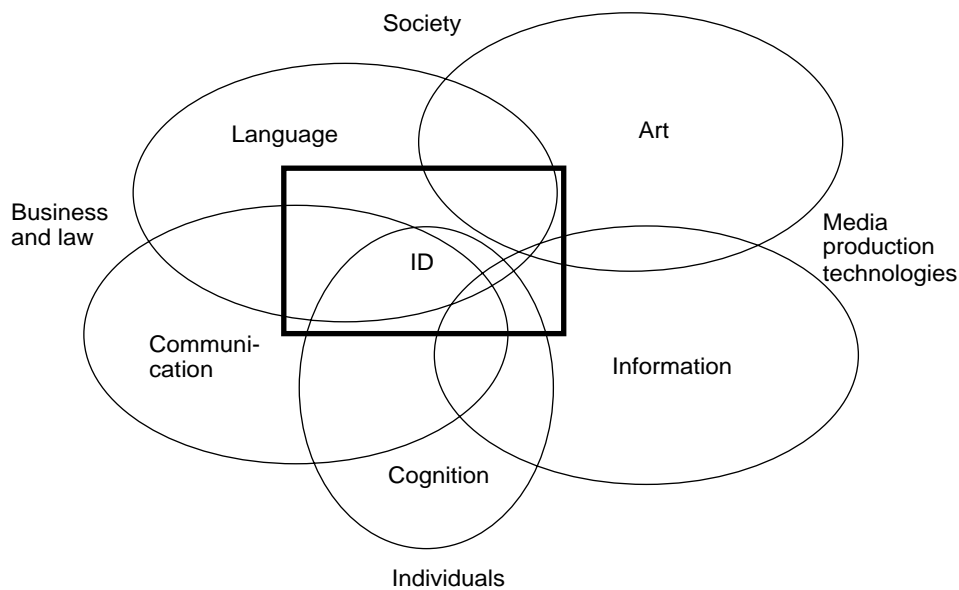


Figure 3. The information design model. The “base disciplines” influence and contribute to information design, ID. Language disciplines are more important to information design than art, information, cognition, and communication.

important. Some aspects deal with individuals, and some with the societies in which we live.

6. **Business and media production technology disciplines** such as business economics and management, information economics, information management, law, and various technologies for production and distribution of different media.

These six groups *influence and contribute* to the area of information design (Figure 3, next page). Please note that the ovals representing the various groups of disciplines are not ment to be sharp and distinct. The borders between the areas are rather blurred, unclear, and indistinct. Furthermore, the model is not intended to show any *exact* relationships between the different groups of the base disciplines. It seems probable that the language disciplines are the most important to information design.

In the future information designers may probably focus more on the *information content* rather than on the traditional *information materials* as such. We may need access to the information required for maintenance of a machine, not necessarily for a printed document with this information. Thus many traditional printed documents may be replaced by on-line services. On a full scale this will be a paradigm shift.

6.3 Visual interface design

Human computer interaction (HCI) comprises research on the design of computer systems that support people so that they can carry out their activities and tasks productively and safely (Pettersson, 1998a). All *graphical user interfaces* (GUIs) are communication systems (Mullet and Sano, 1995). Human computer interaction and *visual interface design* have a role in the design and development of all kinds of man–machine systems. Safety aspects are very important in the design of control systems for air traffic and nuclear plants.

High productivity and job satisfaction are important issues in office systems. Entertainment and fun are key concepts in the design of computer games. Interactive information systems are needed in all these cases. Since the new electronic media differ greatly from print media in many important ways, and their raster displays provide lower resolution but greater freedom to manipulate colour and contrast the designing of visual interfaces, or graphical user interfaces, is a rapidly developing area.

Information ergonomics (Ivergård, 1981) comprises research and development of the ergonomic design of man-machine systems. The design of an information system must be based on studies of the information user’s aims, knowledge, experience, and way of working. Tasks making particularly heavy information demands occur

in work at computer terminals, work at complex information panels, and in signal systems (e.g., for the monitoring of industrial processes and tools).

Information ergonomics include lighting, the design of instrument panels, video display units, characters, symbols, signals, etc. Human computer interaction, information ergonomics, and visual interface design may all be seen as subsets of *industrial design*. These areas may also be seen as subsets of *information design*. However, it is also possible to see these areas as an *information system design* area.

7 Related design areas

The information design model (Figure 3) reveals that it may be used to explain and describe also other interdisciplinary areas of knowledge, such as *persuasion design* and *instruction design*. Information design students were asked to evaluate any perceived differences in the influence of individual groups of disciplines on persuasion design and instruction design, in comparison with information design (Figure 4, below). For each group of disciplines the students had to judge if the influence was less, equal, or more important to persuasion design than to information design; and less, equal, or more important to instruction design than to information design. Most students felt that language disciplines are of equal importance for these three design areas.

Art and aesthetics disciplines were felt to be more important to persuasion design, but less important to instruction design. Information disciplines were evaluated as less important to persuasion design, and equal or less important to instruction design. Communication disciplines were evaluated as more important to persuasion design, and of equal importance to instruction design. For instruction design opinions about this variable were the most scattered.

One possible explanation for this spread may be a lack

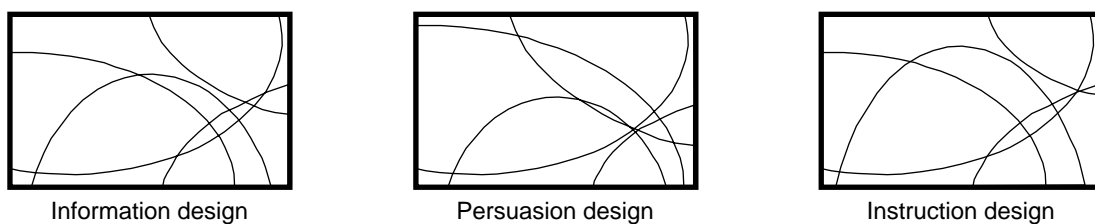
of understanding of the subject instruction design among the students. This view is substantiated by the fact that also the opinions about the importance of the other subjects on instruction design are less distinct in their distribution than for persuasion design. Behavioural and cognitive disciplines were evaluated as less important to persuasion design, but as equal or more important to instruction design. It is obvious that student subjects evaluate a difference in importance of the “base disciplines”. This may be explained with clear differences in intentions and objectives.

8 Conclusions

Various areas of design have their different objectives and the materials and products reach out to different groups of receivers. Based on the intended purposes, the different areas related to design of information sets may be grouped into four main categories:

1. *Graphic design* includes traditional graphic design (typography and layout), visual graphic design, industrial design, and parts of architecture. Here the main intentions are to provide functional, aesthetic, and organized structure to all kinds of information sets. The interpreter/s may develop new views, relaxation, emotions, awareness, attention, and understanding.
2. *Persuasion design* includes advertising, propaganda, planned communication and persuasive communication. Here the main intentions are to provide advertising or propaganda in order to persuade interpreters to buy a product or a service, or to change behaviour. The interpreter/s may develop new prejudices, apprehensions, willingness to buy, beliefs, reinforced attitudes, emotions, opinions, and views.
3. *Information design* includes information design,

Figure 4. As indicated in these three diagrams the importance of the groups of “base disciplines” are partly different for information design, persuasion design, and instruction design.



technical illustration, technical writing, technical communication, informative layout, lexi-visual layout, communication design, visual interface design, and parts of information ergonomics, and design of graphical user interfaces. Here the main intentions are to provide information materials needed by the interpreter in order to perform a specific task. The interpreter/s may develop new skills, understanding, and experience.

4. *Instruction design* includes parts of audiovisual instruction, educational technology, instructional technology, visual literacy, technology of instruction, instructional design, instructional message design, and design of instructional materials. Here the main intentions are to provide courses and learning materials needed by the interpreter in order to modify behaviour with respect to learning. The interpreter/s may develop new understanding, experience, comprehension, knowledge, insight, and finally wisdom.

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