

Visual Design in Distance Education

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This paper provides a brief overview of the Open Learning Institute and outlines the course development process used. The visual design process is then described and examples are given of several different approaches used to generate visual ideas. Finally, a two-dimensional model is given for classifying visuals according to the function (instructional, motivational and directional) and mode (drawing or photograph). Examples are then given of visuals in both modes created at the Institute which fulfill various functions.

Establishment of the Open Learning Institute

The Open Learning Institute (OLI) is a relatively new, public, distance education institution in Canada. It was established by the British Columbia Provincial Government in June 1978. The Institute has a broad and challenging mandate to perform the following functions:

- (1) (a) provide programs of study leading to a first degree in Arts and Science;
- (b) provide programs of study in career, technical and vocational areas and; adult basic education.
- (2) The Institute shall manage needed support services, develop and acquire courses, programs of study and learning materials and distribute them by distance education methods.

Many definitions have been given for the term "Distance Education". In this paper, the term is used to mean an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. The purpose of the Institute is to provide these services to, amongst others, geographically or socially isolated adults across the Province of British Columbia.

It should be pointed out that the Institute was created in a context of distance

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Enrolments	— September 1979 — 750 enrolments
	— January 1980 — 2,400
	— Fiscal 1980-81 — 7,500
	— Fiscal 1981-82 — 11,000 (predicted)
Students	— Two-thirds are between ages 25-40.
	— Two-thirds are women.
	— Two-thirds are from non-metropolitan regions.
Courses Available	— September 1979 — 7 credit courses
Most developed in-house)	— January 1980 — 37
	— September 1980 — 52
	— January 1981 — 64
	— September 1981 — 85
	— January 1981 — 85
Programs	— Adult Basic Education: Grade X completion; Grade XII completion.
	— Career/Technical/Vocational: Nine certificate programs:
	— General — Office Management
	— Construction Management — Secretarial
	— Industrial Supervision — Electronics
	— Motel Management — Restaurant Management
	— University: Bachelor's Degree: Eight academic concentrations:
	— Economics — Sociology
	— History — Geography
	— Psychology — Mathematics
	— English — Biology
Student Support Services	— Seven Regional Advising Centres throughout British Columbia
	— Tutors for each course, mail and toll-free telephone contact
	— Library "hot-line"
Staff	— 106 regular and 23 temporary employees (in-house)
	— Approximately 100 tutors and 67 coursewriters and consultants

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education projects existing in Canada and throughout the world. In Canada, we can point to Athabasca University, the Télé-Université, North Island College, and the University of Waterloo Correspondence Division. Internationally, the best known institution is The Open University in Britain. Other notable institutions include Everyman University in Israel and the University of Mid-America in the United States.

Current status of the Institute

Table 1 provides a summary of the status of the Open Learning Institute as of January 1981. It is clear from these data that the Institute has grown very rapidly since its inception.

Details regarding the establishment of OLI and the decisions which have led to its current status have been described earlier (Mugridge, 1981).

Components of an OLI Course Package

OLI courses are paced home-study courses. Students are mailed packages that contain all of the necessary materials for a particular course. An OLI course package consists of a number of components, as shown in Figure 1. Some components are produced at the Open Learning Institute and others are purchased. It is unlikely that all the components listed would be part of a particular course package.

The majority of courses developed at the Open Learning Institute are based on a particular textbook. The learning units provide the needed support to students for working through the textbook. A number of OLI courses are "stand-alone" courses. That is, they are self-contained courses in which the learning units serve as the textbook in addition to the other functions outlined in Figure 1. For example, one OLI electricity course contains about 400 pages and 175 visuals. Since the development of a stand-alone course is a major undertaking, every attempt is made to identify suitable published material.

Course development at the Institute

Course development at OLI is based on a course team approach. Each member of the team performs a particular function, but often contributes ideas and expertise in several areas. This leads to carefully designed, developed and produced course materials which have benefited through contributions by several individuals. The course team members and their functions are given in Table 2. Figure 2 illustrates in a general way the course development process at the Institute.

Visual design at the Institute

The visual design process at the Institute can be thought of as having two elements: page design and visual support of text material.

This paper deals mainly with the visual support aspect of visual design. However, a few words are in order about page design.

Page Design

Page design refers to the particular configuration of text and visuals placed on the page. It includes decisions about typeface and typefont, number of columns used and the width and depth of these columns, as well as size and placement of visuals. The outside and inside covers, copyright and acknowledgments page, and contents page also require their own particular specifications.

University courses use a Times Roman typefont in 10 point while the Adult Basic Education and Career/Technical/Vocational areas use Univers Type in 12 point. All three program areas make use of a predetermined set of heading sizes. A single column page layout is employed with large margins to accommodate visuals, labels and to allow students to make notes. However, the Institute is actively researching page designs in order

to expand its repertoire in the near future.

Visual Support of Text

Since June, 1979, more than 3,000 illustrations and 400 photographs have been produced at the Institute. Currently, more than 500 copyrighted photographs have been used (with permission) in OLI courses. Some pertinent questions have been addressed as a result of these activities. What teaching role do these visuals play in course materials? What are the benefits of using the course team approach to visual design? How does the visual design process function at the Institute?

Role of visuals: The role that visuals play in course materials is a crucial issue for course designers and visual designers. Unfortunately, detailed guidelines for the effective use and design of visuals is scarce. Holliday (1973) has concluded that:

Because of the complexity and almost infinite interrelationship among varying picture types, subject content, presentation formats, and individual learner characteristics, specific prescriptions for instructional designers unfortunately are not available. (p. 211)

Course Team Member	Main Function
Course Writer	— Prepares course material
Consultant	— Ensures academic acceptability and transferability outside of OLI
Program-Co-Ordinator (and/or Director)	— Ensures internal academic acceptability and articulation with other OLI courses
Course Designer	— Edits and instructionally designs material, and co-ordinates development of the course at OLI
Visual Designer	— Designs and develops visuals for course
Copyright Officer	— Advises course team members about copyright and applies for copyright clearances
Pilot Student (when available)	— Works through drafts of material in developmental stage
Scriptwriter and/or Producer	— Works on preparation of audio script for studio recording

More recently, Broudy (1981) noted that his examination of related literature revealed that there have been few attempts to examine closely the relationship between pictures and learning from instructional texts. Nesbit's (1981) view is that the increased use of illustrations in educational materials is more often based on common sense guidelines and artistic notions than on experimental evidence. Duchastel (1980) concluded that research has had relatively little impact in the practical area of text illustration. He did argue, however, that research has been useful in specific areas such as supporting the value of illustrations in assisting learning (in a number of studies), showing that there may be some danger in the improper use of illustrations. He also argued that the value of illustrations for motivational purposes must be accepted on intuitive grounds—and not unreasonably so. This particular view has been prevalent at the Open Learning Institute during these early years of course development. The assumption has been made that visuals are inherently useful for instructional as well as motivational purposes.

Visual design process: At present, the visual design process is primarily concerned with the design and development of visuals to support text material.

The prime responsibility for managing the visual design process rests with the course designer. The responsibility for controlling the creative design rests, of course, with the visual designer. The purpose of the design stage is to decide on the nature and placement of visuals in a particular course component (usually a unit). This stage usually involves input from several members of the course team. The development stage then involves illustration, photography or the acquisition of visuals that were decided upon in the design stage.

The major benefit of using the course team approach to visual design is that it makes effective use of the Institute's instructional resources to produce instructionally valid and technically accurate visuals. The wide variety and scope of courses offered by the Institute necessitates a flexible process for the development of visuals. For instance, the courses range from introductory to advanced levels in science, humanities, technical and business courses. No two courses, therefore, have the same needs and requirements. And each course must be designed to be instructionally sound as well as visually pleasing. The visual design process often varies according to the type of course.

In a technical course such as electronics, the coursewriter usually initiates the visuals. He or she is the subject area specialist, knowing what the student has to learn and the added knowledge of the visual conventions of the particular subject or trade. In technical courses, the coursewriter first indicates or sketches out rough comprehensive drawings of the

technical information to be illustrated. Then the coursewriter, consultant and course designer check, edit and approve the proposed visuals. Once the proposed visuals are approved, they are passed on to the visual designer, who corrects and transforms the edited rough comprehensives into finished visuals. Although there is some latitude for creativity in the manner of presentation, the visual designer must assure complete design consistency throughout a course and adhere to technical and house style conventions.

In a humanities course such as psychology or sociology, the visual designer often initiates the visuals. He or she reads through the manuscript and suggests possibilities for visuals. These concepts are considered by other members of the course team. The visual designer may present these ideas in a number of ways, such as thumbnail sketch, a written description or a combination of both of these. The ideas for the visuals may be modified, adopted or dropped during discussion by the course team. Once the course team has approved the proposed visuals, the visual designer transforms the ideas into finished visuals. Also, in many cases, permission is obtained for the use of copyrighted visuals which meet the design requirements of a particular course.

In many areas all members of the course team participate in the visual design of the course. For instance, in a career course such as Business Management and Principles, the course team often works together on the visual design. Sometimes the coursewriter may suggest a concept that he or she wishes to illustrate. This concept may take the form of a very rough drawing or a written description. The visual designer then considers the coursewriter's idea and renders a more complete rough, which is then discussed with the course team. At other

times, the course designer will determine that an illustration is necessary to clarify a point in text and will present the concept to the course team for discussion. Once all the ideas for visuals have been approved, the visual designer prepares the finished visuals.

In summary, there are no clear rules for designing visual material at the Open Learning Institute, but there are definite styles or approaches used. This flexibility has proven to be successful thus far in maintaining the tenuous balance between creativity and productivity.

The examples in Figures 3 & 4 illustrate two approaches used in the visual design process at the Open Learning Institute.

Classification of visuals

There have been several attempts at establishing frameworks for classifying visuals. Knowlton (1966) provided a lead in this regard by classifying visuals as either realistic, analogical, or logical. Twyman (1979) more recently proposed a scheme that consists of a matrix with one dimension describing the methods of configuration of graphic language and the other dimension describing modes of symbolization. Duchastel (1980) pointed out that there has been little enthusiasm for these classification schemes, perhaps because of difficulties of basing taxonomies on the physical attributes of visuals rather than their communicative intent. He suggested that it would be more useful to use a functional approach to classifying visuals. This approach is primarily concerned with the function of a visual, while the appearance of a visual is of secondary concern. In his functional scheme, illustrations are considered as having attentional, explicative, and/or retentional roles. Duchastel more recently (1981) reported on a study from which he concluded that illustrations can influence retention even when they have no influence on immediate recall. He called for

pertinent theoretical elaborations and empirical studies in the area. Levin (1979) also developed a functional approach to research on visuals, and his scheme identifies eight different functions that visuals play in text.

MacDonald-Ross (1977), in an important review paper, has explained that the knowledge we have about the use of graphic devices is derived from two sources: the expert practitioner and the formal scientific study. These are two quite separate traditions, and yet it is necessary to bring them together for their mutual benefit. He has argued that despite his sceptical outlook about the research tradition, there is, in fact, a surprising stock of knowledge available and he has listed some of the more important sources in his paper. More concrete guidelines are available for effective visuals in scientific and technical subjects, and particularly in representing quantitative information. Wright (1977) has provided some useful guidance in these areas. Because these areas are better developed, guidelines provided by Wright and others have been particularly helpful in designing visuals for the technical and scientific courses developed at the Institute.

The present paper draws upon the work of MacDonald-Ross (1977) who suggested a set of purposes that he thought could be used to develop a more sophisticated classification. His categories of purpose are: iconic, data display, explanatory, and operational. These categories form the basis of the scheme suggested in the present paper.

The classification schemes are useful in guiding research in this area. However, they are also useful in indicating to the course team the various possibilities available through the visual medium.

In order to examine the various types of visuals used in OLI course material, we have classified them according to their purpose and mode. Figure 7 shows the scheme used for classifying visuals. Definitions of the terms used in the figure are then given.

Instructional: To assist learning by providing information in a visual manner or by clarifying the text material.

Iconic: To show what an object looks like, and to identify and label key parts.

Data Display: To display the results of empirical observations.

Explanatory: To show the logical relationships between key ideas.

Operational: To help the reader to perform some well-specified task.

Some diagrams have a single purpose, but others combine two or more. For example, mathematical diagrams can be both explanatory and operational (algorithms); biological diagrams can be both iconic and explanatory (physiological diagrams); technical drawings can be both iconic and operational (maintenance diagrams).

Motivational: To indirectly assist learning by keeping the student interested in the text, e.g. cartoons, pictures of famous people, pictorial settings. These visuals help the subject matter to "come alive", but are not intended to directly provide instructional material about the subject matter.

Directional: To provide symbolic cues which help guide the student through the text and supporting course material.

Mode

Mode refers to whether the visual is in the form of an illustration (drawing) or a photograph. At the present time, the majority of illustrations are prepared by visual designers at the Institute. Although the Institute shoots many of its own photographs, the majority of photographs are copyrighted works obtained from outside sources (with appropriate payment and acknowledgement given).

The following examples illustrate the two modes of visuals (illustrations and photographs) as they serve a number of purposes (instructional, motivational and directional).

Examples of Visuals

An iconic visual (Figure 6)

This iconic visual is taken from a social studies course for grade 10 completion. The learning unit it appears in is entitled "Consumer economics". This visual shows the student what a monthly revolving charge account statement looks like. In fact, it is a reproduction, reduced in size, of an actual charge account statement. The key parts of the statement are labelled and identified for the student.

A data display visual (Figure 7)

This data display visual is taken from a social studies course for grade 10 completion. It is a graph showing the percentages of hidden taxes in the pump price of gasoline. Notice that the graph is in the shape of a gasoline pump. This is an interesting way to present this type of data to a student at this level. This same information in a more conventional table or graph would not be as attention-getting or as memorable.

An explanatory visual and a directional visual (Figure 8)

This explanatory visual shows the balanced relationship between the body's intake and loss of water. It also shows the factors involved in intake and loss. Note the directional visual that appears in the left-hand margin. This particular directional visual alerts the student to do part of an assignment. The Open Learning Institute has developed a library of directional visuals of this type, alerting the student to experiments, audiotapes, readings, etc.

Figure 1. Structure of an OLI course

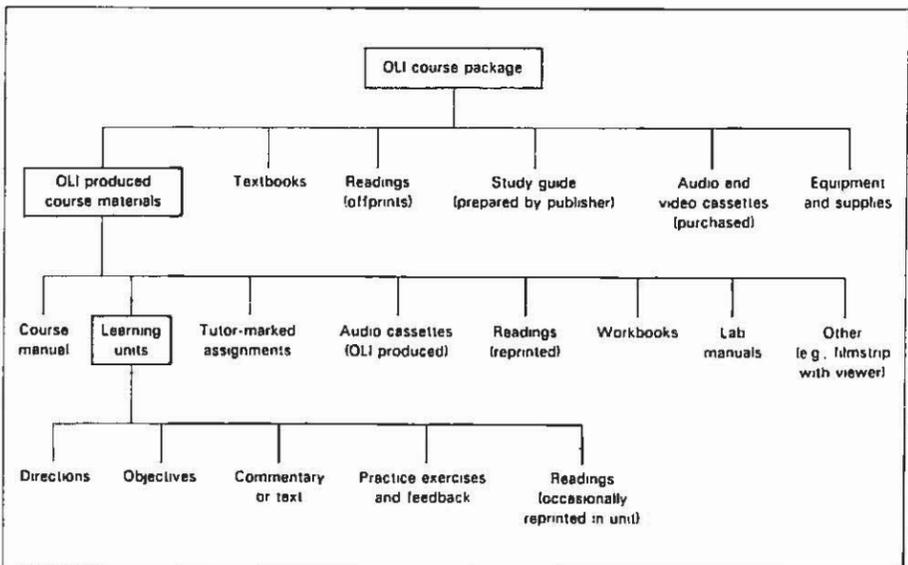


Figure 2. OLI course development process

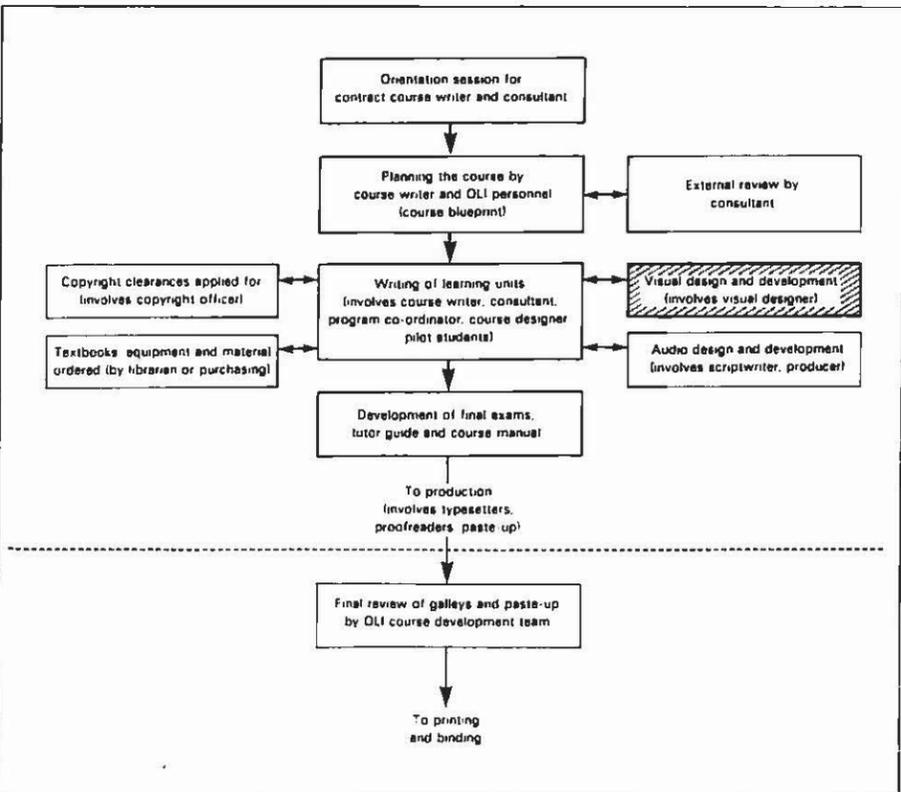


Figure 3. The concept of systems from a business management course

"The coursewriter presented the visual idea with the drawing of the concept of systems shown in Figure 3a. The visual designer then "worked-up" the coursewriter's idea, as shown in the finished illustration in figure 3b."

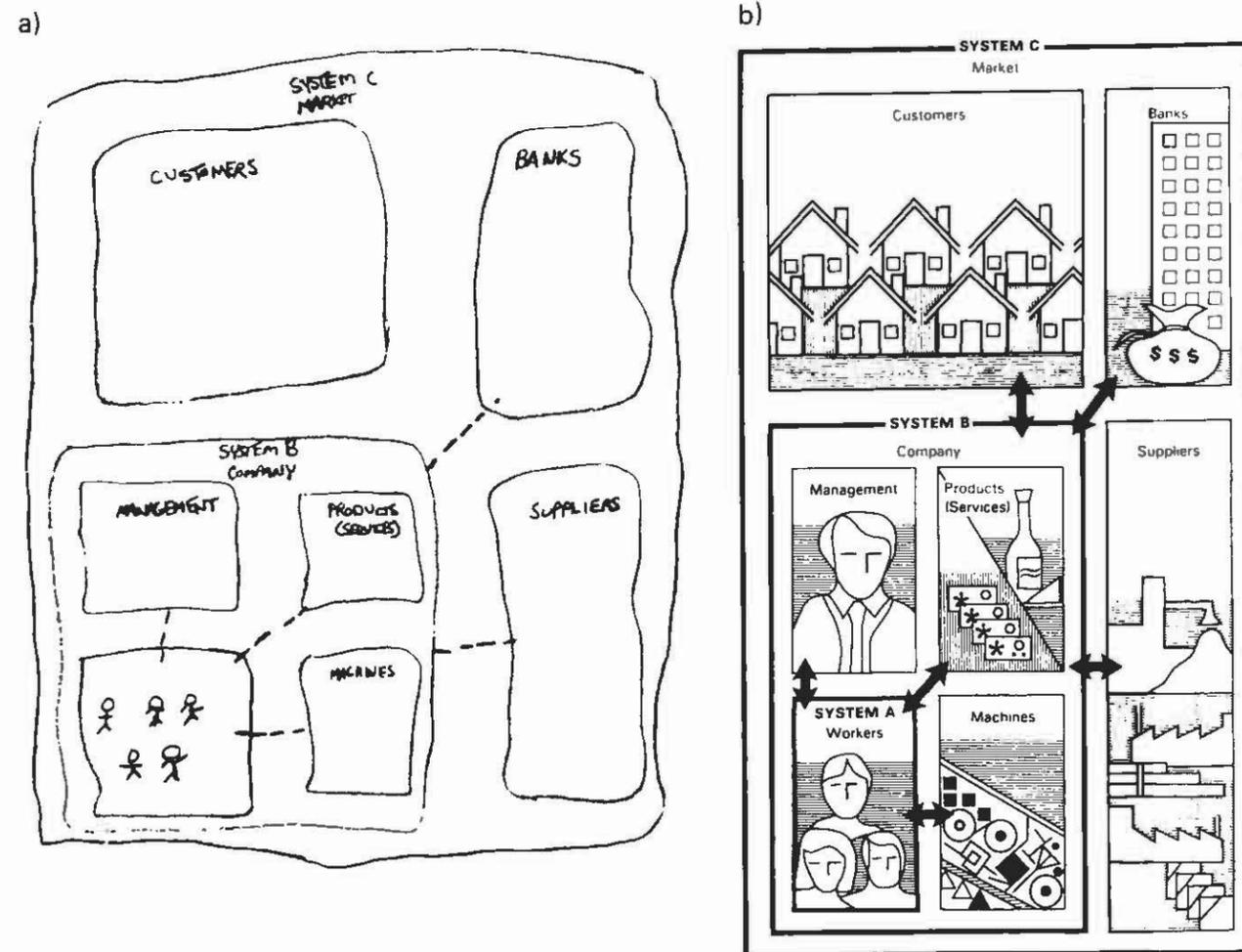


Fig 15 Systems

Figure 4. An illustration of dissonance from a business management course

"The visual designer read the coursewriter's manuscript and conceptualized a visual (Figure 4a) which later appeared in finished form in the learning unit as shown in Figure 4b."

a)



or frustrated or anxious? (Maybe because it was a case it wasn't real enough to bother you). However, most people in real life when faced with a hard decision get a "funny feeling" or anxiety which is called "dissonance". Dissonance is the uncomfortable feeling which people experience when no perfect solution exists for a problem and they must choose an imperfect alternative. Remember the last time you made a major purchase, a purchase such as a house or car. If you had more than one alternative did you try to weight the advantages and disadvantages of each? Did this only seem to make it harder to choose?

b)

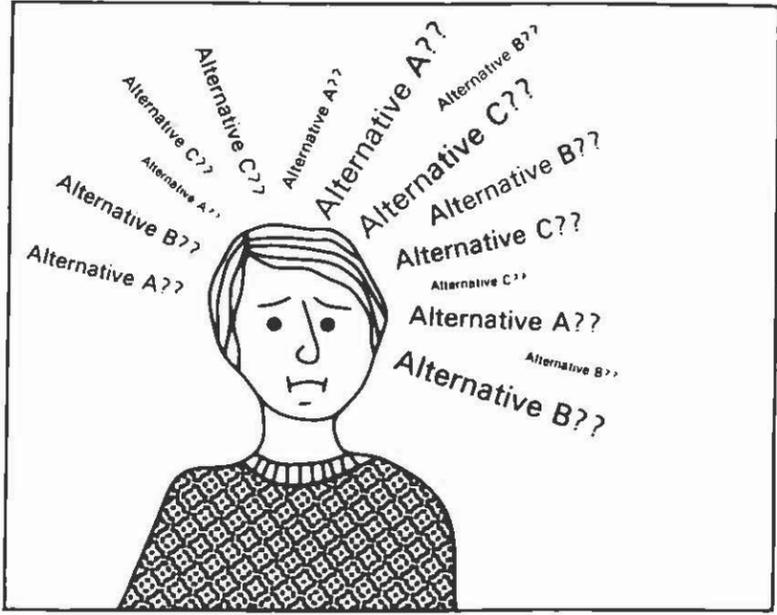


Fig. 2.11. Dissonance

"The upper visual is a top-view photograph from a basic electronics course. It shows the student the correct positioning of the components involved. The lower visual is a cutaway illustration of the same operation involved in the photograph and also shows the student the correct positioning of the components involved. The use of both modes make the operation very clear to the student."

Figure 8. Explanatory and directional visuals (the directional visual is in the left-hand margin)

14 Science 010 Unit 2

NORMAL WATER BALANCE IN BODY

Water is important to the body because many substances will dissolve in it. Chemical reactions between substances usually take place only when they are in solution that is dissolved in a liquid. The nutrients in the body cells must be in solution for the life processes to go on.

When dissolved in water, substances can also move in and out of cells through the cell membranes and can be transported round the body as, for example, in the circulatory system you studied in Unit 2.

Now turn to the Assignment File and carefully read the instructions on the front of the file. Then do Part 3 of Assignment 1.

Food for control

Let us now consider certain nutrients that are essential for regulating the processes that go on inside your body.

We have already discussed the importance of the minerals iodine and iron. You will recall that they are essential for regulating the "burning of fuels" reaction (respiration) which takes place in the body cells. Other minerals, vitamins, and water also play vital roles in regulating various body processes.

Figure 9. Operational visuals in two modes, illustration and photograph

After one or two seconds (no need for a stopwatch!) of this "pre-heating" touch the end of the solder to the joint as shown in Figure 1-14

The solder should melt almost immediately and flow around the joint. It is unlikely that more than 1-2 mm of solder need be melted to form a good connection. See Figure 1-15

Tip heats both lead and foil. Solder flows smoothly and evenly around joint, adhering to foil and lead.

Figure 1-15 CORRECTLY POSITIONED IRON TIP

"This explanatory visual shows the balanced relationship between the body's intake and loss of water. It also shows the factors involved in intake and loss. Note the directional visual that appears in the left-hand margin. This particular directional visual alerts the student to do part of an assignment. The Open Learning Institute has developed a library of directional visuals of this type, alerting the student to experiments, audiotapes, readings, etc."

Figure 10. A motivational visual

6.106, 471

Regional geography of Canada II

Course manual

"This visual is taken from a basic business management course. The visual is both iconic and operational. It shows the key documents involved in a cheque transaction and the procedures to follow in accepting a cheque."

Figure 11. A visual that is dual-purpose, iconic and operational

BRSM 1-2-1984

Credit cards

Credit cards are normally used at the retail level of business, although some trade suppliers issue their own cards as a promotional and record-keeping tool.

Read this section then turn to the text and read pages 237 to 241 (top) in your textbook.

Credit cards are perhaps the best sales tool a small retail business can have if it is dealing in fairly costly items. Credit cards are a way of life and fewer and fewer people are carrying large sums of money around with them. You may be willing to accept cheques but you may find that cards have their place.

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