COMMUNICATING BY ORDERING ELECTRONS

The development of Electronic Communication as part of a secondary school Communication Science curriculum in the Language, Literacy and Communication learning area

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Abstract

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In this thesis I focus on the introduction of Electronic Communication as part of an envisaged Communication Science curriculum in the Language, Literacy and Communication Learning area of the Further Education and Training band. In the course of my thesis I will show that the requisite elements of verbal and written communication are dispersed throughout the Language, Literacy and Communication learning area in the General Education and Training band, and that they can be utilised as basis for formally introducing Communication Science, as a subject in the Language, Literacy and Communication learning area in the Further Education and Training band. I also show that electronic communication will form a crucial area of study in such a Communication Science curriculum. I argue that due to the diversity of cultures in South Africa, cross-cultural communication is required in such a curriculum. I also argue that by the very na-

ture of Outcomes-Based Education it is necessary to have a subject into our school curriculum that will form an interface with conceptual learning and experiential learning, that will contextualise language study within the more comprehensive scope of forms of human communication, and that will form an interface between the humanities and science to prevent the humanities from becoming soft options in Further Education and Training band learning programmes. To this effect I focus on the crucial role of Constructivism as integrating theory to account for various approaches to motivational learning, the primary form of learning required in Outcomes-Based Education.

I examine the principles of curriculum construction in OBE and its associated culture of learning against the backdrop of the theory of Situated Cognition. This presents a platform to argue the case for Electronic Communication as part of Communication Science in the Further Education and Training band curricula in South African schools.

TABLE OF CONTENTS

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WRITING CONVENTIONS

I wish to draw the attention of the reader to the following conventions that I am following in this study:

- I am using the abbreviated Harvard style of referencing, for example Wellman 1992: 108, meaning Wellman 1992, page 108.
- When reporting current events from the print media I provide the name of the publication, followed by the date of publication in brackets as in (Highway Mail, 15 September 2000)
- I have made a conscious effort to limit the use of footnotes as far as possible in order to facilitate the uninterrupted reading of the dissertation.
- Illustrative graphics and tables are all given as Figures 1 – 2.
- The term "Electronic Communication" is used to refer to both analogue and digital communication.

Chapter 1

ORIENTATION

Preview

In this study I focus on the development of Electronic Communication as part of a secondary school Communication Science curriculum in the Language, Literacy and Communication Learning area of the Further Education and Training band. In the present chapter I will provide a brief outline of the structure of this thesis.

Overview of thesis

In chapter 2, I state the problems that will be investigated and I motivate why it is important to focus on Communication Science in an Outcomes-Based Education (OBE) environment.

In chapter 3, I will define and discuss the key concepts used in this study. I will, for instance focus on concepts that will foster understanding of Electronic Communication and Outcomes-Based Education (OBE) since these are relatively new areas of study in South Africa.

In chapter 4, I trace the development of Electronic Communication and its impact on society. I focus on current issues such as *interactivity* and *convergence* of new communication technologies.

In chapter 5, I present an argument for including Electronic Communication in the Further Education and Training band of a Communication Science curriculum. I examine issues such as the diminishing demand for the study of grammar and literature among learners and breaking cultural, geographical and time barriers with Electronic Communication. I included a case study to show the real impact of Electronic Communication on how we live and work in order to justify that Electronic Communication has to be taught and learnt in our schools.

In chapter 6, I examine the state of Electronic Communication in South African schools. Issues such as the rural-urban divide in South African education and efforts to globalise South Africa

are examined. Key issues such as the role of Government Communication Information System (GSIS) in reaching rural communities are examined. Initiatives taken by the Ugandan and Indian governments to globalise their countries are discussed. I will also focus on the role of Telkom in promoting digital communication. I will undertake a case study to examine the possibility of wiring even the most remote areas of South Africa.

In chapter 7, I examine the role of Communication in Outcomes-Based Education.

In chapter 8, I examine the benefits of Communication Science to subjects in other learning areas. Here I give expression to the educators' role in knowledge construction, the social benefits of Electronic Communication and recognising and sharing of information. Finally, I will discuss communication and collaboration in education.

In chapter 9, I will propose a curriculum that could be used for teaching Electronic Communication in the Further Education and Training band of the school curriculum.

In chapter 10, I will present the conclusions of my research and make recommendations with regard to the development of Electronic Communication as part of a secondary school Communication Science curriculum in the Further Education and Training band.

Conclusion

I this chapter I provided an overview of what this thesis entails. In the next chapter I state the problems with regard to place of Electronic Communication in the Communication Science curriculum of the Further Education and Training band and elucidate the research procedure required to solve it.

Chapter 2

STATEMENT OF PROBLEMS AND RESEARCH PROCEDURE

Preview

In this chapter I will state which problems there are with regard to Electronic Communication in an envisaged Communication Science curriculum in Outcomes-Based Education in senior phase classrooms. Thereafter I will state the aims of my research, and I will indicate what research methodology I used to find solutions to these problems in order to meet the aims of my research.

Statement of problems to be analysed

This thesis presents the curriculum contents for Electronic Communication in an envisaged Communication Science curriculum to be introduced as part of the Outcomes-Based Education (OBE) renewal of the Language, Literacy and Communication (LLC) learning area in the Further Education and Training band (FET) band of school subjects.

As part of educational renewal in South Africa one of the learning areas, Language, Literacy and Communication, entails of shift from passive learning about language and literature to the mastery of a series of dynamic communication skills. The shift towards dynamic communication skills requires the introduction of Communication Science as an independent subject within the Language, Literacy Communications learning area.

Problem 1: Broad implications for language learning due to the switch from traditional education to OBE

Traditional approaches to language teaching entailed the study of the literatures and the grammatical rules of such languages. The introduction of OBE entails a fundamental switch from

active teaching and passive learning to an interactive, cooperative process of learning where both educators and learners need to be in command of a range of communication skills. In this thesis I will present the results of research on communication and cognitive skills that educators and learners need to master in order for OBE to succeed as a programme of cooperative learning in the senior phase of school curricula.

Problem 2: The place of Communication Science[1] in the Language, Literacy, Communication learning area in the Further Education and Training band

With the shift away from passive knowledge about languages to an active communicative competence in particular languages as well as in other subjects I will present the results of research on what the interrelationship should be between language studies, literacy studies and Communication Science in the senior phase of school curricula.

Problem 3: Possible strategic alliances between Electronic Communication and other learning areas

OBE requires that learning areas function in conjunction with each other. There exist problems in ensuring cooperation between the eight learning areas in OBE. I will explore possible alliances between Communication Science and other learning areas in order to illustrate how Communication Science can be used bridge all learning areas.

Problem 4: The potential roles of computer-mediated learning programmes in South African Outcomes-Based Educatilon have not yet been realized

The digital electronic revolution of the late 20th Century has resulted in the emergence of the Internet as the main medium for the development of virtual knowledge-based communities that transcend the limitations of time and space to form the "global village." In this thesis I will pre-

[1] The term "Communication Science" is used as collective reference to the study of all knowledge systems that relate to the communication processes, including those that relate to Media Studies and particularly aspects of Information Technology that relate to digital electronic communication.

sent the results of research on these emerging trends of the "global village" should be accommodated as part of Communication Science curricula in the FET band in order to integrate South African education specifically and South African society in general in international affairs. An important aspect of this problem is ways of using the Internet for information retrieval, research and knowledge dissemination.

Research within Communication Science reveals that Electronic Communication can play a number of important roles in Education. Online learning programmes can be used to reach rural settlements in South Africa. Virtual laboratories can be used to overcome problems of setting laboratories in previously disadvantaged communities. Information can never be out of reach for all South African.

Problem 5: The role of Electronic Communication in secondary school Communication Science curricula as part of a Communication Science curriculum

Research within Communication Science reveals that Electronic Communication can play a number of important roles in Education as part of a Communication Science curriculum. Electronic Communication has changed the way in which humans communicate and work. Electronic Communication has impacted on learning styles in general and since there are changes in the job environment, there should be changes to the manner and the content that we teach.

In this thesis I will present the results of research on what the roles should be of electronic communication as part of Communication Science in the senior phase of school curricula.

Aims

The five aims of this thesis are (a) to work out the broad implications of electronic communication for OBE, (b) to determine the place of electronic communication in the Language, Literacy, Communication learning area in Communication Information Science, (c) to determine the relationship between electronic communication and subjects in other learning areas, (d) to indicate

how the extremely fast trends of technological convergence and the emergence of new forms of electronic communication can be accommodated in Communication Science curricula, and (e) how the Internet can be used to teach learners the principles of knowledge retrieval, research and knowledge generation.

Research procedures

This thesis is of an analytic-descriptive nature, which entails the following:

- The role of communication in OBE will be explained
- The nature of Electronic Communication within the OBE framework will be explained;
- The nature of Communication Science (CS) will be outlined, and it will be motivated why CS forms a proper framework for an integrative approach to learning;
- Innovations, convergences and emerging trends in electronic communication will surveyed to ensure that current aspects of electronic communication are included in the proposed FET Communication Science curricula;
- Case studies will be made of how rural isolation was overcome with regard to Internet access in South Africa, elsewhere in Africa and abroad, to ensure that the introduction of electronic communication as part of Communication Science curricula does not contribute to the entrenchment of the digital divide between rural and urban schools in South Africa;
- Proposals will be made about use of Electronic Communication in the senior phase of OBE, by using specific communication strategies as part of teaching and learning within the general framework of Communication Science.

Value of research

The research will contribute to an overall plan that is being worked out by a team of students for the introduction of Communication Information Science. Besides formalising the curricula for this subject the dissertation will contribute to the overall aim of Outcomes-Based Education that learning should be open-ended and multi-disciplinary and should harness new technologies to increase the effectiveness of education.

Conclusion

I this chapter I identified five problems that relate to bringing coherence to learning areas in the senior phase of schools because of the absence of Communication Science in the school curriculum in Outcomes-Based Education. I outlined the nature and stated the value of my research with regard to giving expression to the communicative principles underlying OBE and specifically the benefits of Electronic Communication in the Further Education and Training band of the school curricula

I formulated five aims based on the identified problems and stated research procedures that would be used to resolve the said problems.

Chapter 3

KEY CONCEPTS

Preview

In this chapter I will define the key concepts relating to my research regarding electronic communication in a proposed Communication Science curriculum for the Further Education & Training (FET) band of Curriculum 2005. The purpose of this chapter is to introduce the main concepts that I will be working with, and which I will analyse in greater detail in subsequent chapters.

ISDN

According to Becker 2002: http://www.ralphb.net/ISDN/defs.html **ISDN**, which stands for **I**ntegrated **S**ervices **D**igital **N**etwork, is a system of digital phone connections, which has been available for over a decade. This system allows data to be transmitted simultaneously across the world using end-to-end digital connectivity.

ISDN cards are like modems, but 5 times faster. They require special telephone lines, which cost a little (or a lot, depending on the phone company) more than normal phone lines.

E-learning

According to Brad Grimes 2002: http://www.cisco.com/global/ZA/solutions/ent/bussolutions/elhome.shtml, if wireless communication is still in its infancy, wireless e-learning is in an embryonic stage. Delivery of e-learning content to wireless handheld devices such as Internet-enabled cellular phones, personal digital assistants, and even mobile computers is ready to take corporations by storm The principal advantage of using a wireless device for e-learning is sheer convenience. With more and more workers on the go, access to a centrally lo-

cated knowledgebase is essential, and a wireless device makes such access possible virtually anywhere. Also, a wireless device can increase productivity by allowing employees to engage in learning at any time of the day or night.

Wireless e-learning makes perfect sense for the many taxi, bus and train commuters. These people can take assessment tests or perform exercises using handheld devices and then complete fully assembled courses when they reach their workbenches.

Benefits of e-Learning

- Employees can tap into a knowledgebase from almost anywhere. This results in increased productivity since information can be accessed from the most remote areas. Workers or learners can engage in e-learning at any time—while commuting, travelling, or waiting in line.

- Field learning can become a great success. Employees can learn on the job, wherever and whenever the information is most useful.

- As soon as they learn something new, learners can add to the knowledgebase right from the field.

According to Frankola 2001:14, people attending a lecture remember only 5% of what they heard. E-learning can do much better through stimulations, probing discussions and practising skills.

The e-learning industry is moving towards a future in which the most important product is not a course, but learning objects (small chunks of instruction that take about 15 to 20 minutes of study. They are easy to revise and update so learning becomes much more topical and relevant. Instructors can mix and match learning objects to create a course. E-learners can create their own courses by deciding which learning objects they need for learning a particular skill. As

learners take responsibility their learning, the traditional concept of the prescribed course should become less relevant, and with it, the drop out rate will also diminish. Engaging and satisfying the e-learner will continue to be crucial.

Artificial intelligence

Artificial intelligence refers to the possibility of programming computers to make decisions on the basis rejecting errors or fault finding. Whilst computers can perform operations faster than 2 trillion operations per second (Ray Kurzweil 2000: 54), they do not have sufficient conditioning for creating human-level intelligence. A computer that seems to be thinking and acting like a human would not be thinking but will simulate the process of thinking. Williams 1992: 389 describes artificial intelligence as computer programs that perform functions, often by imitation, usually associated with human reasoning and learning.

Bandwidth

Bandwidth is simply the size of the medium, which carries a message. It is terminology that is usually used in electronic communication. It refers to cabling or other such infrastructure that is used to transmit electrical impulses. As digital communication leans towards multimedia communication service providers will have to looks for ways in which to increase bandwidth. Currently, Telkom has used software to increase bandwidth. This means that the physical size of the medium did not increase but programmes were used to send more information through the same cabling.

Williams 1992: 389 states that the bandwidth is the width of an electronic transmission path or circuit in terms of the range or frequencies it can pass; a measure of the volume of communication traffic the channel can carry. A voice channel typically has a bandwidth of 4000 cycles per second per second; a TV channel requires about 6.5 million cycles per second.

Digital convergence

According to Mersham & Skinner 1999:213, digital convergence occurs when different kinds of media, codes and messages are encoded in one common digital form. Digital convergence has gained momentum in the recent past and is expected greater heights in the near future. All forms of communicating devices are being merged for greater utility. A common example is the cellular telephone, which can be used to send or receive voice mail, faxes, email and surf the Internet. It can also be used as a remote control unit to access other devices!

Encoding

According to Mersham & Skinner 1999:214, encoding is the process of transforming message ideas into observable sensory signs.

Extranet

According to Mersham & Skinner 1999:214, extranet is an electronic network that allows exclusive electronic communication between the organisation and its customers and suppliers.

Electronic mail (e-mail)

This includes the delivery of correspondence, including graphics by electronic means, usually the interconnection of computers, word processors and/or facsimile equipment. E-mail is an extremely fast method of sending messages via computers or other wireless application protocols any where in the world. Messages sent in this way can reach its destination within minutes. This process of delivery is very economical to use.

Electronic publishing

Electronic publishing deals with the distribution of print or graphics to the consumer electronically rather than on paper.

Virtual communities

Electronic virtual communities represent flexible, lively and practical adaptations to the real circumstances that confront persons seeking community. They are part of a range of innovative solutions to the drive for sociality – a drive that can be frequently thwarted by the geographical and cultural realities of cities increasingly structured according to the needs of powerful economic interests rather than in ways that encourage and facilitate habitation and social interaction in the urban context. Virtual communities are complex and ingenious strategies for survival.

Fibre optics

Fibre optics is glass strands that allow for the transmission of modulated light waves for communication. According to Fairhurst 2001: http://www.erg.abdn.ac.uk/users/gorry/ course /phy-pages/fibre.html, fibre optic cables propagate a signal as a pulse of light along a transparent medium.

A fibre optic cable is made from a glass or plastic core that carries light surrounded by glass cladding that (due to its lower refractive index) reflects "escaping" light back into the core, resulting in the light being guided along the fibre. The outside of the fibre is protected by cladding and may be further protected by additional layers of treated paper, poly vinyl coating or metal. This is required to protect the fibre from mechanical deformation and the ingress of water.

Fibre optic cables are increasingly replacing copper conductors as networking conductors because of their unique properties:

- Lower signal loss per unit distance (resulting in longer distances between repeaters)
- Higher Capacity (allowing operation at higher data rates)
- Smaller physical size (allowing more fibres in a duct or trunk)

- Immune to interference
- Provides electrical isolation between local and remote nodes

Fibre optic cables are also used to span larger distances, provide potential upgrade to higher data rates or to provide electrical isolation (e.g. when a cable must be laid between two buildings).

Hardware

According to Williams 1992: 392 hardware is the electrical and mechanical equipment used in telecommunications and computer systems.

Hypertext mark-up language (HTML)

HTML codes tell an Internet browser (such as Netscape Navigator or Microsoft Explorer) how to display a web document, but each browser will interpret the HTML commands in different ways and will therefore display the document in slightly different formats.

Information society

Williams 1992: 389 states that information society generally refers to our modern society in which knowledge; education, research, and uses of computers and telecommunications are a basis for economic growth.

Internet

The Internet is an international 'network of networks'. It allows millions of computers and other electronic devices of all kinds (cell-phones, portable computers, pages and video cameras) to communicate with each other via telephone lines and satellites around the world in an economical, easy to use way. The Internet is a single medium communication that can transmit and receive all existing media forms between one organisation and another, or between one individ-

ual and another, regardless of their geographical location. The Internet is sometimes referred to as the "Net".

The information age

According to Encarta 1998: compact disc, Scientists agree that we are in the midst of a new stage in the development of communication: the information age, also called the computer age. There is no clear-cut distinction between the age of mass media and the information age - the information age is the inevitable outcome of the new technologies of the second half of the twentieth century. The significance of the information age is that it has created 'information societies', societies that depend on their economic survival on immediate access to large amounts of information on a global scale.

Information technology

Computer technologies designed to facilitate the production and distribution across time and distance. These technologies include word-processing and e-mail programs, synchronous and asynchronous networks, World Wide Web publishing tools and browsers. Serving to connect people and information, it can be used to promote interactions and provide the technological structure for people to share information and ideas.

Medium

A medium is anything that is capable of storing or transmitting symbols, for example, the air (as in speech), paper, a telegraph wire, or the broadcast wave, often used generally to denote a type of communication, for example, print.

Multi-user dimension object orientated environment (MOO)

Multi-user dimension object orientated environment is an interactive, synchronous virtual environment that allows users to move around virtual "rooms/spaces and converse with other users who are

virtual users of that room. Unlike multi-user dimensions, which were games that dictate participants' paths and usages, MOOs are constantly changing arenas that allow users to create their own virtual spaces and to decide what will happen in those spaces. MOOs allow users to be creators of the environment, not simply participants in it.

Network

Williams 1992: 394 states that technically, network refers to the organisation of a communication system, such as the linking of the computers in an organisation; in-group communication, individuals who regularly share information; in broadcasting, a group or system of stations.

Online

The process of being connected to a network of computers for the purpose of electronic communication is referred to as being online.

Robotics

According to Williams 1992: 396 robotics is the use of electronic control techniques, as programmed on microprocessors, to operate mechanical sensing and guidance mechanisms in manufacturing and assembly process.

Satellite

Williams 1992: 396 defines a satellite in communications as a radio or television receiving and transmitting device orbiting the earth and capable of broadcasting signals over a wide area.

Software

Software is program instructions that direct a computer's operations. More generally, in communication, any program or content material for a communications system, for example, materials in an instructional technology centre.

Telecommunications

Williams 1992: 397 defines telecommunications as the circulation of messages over a wired, optical, or broadcast system.

Teleconference

According Williams 1992: 397 a teleconference is the visual sound, or text interconnection that allows individuals in two or more locations to see and talk to one another in a long distance arrangement.

World Wide Web (WWW)

The World Wide Web (also referred to as the Web) has emerged as the most popular way of using the Internet. It is a communication system, which connects individual web pages and maps out the pathways for browsers so that they can find the information they need. Information is located on various computers and servers around the world.

The psychology of learning and communicating

Learning is a form of cognition. I will focus on the relationship between cognition and learning. According to Williams 1992: 22 communication is the fundamental basis for human relations, and for this reason we cannot not communicate. Knowledge of how learners learn will make an important positive impact to the curriculum.

Communication

Williams 1992: 21-22 states that communication involves the exchange of meaningful symbols (massages) among sources and receivers via a medium. Most of our communication is transactional, that is, it can be seen as a dynamic process by which we exchange messages to satisfy our needs. Mayer 1999:97 explains that to communicate is more than to send and to receive, since two tape recorders do not really communicate when they play or record music. Communicators

need to do something nontrivial with the information they send and receive. We are entering a technological age in which we will be able to interact with the richness of living information; not merely in the passive way that we have become accustomed to using books and libraries, but as active participants in an ongoing process, bringing something to it through our interaction with it, and not simply receiving something from it by our connection to it.

A model of the bi-directional communication process

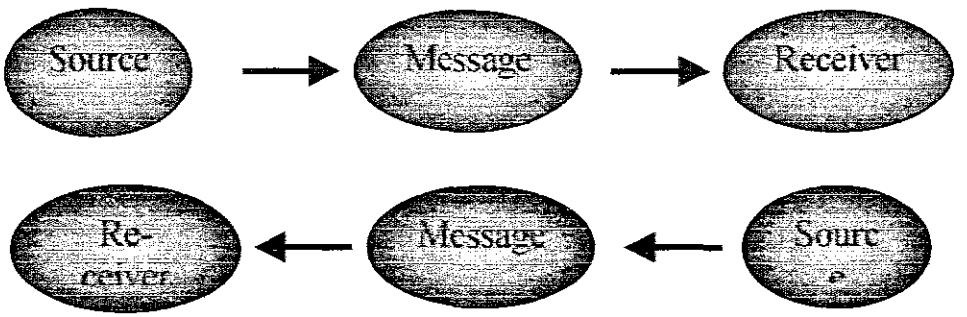

Figure 1: Communication as a Two-way Process

According to Williams 1992: 13 communication can be interactive and transactional. Figure 1 much more adequately fits situations where individuals are simultaneously playing the role of sender and receiver. The most effective interpersonal conversations are highly transactional. That is, both individuals participate equally in the exchange. The transactional quality of communication also extends to situations that do not necessarily involve two or more individuals, for example, a reader of a newspaper can write a letter to the editor, a viewer can call a TV station to complain about a program, or a listener can participate by telephone in a call-in radio show.

Communication Science

Communication Science is the systematic study of all forms of human communication. According to Mersham & Skinner 1999:2, "to communicate," means:

- To exchange thoughts, feelings and information

- To make known
- To make common
- To present something that somebody else understands.

There are basically five types of communication. These include

- Small-group communication
- Public communication
- Organisational communication
- Mass communication
- Electronic communication

The prototypical form of communication is small group communication where small groups of individuals in close proximity interacted with one another verbally or nonverbally. Verbal communication includes speech sounds and articulation. Nonverbal communication relate to kinesics aspect of communication such as facial expression and gestures.

According to Mersham & Skinner 1999: 131 public communication refers to a situation where a communicator, such as a public speaker, entertainer or lecturer, does most of the talking, while several dozen to several hundreds or thousands of people do most of the listening

Mersham & Skinner 1999: 148 states that organisational communication is usually described in levels, hierarchies and communication networks in the organisation. In most organisations members are arranged in some form of hierarchical structure. Levels of communication include

intrapersonal communication, interpersonal communication, small group communication and communication in the whole organisational.

Mass communication, according to Mersham & Skinner 1999:166, is defined as a process of delivering information, ideas and attitudes to a sizeable and diversified audience through a medium. The mass media may be defined as the technologies and social institutions (such as newspapers, radio, and television) that are involved in the production and distribution of messages to large audiences.

Electronic Communication refers to any form of communication that uses an electronic medium to convey or transmit the message.

Emotion

Guinness 1990: 84 states that emotions such as fear, love, hate, anger, elation, greed, lust, envy and shame have not one cause but several, beginning with the internal or external event that provokes them. Each conscious emotion is the result of a welter of signals travelling back and forth on nerve and brain pathways. The limbic system is the control centre for all this activity. This is made up of several interconnected structures that lie near the brain's core. In this strategic spot, where visceral feelings, cognition and memory meet, the limbic system helps to shape the basic motivations and emotions of our lives.

Knowledge

According to Stemberg 1998: 42, Kant identified two types of knowledge:

- *Posteriori knowledge* – this refers to empirically acquired experiential knowledge. Most of us learn after a few poor grades, for example, that last-minute cramming for exams is not the most effective way to study

- *Priori knowledge* – this refers to knowledge that exists regardless of whether or not an individual becomes aware of it through experience. A key example is our knowledge of time. We know a priori to link together our fleeting sensations over time into a seemingly continuous stream of experience.

Understanding evolves through both nature (innate concepts) and nurture (knowledge gained through experience).

Conclusion

I this chapter I provided a list of concepts that will clarify my discussions and arguments that I present in the various chapters. I discussed key elements of the communication process in electronic communication in an envisaged Communication Science curriculum for the Further Education and Training (FET) band of Curriculum 2005. I briefly discussed the revised national curriculum statement and the role of OBE in the classroom. In later chapters, I will illustrate how each of these concepts forms an essential part of a Communication Science curriculum.

In the next chapter I begin a discussion on Electronic Communication and its impact on society.

Chapter 4

ELECTRONIC COMMUNICATION

Preview

In this chapter I will provide an overview of electronic communication from an analogue stage to the current digital form of communication. I will explain how current forms of electronic Communications have not only changed the way we communicate but also facilitated changes in the way we work and live.

The dawn of mass communication

The development of print technology in the 15th century

In the mid-15th century, things began to change with the advent of the printing press. In 1452, Gutenberg conceived of the idea for movable type. In his workshop, he brought together the technologies of paper, oil-based ink and the winepress to print books. The printing press is not a single invention. It is the aggregation in one place, of technologies known for centuries before Gutenberg.

According to Brue 1997: http://communication.ucsd.edu/bjones/Books/printech.html, there is speculation that Gutenberg received credit for an invention that may have been developed simultaneously in Holland and in Prague. The other inventions brought together by Gutenberg in his pursuit of a printing press were:

- The adaptation for printing, of the wine or olive oil, screw-type press that had been in use for hundreds of years, throughout Europe and Asia.

- The adaptation of block-print technology - known in Europe since the return of Marco Polo from Asia at the end of the 13th century.

- The development of mass production papermaking techniques. Paper was brought from China to Italy in the 12th C. but was thought too flimsy for books.

- The development of oil-based inks. These had been around since the 10th century, but smeared on the vellum used to make books. The religious manuscripts used an egg-based tempura. This was unsuitable for printing with type.

Gutenberg's contribution to printing was the development of a punch and mould *system, which* allowed the mass production of the movable type used to reproduce a page of text. These letters would be put together in a type tray, which was then used to print a page of text. If a letter broke down, it could be replaced. When the printing of the copies of one page was finished, the type could be reused for the next page or the next book.

These technological improvements stretch across five centuries. They do not cluster around Gutenberg's time.

But the advent of the printing press did not bring about a great shift in the social organization of learning in Europe. The first books to show up in print shops were bibles and religious tracts. The next books to attract publishers were the "humanist" texts brought back from Byzantium by the Crusades, and other texts of antiquity but there was little or no printing of new ideas.

Many people went into the printing business and went right back out again. The reason was that the distribution of books was poorly organised. The market was there, and the potential for filling the demand, but the transport and control and "advertising" mechanisms were not in place.

In addition, there was still a low literacy rate in Europe. Most people did not know how to read at all. But non-literates were still affected by the book trade because books affected the elite, who controlled society. And people who could not read still had access to book culture because there were travelling raconteurs who stood in the market and read from books as a means of making a living as entertainers.

The situation was improved by the introduction of the Frankfurt Book Faire. Cities in Europe held yearly fairs, featuring whatever kinds of things the city and surrounding area was good at producing. (The county fair of today is the descendant of these early commerce fairs).

Frankfurt was an early centre for printing and so it sponsored a book fair, which drew publishers, booksellers, collectors, and scholars, who could find what they needed for their livelihoods. This helped co-ordinate supply and demand. The fair also produced a catalogue of all the works shown at the fair - an early *Books in Print.* None of this is to say that new book printing posed much of a challenge to the power and prestige of the church. Early print books were conservative in content, and were filled with medieval images and ideas.

Electricity and telegraphic communication in the 19th century

Steinberg 1999: 176 states that scientific discoveries and technological inventions during the nineteenth century (such as electricity and the telegraph), laid the foundations that would eventually lead to mass electronic media.

The discovery of the fax machine preceded that of the telephone. The full name of the fax machine is the "telefacsimile" machine. A facsimile is "an exact copy". A fax machine reads an image from paper, then sends the image over a telephone line, where another fax machine receives it and prints out a copy. The full name of the fax machine is the "telefacsimile" machine. A facsimile is "an exact copy". A fax machine reads an image from paper, then sends the image over a telephone line, where another fax machine receives it and prints out a copy.

Although the transmission of images using telephone lines did not become common practice until the late 1980's, the basic technology for doing so dates back to the nineteenth century. In 1843 in England, Alexander Bain (1818-1903) invented an early fax machine. His invention had two pens that were connected to two pendulums. The pendulums were joined to a wire, which could reproduce writing on an electrically conductive surface.

In 1862, the Italian physicist Giovanni Caselli built a machine he called a "pan telegraph" (the word is a combination of "pantograph", a tool that copies drawing, and "telegraph", a machine that sends messages over a wire.) His machine was based on Bain's invention, but also included a "synchronising apparatus" to help two machines work together. His pan telegraph was used by the French Post & Telegraph agency between Paris and Marseilles from 1856 to 1870.

In 1934, the Associated Press news agency introduced the first system for transmitting "wire photos," so news reporters could send photographs from place to place. Thirty years later, in 1964, the Xerox Corporation introduced Long Distance Xerography (LDX).

For many years, facsimile machines were big, expensive and difficult to operate. In 1966 Xerox introduced the Magnafax Telecopier, a smaller, lighter facsimile machine that was easier to use and could be connected to any telephone line.

Using this machine, a letter-sized document took about six minutes to transmit. The process was slow, but was a major technological step forward. In the late 1970s, Japanese companies entered the market, and soon a new generation of faster, smaller and more efficient fax machines became available.

Towards the end of the nineteenth century people were able to send telegrams and cables, and talk to each other on the telephone. It is important to note that the advent of electricity created

the 'wired world' and, for the first time in history, it became possible to separate communication and transportation. Until then, the medium, which carried the information, had to be physically transported from one place to another.

Books and newspapers had to be physically transported from place to place in much the same way as clay tablets in ancient times. Information travelled only as fast as the messenger who carried it. With the invention of the telegraph and the telephone, information could be transmitted rather than transported. Communication over vast distances was no longer dependent on the available means of transportation. The effects of this 'revolution' are still in evidence today. The fax machine, for example, can transmit a letter speedily without the need for mail delivery. According to Heyer and Crowley 1994: 116, it is also important to note that, while the telegraph facilitated the sending of information that could be collected at a distance for later use, the telephone was an immediately interactive medium. In other words, there was no longer a time delay between the transmission of information and its reception by the person to whom it was addressed.

The invention of radio at the end of the 19th century

Steinberg 1999: 177 states that towards the close of the nineteenth century Marconi invented the first 'wireless telegraph' which permitted signals to be transmitted without the use of electric wires. Technological inventions and public interest in the possibilities of using radio for commercial purposes followed, and by 1912 the first licensed radio station transmitting news and music was operating in California. After the end of the First World War the idea of using radio to broadcast messages to large audiences emerged, and by 1928 a number of commercial networks were operating across the United States of America.

The British Broadcasting Corporation was established in 1922 and similar developments took place in other industrialised countries. By the 1930s radio achieved a central position as a mass

medium providing news and entertainment to an increasing number of audiences. During the Second World War radio was the primary means for keeping people informed on the progress of the war.

The invention of film in the latter half of the 19th century

Even the most dramatic and hectic scenes in any present-day movie consist of a series of well-selected still photographs. This effect is known as persistence of vision. According to Krystek 1996: http://www.unmuseum.org/stopact.htm, motion pictures are usually projected at 24 frames a second and video at 30 frames a second.

According to Steinberg 1999: 178-9 the invention of photography and developments in optics and chemistry in the late nineteenth century made it possible to record images on film. By the early twentieth century the movie camera and projector were available and motion pictures became an important means of providing entertainment.

The golden age of film in the United States was from 1930 to the late 1940s during which time thousands of films were made. The content of most of these films was sufficiently bland to provide excellent and inexpensive family entertainment, especially during the Depression. While the majority of films still seek to amuse or entertain by providing diversion and entertainment, films are socially significant in other ways. For example, many documentaries seek to educate people and most propaganda films have a persuasive influence. The majority of films reflect the society that produces them and thereby enrich our cultural experiences as well.

Any movie is made up of individual frames. The smooth transition between the many frames creates an illusion of motion.

Botha (1997), reported in Steinberg (1999), argues that, while film is an important part of any country's culture, this is particularly true in a country like South Africa, where film can make an important contribution to the democratisation and development that need to take place. For example, a film such as Taxi to Soweto explores some of the changes taking place in South African society in a humorous way that nevertheless helps people to make sense of what is happening around them. However, in the past, apartheid policy and ineffective subsidy structures contributed to the fragmentation of the South African film industry so that, for most of its history, it has reflected apartheid ideology and ignored socio-political turmoil as well as the realities experienced by black South Africans.

The invention of television early in the 20th century

Steinberg 1999: 179-180 states that developments in film and radio prompted attempts to transmit images and sound over the air, and so television was born. Television was demonstrated in London in 1926 and, as early as 1936, the British Broadcasting Corporation offered a regular daily broadcast. In the United States, television began operating in 1940. However, its growth was halted by the outbreak of the Second World War, and it was not until the 1950s that development started again. The expansion of television was rapid. For example, in 1950, there were only about one million television sets in American homes. Within ten years their number rose to about sixty million, while less than twenty years later television was being used in approximately 90 per cent of American homes. In most societies, even though it may be primarily used for entertainment and information (for example news and discussion programmes), television is also part of the culture of the society.

The mass media are so deeply embedded in modern society that we cannot imagine life without them. Not only would we be deprived of the source of much of our entertainment, but also the incredible flow of information that we accept as 'natural' would not be available. A significant social outcome of developments in the mass media is that the increase in the speed of commu-

nication and the increase in the volume (amount) of communication and information brought about changes that created the information society. Equally significant is what Fang 1997:138 describes as the creation of the *"Communication Toolshed Home"* which has transformed the average person's home into the central location for receiving information and entertainment. The Communication Toolshed Home is equipped with 'tools' such as radio, television, video cassette recorders (VCRs), compact discs (CDs), newspapers, books, magazines, fax machines and computers, all of which perform a variety of communication functions that make it unnecessary to leave the home in order to obtain entertainment and information.

Digital communication in the new information revolution

Marchant 1988: 53 describes communication as a process in which a source makes data available to a recipient by means of a channel, signs and symbols with the intention of letting the recipient process the data into information with a meaning intended by the source. The process entails sharing, through which understanding develops. Without the elements of information and response, communication is incomplete. Therefore, the key factor is participation— accepting or rejecting information. It is feedback, which provides ideas leading to the modification of the original input and result in positive action.

Marchant 1988: 51 stated more than a decade ago that the electronic revolution in communications is transforming the quality of life beyond all historical precedents of cultural change. Mankind is experiencing a new informational upheaval. The resulting socio-economic impact leads to inequalities as the gap between the information-poor and the information-rich widens. It is important that communication analysts and decision makers are conversant with the key concepts and models of communication relevant to their fields.

He further states that Communication Science has only recently emerged as an academic discipline. In the past the main concern of communication research was the investigation of effects,

that is, of the changes in an individual's behaviour, which occur as a result of the transmission of a message. The concept "interactivity,"—the result of the new communication technologies—has resulted in an epistemological approach to communication science.

The new information revolution has been the focus of much discussion, mainly from the point of view of the developed world. The crux of the matter is that a society's communication facilities are among its most important resources. As development proceeds, the goals of communication programmes, and of the system, change. Indeed, the only certainty in life today is change.

The coming of the information age

Graham 1988: 8 says the way we communicate with each other now is the result of research and developments in computer technology, microelectronics and space research in the last 25 years. During that time, the transistor has replaced the radio valve and, in turn, the transistor was replaced by the integrated circuit or silicon chip. As 'chip' manufacturing technology has improved, more and more individual electronic components have been packed into the same size of chip. The latest chips contain the equivalent of several rooms full of valve-based equipment.

Advances in space research enable messages to be relayed round the world by satellite. The earth is now encircled by dozens of satellites that provide invaluable information-gathering and communications services to weather forecasters, geologists, telephone companies, television broadcasters and many others. Research and development in laser technology is continually producing new uses for lasers, especially in communications and information storage.

According to Steinberg 1999: 180-1 scientists agree that we are in the midst of a new stage in the development of communication: the *information age*, also called the computer age. There is no clear-cut distinction between the age of mass media and the information age — the information age is the inevitable outcome of the new technologies of the second half of the twentieth cen-

tury. The significance of the information age is that it has created 'information societies', societies that depend for their economic survival on immediate access to large amounts of information on a global scale.

We can trace the beginnings of global communication—the worldwide network of communication—to the introduction of the computer and satellite technology after the Second World War. Most of the satellites are used for broadcast services—that is, television and radio signals are sent up to the satellite and are then relayed to different stations all over the world. Important news events happening in one country can be broadcast around the world via satellite as they are happening and are seen simultaneously by millions of people in many countries.

While the invention of the printing press made possible the sharing of large amounts of information on a massive scale, computer technology has made this process even more efficient. According to Steinberg 1999: 181 computers are basically machines capable of processing and storing information. Originally used in large organisations to perform complicated mathematical calculations and to aid administration, they are used today in industry, medical research, the military, and the exploration of outer space, to name but a few examples. Computers are the basis of the Internet, the worldwide network that carries information and entertainment along what has become known as the *Information Highway*. Fang 1997, remarks that while scientists are yet to find a satisfactory definition of the Internet, it is not difficult to explain how it works. A person using a computer connected via a telephone to another computer anywhere in the world can send and receive large amounts of information on almost any imaginable topic along the Information Highway. Being connected to the Internet allows you to find out, for instance, the latest cricket score in a match being played in Australia, what courses are offered at Unisa, stock exchange prices in New York, or weather conditions in Paris.

In contrast to the thousands of years that elapsed between the development of speech and language, writing, and finally print, the most remarkable achievement of the twentieth century has been the speed with which communication developments have occurred. However, today's media still perform the same functions as the clay tablets and hieroglyphics of centuries ago — they move information across time and space. The difference is that information reaches unlimited numbers of people over vast distances at breathtaking speeds using incredibly sophisticated technology.

We are literally drowning in information. We find ourselves awash in a vast ocean of data, from the Internet, non-stop cable TV news, e-mail, voice-mail, faxes, pagers with stock quotes, cellular phones and an explosion of newspapers, magazines and books.

Data glut has become a serious issue in our workplaces, where the average worker spends more than half his or her day processing documents. Office workers can spend hours reading and answering e-mail, not to mention voice-mail, faxes, etc. At first a blessing, e-mail has become a curse to those whose in-boxes that are deluged daily with "junk mail"(spam) and other information that, previously, would have been too cumbersome or time-consuming to deliver in the old mediums.

It is common for people to continually desire more and more information, but they make the mistake of confusing information with knowledge. Information overload fuels stress and promote faulty thinking. The data glut we all slog through every day at work reduces our attention span.

It is an uncontroversial fact that people in urban environments are subject to all kinds of information overload. In the next section I will outline how this happened.

Innovations in digital communication

Smart cards

According to Mersham & Skinner 2001:186 (a), soon it will be technically possible to function in a cashless society. By December 2004, the account details of a great many South African bank customers will be stored on tiny computer chips embedded in smart cards. A smart card can be described as an electronic wallet that will store your debit card, credit card and petrol card, and will even have an e-purse facility that allows for day-to-day purchases such as bread and milk.

The smart card will have an electronic ticket facility that will enable you to download movie or theatre tickets onto your card via your cell phone. New generation cell phones allow you to insert your card into the smart card slot. You then phone the ticket service, pay for your booking via your cell phone, and download the electronic ticket onto your smart card. When you get to the movies or theatre, you gain entry with your smart card.

Your smart card will also be able to accommodate loyalty applications. Instead of issuing membership cards, chain stores or airlines will simply load your loyalty points onto your smart card. In addition, your smart card can also contain your ID card, driver's license and medical history.

Whether you hold a Visa, Master- or any other kind of smart card will not matter. All ATM machines and all card-readers will be able to read the chip. ATMs will still be able to read magnetic stripe cards as well. In future, when an ATM machine or card-reader needs to be replaced, a smart card-friendly device will be installed. And since the card will comply with an international standard, you will be able to use it anywhere in the world.

Mersham & Skinner 2001: 187 (a) adds that the changeover to smart cards is a worldwide initiative with the international deadline set for December 2005. For years South Africa's migration from magnetic stripe bank cards to smart cards has been delayed by disagreements between the banks over which standards to follow. All banks will adopt the international EMV smart card

standard, which facilitates a smooth migration from older magnetic stripe cards to smart cards which contain electronic chip technology.

Worldwide, the cost of fraud has stimulated migration to smart cards. Countries with a high fraud rate such as the United Kingdom and South Africa are spearheading the EMV project. Smart cards will greatly reduce the losses banks incur through fraud and the handling of cash. South African banks lose around R1 -billion a year in cash handling and losses through theft and robbery.

Smart cards will greatly reduce fraud since the customer is authenticated by means of a personal identification number (PIN) instead of just a signature. Customers' signatures appear on the back of credit cards and are easy to copy. And most cashiers don't check anyway. In addition, the PIN will make on-line purchases more secure. Miniature smart card readers plug into your PC. With the smart card you no longer have to release your credit card details into cyberspace. Inserting your card into the smart card reader and entering your PIN automatically authenticate you as the authorised user.

The other great advantage of a smart card is that the chip will enable it to perform multiple functions without a telephone link to the bank's computer system for authorisation of transactions. No more waiting in long queues because 'the lines are down'.

Digital signatures

In June 2000, the President of the United States signed a very prominent bill into law: the E-signatures Bill. This bill effectively gave binding legal status to an electronic signature and equality with one that has been signed with pen, notarised or commissioned by a Commissioner of Oaths.

This was the first step in a process that will eventually revolutionise many aspects of business transactions. Firstly, it will give consumers additional confidence that they can securely transact on the Internet, therefore, boosting e-commerce. Secondly, and perhaps more importantly, it opens the way towards the possible completion of all forms of contract within digital, web-based technology.

Mersham & Skinner 2001: 187 (a) identify four interrelated issues can be identified when looking at e-commerce, namely security authentication, non-repudiation and privacy.

- In the case of *security*, very simply, you want to know that the transaction cannot be tampered with, for example that someone cannot erase or add a zero to make the value ten thousand instead of the original one thousand.

- *Authentication* refers to the proper identification of the parties involved and the assurance that the money (or more correctly the exchange of value) goes to the place for which it is intended.

- Non-repudiation refers to the requirement that the transaction is not going to be reversed (repudiated) at a later date.

- With regard to the question of privacy, you do not want the details of the transaction and your personal details to be leaked to anyone apart from the party with whom you are transacting.

The B-signatures bill focuses on authentication and non-repudiation. Essentially, what it says is that if a person receives a transaction that has been digitally signed by another person, it is as valid as any paper contract.

In many ways the process can be likened to signing a cheque. The technology makes use of what is called a public key and private key infrastructure to ensure that your digital signature is secure.

There are two keys for every transaction. You will lock a transaction with what is called a private key. You will give another key, which opens that transaction to the rest of the world. Unless those two keys meet exactly, you cannot access that transaction. It's quite possible that someone might steal, for example, your computer, but there are two ways of securing this. Firstly, there is the personal password, much the same as you have for your credit card or your ATM transaction. Secondly, authentication agencies or certification agencies will take your digital certificate every couple of months, and authenticate that it is indeed from you.

According to Mersham & Skinner 2001:188 (a) a password is a code or word used to gain access to a computer system. While passwords provide security against unauthorised users, the security system can only confirm that the password is legitimate, not whether the user is authorised to use the password. The same goes for smart cards that are inserted into the computer. However, new technologies include voice, palm, fingerprint and iris recognition devices. 'Voice prints' and 'eye prints', much like fingerprints and palm prints, are virtually impossible to replicate.

In the future, for example, we will have biometric authentication where the device will scan your iris, voice, palm and fingerprint, and encrypt this information in a digital fashion in order to verify your identity.

To make e-commerce viable in South Africa, all the banks need to agree on a common standard. We will then reach a point where you activate a transaction by inserting a smart card into your computer, personal communicator or any other digital device that allows you to exchange units of value via the Internet or any other network.

This can be done now on a limited scale in South Africa, but one can deal only with companies which have signed up with certification agencies, and which have the ready software. One of the key problems at the moment is that not all governments worldwide have adopted the same policy. In South Africa, we ate in a critical phase, where the Department of Communications is overseeing an e-commerce debate on the matter. A Green Paper was released in November 2000, but critics charge that government has given insufficient attention to infrastructure and transaction security issues.

The multilingual Web

Mersham & Skinner 189: 2001: 189 (a) states that the Internet has rapidly expanded to cover the globe, but the vast majority of Internet websites are in English. This is acceptable in countries where English is commonly used or widely understood. To address these needs, the Web is becoming increasingly multilingual. For example, there are more than one million Thai Internet users, 60 per cent of who are domestic. The remainder are Thai nationals living or travelling abroad.

Where business is transacted transnationally, whether it is B2B (business to business) or B2C (business to consumer), individual multilingual websites are needed. For example, it is estimated that by 2004, 50 per cent of all on-line sales in the US will originate outside the country. For this reason, it's vital that customers are offered the same services such as product data sheets and technical FAQs (Frequently Asked Questions) in their own languages. These services enable support costs to be lowered and brand loyalty to be more fully developed.

Mersham & Skinner 190: 2001 (a), add that some companies already offer alternative versions of their websites in different languages. For example Euronews, a free-to-air -satellite -television channel currently available to Europe, North and South America and Africa, has a website (euronews.net) that provides options for the user to access its news updates in Italian, Spanish,

Portuguese, French and English. However, the cost of creating and hosting multiple language sites at present is beyond the reach of smaller businesses.

Nevertheless, globalisation software and services will soon become widely available. Global site infrastructure will include a set of applications that can be customised for any user in any country. So, for example, a user will choose a language in which he or she wishes to interact from several hundred languages and dialects listed on the site. Successful trials, using the written word, have been conducted between two participants, one speaking German and the other French. The participants were able to engage in a conversation, although neither of them understood the other language. Each response was immediately translated into the language of the respective user. Future developments include interactive voice recognition software that will allow for a spoken interaction that functions in the same way. A Japanese person, speaking Japanese, will he heard by a Zulu-speaking person in Zulu, and vice versa.

Web publishing versus print publishing

History has shown that one new medium never completely replaces an earlier form. TV did not replace radio and the Internet will not replace the print medium. The emerging pattern is for one medium to become complementary to another.

However, web publishers also have the advantage of knowing exactly what their communities have read or are reading at any one time. Using this knowledge scientifically, they can determine the content in which their communities are interested, and plan and source material accordingly. This is in contrast to traditional print editors who decide on coverage of stories based on a 'gut' feel. They will never accurately know for example, how many people actually read their front-page lead stories.

Marketing and promoting a website

A key requirement in launching a web-based product or service is the efficient use of the traditional marketing mix to market and promote the site. Mersham & Skinner 192: 2001(a) state that if you wish to communicate to people about a need you can fulfil, you must do so in the medium in which they expect to encounter your product or service, or where there are natural synergies. So, publication in magazines, either hard print or eZine format, claiming to reach the Internet enthusiast had no discernible effect. Someone looking for tax advice is not going to look for it in a magazine about websites, but rather in a magazine or newspaper section that specialises in personal finance. Alternatively, he or she will do an on-line search.

The point about website promotion is to follow natural synergies and familiar associations. Typically, countless T-shirts, mouse pads and billboards have been emblazoned with website addresses, disconnected from recipients' media habits and preferences.

A focused approach is used by several California wineries, which advertise their websites on their corks and on the backs of bottle labels. The Internet provides a perfect vehicle to complete the marketing plan, because it allows the easy exchange of information between consumers and producers. While quality is important in the wine business, information is even more valuable: knowing where to purchase cases of a particular wine or find out about a vineyard's best year can turn a one-nine taster into a lifetime customer.

Interactive television — a view of the future

According to Mersham & Skinner 2001: 193(a) television, as we know it, is the most popular medium of mass communication used for entertainment and education. In recent years there has been a move towards enhanced television — where the viewer of TV is much more involved in the communication process. These advances are turning TV into a new exciting medium of the future.

This technological move sees the TV, Internet and PC converge into a new 'interactive TV'. You can use your TV instead of a PC for the Internet and simple computing functions. Many people would be more comfortable sitting in front of the TV screen than in front of their PC monitor. Advertisers like the idea because interactive, web-enabled television allows consumers to make a purchase instantly, without having to move out of their seat.

Interactive elements such as on-screen links, interactive panels and displays during TV shows and TV commercials, as well as the expected full-screen access to the Internet, are soon to grace your TV screen. We will soon see digital video recorder functions and digital video discs (DVDs) replacing the familiar videotape and the video tape recorder (VCR).

DStv (Digital Satellite Television) is Multichoice's package of pay channels that subscribers receive via satellite. DStv offers 45 video channels, six data channels and 51 audio channels (radio and music channels) on its satellite service. DStv reaches across Africa, with subscribers exceeding 500 000. Apart from other interests, Multichoice Africa has direct investments in or franchises for television platforms in South Africa, Botswana, Ghana, Kenya, Lesotho, Malawi, Mauritius, Namibia, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe (MThIH 2000).

DStv first introduced its range of interactive channels at the end of 1999. The new data or information channels allow the viewer to find out the weather forecast, access financial information, do electronic banking, play games on TV with the remote control, access intellectual puzzles and teasers, get daily horoscopes, obtain 'as it happens' news, sports and business updates, and monitor 16 channels simultaneously on the screen. Further interactive developments, such as allowing viewers to select the camera-view at sporting events and pay-per-view on demand of any programme, will characterise the future.

Music, youth and the digital revolution

Mersham & Skinner 2001: 194(a) state that empowered by Internet technology, music-loving youth have for several years been obtaining and sharing their favourite recordings for free.

Utilising digital formats like MP3 sound files and music-swapping Internet sites, young Net-savvy surfers have forced the recording industry to reassess the value of the media that they have long relied on, such as CDs and for-sale music videos. Already more than 11 million Americans have downloaded music free over the Internet, with no regard for copyright. This revolution could eventually consign music CDs to history's bargain basement bin, along with vinyl albums, cassettes and eight-track tapes.

Consumer responses and needs

Mersham & Skinner 2001: 196(a) state that consumers are paying the highest prices in history for music CDs at a time when the relative cost of production is lower than ever before. Quite obviously consumers will feel they are paying too much for a product that can he acquired at much lower cost through the Internet. If the digital content of CDs was universally available on-line at half the cost of the physical product, the only losers would he the many retail music stores, packagers and distributors (intermediaries) who contribute more than half the cost of a typical CD.

Ultimately, this is the heart of the digital download issue from the consumer's point of view, even if the industry legitimately sees it as a copyright issue. The danger to the industry in this discontinuity is that it sets up an adversarial relationship between record companies and their most important customers. Little sympathy will be forthcoming from its customers as it goes to war against its enemies — who have positioned themselves as friends of the consumer. The primary intention of Napster was to allow the user to make copies and compilations of his or her own choice. This remains one of the real consumer needs that must be addressed by the

industry. Taking a longer view, Napster has perhaps done the music industry a favour. It provided the opportunity for millions of people to begin to download music digitally. In the long term, digital downloads could be far more profitable for record labels than traditional CD sales.

Popular culture media sits on the edge of the intellectual property abyss. New software capable of copyright violation is constantly emerging. For example, Internet relay chat (commonly called IRC, or 'chat lines') forms part of an immensely popular youth culture and might soon be extended with enhanced features for file sharing. In other words, Napster might be shut down, but it will not dose the file flow in what is the world's largest open system of communication. According to Mersham & Skinner 2001:175(a), the communication landscape has changed dramatically in the last decade. The convergence of information technology, communications and commerce has meant that professions previously unrelated have had to accommodate a broader point of view and collectively understand the processes and concepts of information technology; communications and business. For example, information technologists are challenged to understand the human interface and the dynamics of human communication more than ever before.

Marketers, advertising practitioners, public relations practitioners and corporate communicators require an understanding of the new technologies of the Internet, web page design and function, and intranets, as well as the processes and strategies of business. What we are seeing is not just the well-known convergence of technologies into a single digital platform, but also the convergence of careers, professions and jobs.

Professionals in individual professions can no longer operate simply within the confines of their traditional roles. But many people feel isolated or incompetent in new modes of expression — and the result is that they sometimes fail to communicate effectively. In this Digital Age new concepts and ideas flood into our vocabulary on a daily basis. Old words take on new meanings.

The issue is further complicated because members of an organisation may use similar language to mean different things. Each profession, for example, would interpret the meaning of everyday words such as 'clients', 'programming', 'transactions' and 'channels' in different ways. Similarly, criteria for success across these industries vary dramatically:

Information technology is measured on lines of code or bugs per line of code; business is measured on return on investment, while marketing is measured on response rates or leads generated. These differences in modes of expression are challenges for the new business approach that employs interdisciplinary team structures.

The need for chief executive officers (CEOs) to behave like chief information officers (GIGs) accelerates and intensifies in relation to the need for the coordination of diverse technical and creative talents. To achieve results in business today, organisations have to go beyond any single expertise or philosophy, and integrate multiskilling with management and communication skills. Organisational teams will know they have achieved this when, for example, the information technologist can hold an intelligent conversation about brand value and market penetration, and the marketing practitioner can talk about the advantages of digital certificates over password protection. Organisational teams face the challenge of cross-pollinated concepts, disciplines, discourses, terminologies and jargon.

Going to the movies — on the Internet

It has been called 'the ultimate horror movie' for Hollywood executives —millions of people watching the latest movies for free. Following the impact of the Internet on the music industry, it was not long before full-length movies could be sent over the Web. More than 5 000 films already issued on a DVD can now be copied and sent on-line. And thanks to advanced digital video recorders and a cadre of enthusiasts, even current movies can be on the Net within 48 hours of screening in the cinemas. Pirates copy first-run movies from projectionists' booths,

using a digital video camera on a tripod and taking audio directly from the projector. Mersham & Skinner 2001: 197(a) state that these copies that are only a fraction below DVD quality, *are* then distributed over the Internet.

Hollywood is now facing the same issues plaguing the music industry — and much sooner than expected. Now that so many people have adopted digital downloading, the adoption curve has become exponential. Movie industry executives are watching the case of the music recording industry, which, as a consortium, is suing Internet companies that make software-allowing users to swap digital music files.

The Internet and video

The integration of video into websites is a common practice, with live webcams proliferating and video-conferencing becoming a common corporate activity. New developments in digital tools allow the broadcast, recording, editing and publishing of any on-screen video. While largely a tool for trainers, video allows instructors to export existing information rather than having to create learning content.

Employing a screen camcorder and video production tool, exact copies of on-screen activity can be recorded and formatted into the most common Internet video formats such as AVI video files, Microsoft Windows Media Player files or Real Networks Real Player G2 files. Alternatively, live output can be captured and sent over the Internet in real time.

Specific areas in a video screen area can be highlighted, in the form of graphic shapes and images, through the use of 'floating annotations'. Objects can be dragged, dropped and repositioned on the computer's screen. For identification of source, each video can be digitally 'watermarked'.

Technology and business services integration

Mersham & Skinner: 197(a) state that a new buzz phrase, 'e-business landlord', describes a new category of e-business service provider. Hub service providers (HSPs) offer both the technology and business services needed to make business-to-business sites function. In the allusion to the 'bricks and mortar' landlord—tenant relationship, a landlord makes partnerships that benefit all the tenants. Some of these are technological and some non-technological.

On the technology side, landlords provide tenants with network infrastructure, data storage, e-commerce software and systems integration. Landlords go into partnerships with other providers to offer these services, and their size allows them to strike favourable deals. Customers (tenants) reap the benefits of having all these services in one place.

Mersham & Skinner 2001:198(a) states that on the business side, landlords offer financial and logistics services; they may even help arrange joint ventures among their tenants. Tenants include traditional companies, large and small, as well as e-marketplace start-ups and other dot-coms. Landlords come from the ranks of procurement software vendors and infrastructure providers; big companies that have a lot of purchasing power and a well-known brand name also get into the act. For example, McDonald's, famous for its hamburgers, has registered McDonalds.com in anticipation of a whole range of non-food goods and service offerings in the future.

Interactive advertising

Mersham & Skinner 2001:198(a) states that advertising agencies have seized upon Internet technology as an exciting new opportunity and have sought to position themselves as strongly in digital interactive advertising as in traditional advertising. They have approached this not as an extension of existing businesses, but as a new investment in specialist businesses. That repre-

sents recognition of a particular set of skills, and a guarding of the creative uniqueness of this industry.

Unfortunately, the new media bring with them not just new tools and creative freedom, but a new way of doing business that flies in the face of the advertising industry's basic premises. Some of these are the following:

- Traditional advertising uses very large budgets to produce clever, often flashy TV and print advertisements, and hardly concerns itself with whether or not these exercises actually sell more products.

- Measurement of the effects of advertisements (to the extent that they are measured) is always based on a statistical sample, which at best can suggest a trend, but never give total, inclusive feedback.

- Traditional advertising speaks in one voice, to everyone, at the same time.

- Worldwide, the level of cynicism and disillusionment with the messages presented by advertisements is rising exponentially. We are often persuaded by a advertisements to switch brands.

- Traditional media advertisements, much of the time, do not initiate action. They either 'grab attention' or they don't. Paper and television are not interactive (although the latter soon will be in South Africa). We have developed defence mechanisms by fast-forwarding, channel hopping, turning the page, and ignoring and avoiding a great deal of advertising.

- As an industry, advertising is fat. Budgets are huge, everything seems to require 50 people to meet over lunch, and no creative idea is too excessive for selling, for example, fla-

voured water, or convincing consumers that inefficient monopoly industry leaders like the post office and Telkom are worthwhile.

- Advertising is an industry in decline. Unlike new media, which are just coming to life, advertising in the traditional sense has in many ways run its course.

The Internet and public relations

Mersham & Skinner 2001:202(a) state that many decision-makers and executives in South African business, along with others around the world, are using the Internet as their news and information resource, even though the communication may not reach mass audiences.

In terms of public relations practice, the Internet cannot be seen as a tool in isolation. It should form part of the holistic campaign to communicate with an organisation's Participants. It has an important place in the public relations practitioner's media plan and in the marketing mix.

The technology offers the ability to track and trace transactions, build portfolios of customers and in turn tailor communication campaigns specifically for the various participants of a public relations programme.

Increasingly journalists regard the web pages of an organisation as a vital source of information. In addition to providing access to valid information, a well designed and fully functional website 'press room' can save the company money provided the target markets have been conditioned to visit the site. For example, in the US, the on-line 'news bureaux' of General Motors, Ford, Nissan and Bell Atlantic have slashed the costs of distributing and printing paper-based media kits and brochures.

All four companies claim to be sending out fewer press kits and receiving fewer phone enquiries as a result of efforts to divert media from the phone to the Web. They say their sites are slashing the high cost of public relations by providing the most requested information —. News releases,

new product information, media kits, executive biographies, digitised photos, contact names and numbers, executive speeches and regulatory filings — on-line, in one easy-to-access area.

American telecommunications company Bell Atlantic cut distribution of its printed press kits by 50 per cent by posting a digital version on its website. General Motors also saved considerably when, after post-publication specification changes to one of its cars meant corrections to 100 different pages of its media kit, it simply updated its on-line version. Ford claims to have had over 900 photo downloads during the first year its site went live.

However, many companies allow their websites to fall out of date. Therefore, public relations consultancies should cooperate with the Webmaster or web-mistress to ensure that (a) the web-site is up to date at all times, and (b) all media releases are immediately added to the virtual pressroom.

Although the South African market is much smaller, the same principles apply the key to effective cyber-public relations is getting journalists to use the site. For every media call, the standard reply should be: 'Have you been to the website yet?' — while ensuring it is up to date.

But websites are only half of the Internet. The other half is e-mail and the possibilities it opens up for public relations practitioners as a means of communicating media releases and delivering media kits.

The semantic web

Knowledge interpretation

Most of the web's content today is designed for humans to read, not for computer programs to manipulate meaningfully. Computers can describe web pages for layout and routine processing but in general, computers have no reliable way to process the semantics (meaning in language).

The semantic web is aimed at bring structure to the meaningful content of web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users. It will be able to do all this without needing artificial intelligence.

According to Berners-Lee et al, http://www.sciam.com/2001/0501issue/0501berners-lee.html#author, The semantic web is not a separate web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation. The first steps in weaving the semantic web into the structure of the existing web are already under way. In the near future, these developments will usher in significant new functionality, as machines become much better able to process and interpret (understand) the data that they merely display at present.

The essential property of the World Wide Web is its universality. The power of a hypertext link is that *"anything can link to anything."* Web technology, therefore, must not discriminate between the scribbled draft and the polished performance, between commercial and academic information, or among cultures, languages, and media and so on. Information varies along many axes. One of these is the difference between information produced primarily for human consumption and that produced mainly for machines. At one end of the scale we have everything from the five-second TV commercial to poetry. At the other end we have databases, programs and sensor output. To date, the Web has developed most rapidly as a medium of documents for people rather than for data and information that can be processed automatically. The semantic web aims to make up for this.

Like the Internet, the semantic web will be as decentralized as possible. Such web-like systems generate a lot of excitement at every level, from major corporations to individual users, and provide benefits that are hard or impossible to predict in advance.

Knowledge representation

For the semantic web to function computers must have access to structured collections of information and sets of inference rules that they can use to conduct automated reasoning.

Adding logic to the web, essentially the means to use rules to make inferences, choose courses of action and answer questions, is the task before the semantic web community at the moment.

Two important technologies for developing the semantic web are already in place: eXtensible Markup Language (XML) and the Resource Description Framework (RDF). XML lets everyone create their own tags—hidden labels such as <zip code> or <alma mater> that annotate Web pages or sections of text on a page.

XML allows users to add arbitrary structure to their documents but says nothing about what the structures mean. Meaning is expressed by RDF, which encodes it

The real power of the semantic web will be realized when people create many programs that collect Web content from diverse sources, process the information and exchange the results with other programs. The effectiveness of such software agents will increase exponentially as more machine-readable Web content and automated services (including other agents) become available. The semantic web promotes this synergy: even agents that were not expressly designed to work together can transfer data among themselves when the data come with semantics.

Properly designed, the semantic web can assist the evolution of human knowledge as a whole.

A revolution in the office

Mersham & Skinner 2001a: 204 believe that one of the problems with mobile office products and non-mobile office products is facilitating communication between the two products. For example, getting a notebook computer to 'talk' to a printer in the past meant replugging cables

and moving things around. Infrared solved some of these problems, but it was slow and devices that used it to communicate had to be virtually on top of one another.

Bluetooth is a communication technology set to revolutionise the modern office. Essentially Bluetooth is a wireless standard that lets virtually any device communicate with other office machines. Unlike infrared, Bluetooth does not require line of sight to work. Bluetooth is also ten times faster than infrared.

Bluetooth works by embedding tiny and inexpensive short-range trans-receivers into mobile devices and office machinery such as printers and digital copiers. Once a new Bluetooth device, like a cell phone, hand-held or mobile computer comes into range, Bluetooth allows it to communicate with similarly equipped machinery.

Bluetooth connects devices such as cell phones, printers, cordless headsets, mobile PCs and computer networks, and automates all communication protocols between them. If you write e-mail on your notebook personal computer (PC) while travelling on an aircraft, the message will be sent automatically as soon as you land and switch on your cell phone. Forget about any connections using cables in the office. Your notebook PC will communicate wirelessly with anything from the printer and fax machine to the modem or mouse you happen to be using.

Mersham & skinner 2001a: 205 state that all information between devices such as a notebook and a desktop PC is automatically updated as soon as the units are within range of one another. You could even transfer digital images from a digital camera via your cell phone and the Internet to a PC anywhere in the world without touching anything as antiquated as a cable.

Bluetooth is in its infancy but devices equipped with the new technology will increasingly become the norm.

The electronic newsletter

An effective way to promote a business, goods or service on-line is through an on-line newsletter.

We can either create our own newsletter or advertise our businesses in a newsletter created by others. In most cases electronic newsletters are used to inform customers periodically about new product offerings, sales, discounts and other promotions that are on offer. Most browsers support html e-mail, which is e-mail that can also display graphics and text in colour. This means that e-mail can be used much like standard print media, but often at a fraction of the cost of design and delivery.

Electronic newsletters can also be used to generate revenue where they contain some form of advertising for products, whether offered by the same business or by other businesses. In forging relationships with other on-line ventures, links with affiliates can be inserted into the newsletter. The insertion of codes keeps track of customers that have clicked through on the inserted link and purchased something on-line. In this way, referral commissions can be earned.

It is also possible to sell sponsorships of newsletters to companies that are interested in their audiences. Conversely the sponsorship of newsletters from other companies is effective if their target audiences correspond to that of the organisation.

From a marketing perspective, newsletters are an extremely cost-effective way of advertising Subscriber e-mail lists generally exhibit a lot of 'churn' (that is, people initially subscribe and then unsubscribe to a variety of newsletters) unless the newsletter provides quality content that keeps audiences and customers coming back for more. For example, although some visitors sign up and agree to receive mailings along the way, they may be interested only in registering for a one-off competition and will unsubscribe unless your content continues to interest them.

Digital convergence

According to Mersham & Skinner 2001a: 220, Marshal McLuhan (1964; 1975) compared each new medium to a rear-view mirror. It will contain, he said, all or parts of all previous media, and something 'new'. We can think of digital coding communication as a 'shopping trolley' incorporating all existing media forms — text, speech, graphics, video, film and sounds. What is new is the increased possibility of two-way communication that digitised media present.

The most distinctive feature of the unfolding digital present is a proliferation of new media and new forms of communicative interaction. Media will continue to multiply. Everybody's daily life will become a whole ecology of media; some of these will be voluntarily chosen, and others will be inescapable parts of life in public spaces and the workplace (Agee 1998: 69—70).

Therefore, while on the one hand we see convergence as a narrowing to a singularity, what we tend to see on the other hand is an additive model of change leading to multiplication of applications, devices and the means to communicate, which are linked to each other.

Another dominant, related idea is that technological convergence forces other forms of convergence. This is where convergence theory becomes the convergence movement: where changes in services industries, corporate structures and policy are explained as responses to technological convergence.

Mersham & Skinner 2001a: 221 add that in addition, the more things converge the more they produce knock-on effects, which cannot he predicted from the contemporary technological horizon of understanding. For example, these include significant privacy copyright and security issues, control issues and breakdowns in systems integrity in the drive to greater personalisation or customisation. We are all familiar with the problem of the number of passwords and 'pins' we have to carry around in our heads — if we are smart — or in our bags and wallets — if we are not.

The World Wide Web represents the first truly converged medium. There will be further major developments of convergence through the availability yet unimagined bandwidth and speed of transmission, and the fact that the digital chip will soon form part of every appliance, machine and technology we encounter. Already a large percentage of digital chips are going into appliances and machines other than desktop computers.

A most important form of convergence has taken place between corporate/commercial interests and the Internet. Refer to my case study on Hirt & Carter in chapter 5 where I explain the effect that digital convergence has on commerce.

Initially the Internet portrayed promises romantic dreams of information sharing and free access to information with the view of connecting the world together. The term 'globalisation' became the keynote of politicians and policy makers. Mersham & Skinner 2001a: 222 maintain that the Internet has recently been subject to a third wave of 'ranchers' or 'railroaders' that looks to the Internet simply as a means of increasing profit. The spectacular collapse of the so-called *Dot Coms*[2] in 2000 restored a bit of the original ethos that characterised the fledgling Internet.

Whether this original spirit of freely sharing information ultimately manages to prevail against future attempts to commodify information or not, the emerging new digital communication that drives the Internet is based on four important ideas, namely:

- Digital encoding
- Navigation and recipient control
- Convergence
- Interactivity

[2] Basically Internet-based business ventures without an own capital base, with vague business plans that were run on public investments until the bubble burst

The first is that information and communication can be digitally encoded, whether text, voice, pictures, sound or video. This digital formatted information can then be easily accessed by a variety of digital devices, not just computers. This is because the digital chip can now he placed in any appliance or object, turning it into a communicating device. Everything becomes a communicating computer.

The second important idea that has revolutionised communications is the concept of hypermedia, which allows recipients much greater navigational control in finding knowledge Negroponte 1995. This refers to the way in which web-based information is structured. In the digitally converged world, the depth/breadth problem disappears and we can move freely between generalities and specifics through what is called 'hyper linking'.

Hyper linking is consistent through out all web-based media. Basically it allows one to look more deeply at a particular finer point and to move effortlessly back to the main body of work. Hyper linking is a term describing the interconnection of different parts of information with each other. In a printed book, sentences, paragraphs, pages and chapters follow one another in an order determined not only by the author but also by the physical and sequential construction of the book itself. Although a book may be randomly accessible and your eyes may browse quite haphazardly it is nonetheless forever fixed by the confines of three physical dimensions.

The third idea concerns the dissolving of traditional media boundaries, or convergence. The medium is not the message in a digital world. It is an embodiment of it. A message might have several embodiments automatically derivable from the same digital data. In the future, the broadcaster will send out one stream of bits, such as the weather, for example, which the receiver can convert in many different ways. The viewer can look at the same data from many perspectives.

Mersham & Skinner 2001a: 225 state that all of these different media representations are encoded in a common digital form, even though they are separately crafted in the multimedia experience. Digital convergence allows the fluid movement from one medium to the next, saying the same thing in different ways, calling upon one human sense or another. If you did not understand something when you read it the first time, you can see it as a cartoon or 3-D diagram. This kind of media movement can include anything from videos or movies that explain themselves with text to books with a gentle voice to read them to you out loud. The common digital form, in parallel with developments in voice recognition, means that we will increasingly talk to devices, rather than input instructions through some form of keypad.

Communication networks

Graham 1988: 14 states that communication networks now use digital electronic technologies. Signals no longer travel as varying waves of electrical current, but as discrete pulses. This has resulted in new communications opportunities. Telephones can now be programmed like computers to remember numbers and re-dial engaged numbers. Several callers can talk to each other in a teleconference, or see each other in a videoconference. The copper cables that used to carry telephone calls are being replaced with optical fibres. These are more reliable, they can carry more information down a thinner cable, /and they are made from cheaper materials. Optical Character Recognition (OCR) machines read typed addresses on envelopes and code mail for electronic sorting machines.

Electronic communication: issues, prospects, and pitfalls

Electronic communication presents challenges and opportunities for the ways humans do business and interact with members and other organizations, and how they participate in the current reshaping of work, institutional responsibilities, higher education and the social contexts of generating and distributing knowledge. Meetings, publications, member services and public aware-

ness are all affected by electronic communication. Technology changes how we work and the possibilities of work.

Summary

In this chapter I have traced the development of electronic communication from the development of print technology in the mid 15th century to current day digital computing. I have illustrated how digital communication overcame constraints relating to distance and time.

This chapter acknowledges that Communication Science has recently emerged as an academic discipline because of the complex nature of electronic communication. The concept "interactivity,"—the result of the new communication technologies—has resulted in an epistemological approach to communication science. Humans need to be schooled on methods of communication and effective use thereof since it is common for people to continually desire more and more information, but they make the mistake of confusing information with knowledge. Information overload fuels stress and promote faulty thinking.

Issues relating to the interactive nature of current digital communication and its impact on rural and urban communities have been explored. Possible solutions to dissolving the digital divide between these communities in South Africa are discussed in chapter 6.

Electronic communication has effectively revolutionized our society. An unexpected by product of this revolution has been the emergence of a generation of children weaned on multidimensional, interactive media sources, a generation whose understanding and expectations of the world differ profoundly from that of the generations preceding them. If we are to give these children the education necessary to succeed in our technologically intense, global future a new form of educational practice, one that builds on children's native learning abilities and technological competence, must replace our existing methods. The theoretical foundation for such changes exists, and the time to implement them is now. We have allowed our schools to remain

in the past, while our children have been born in the future. The result is a mismatch of learner and educator. But it is not the children who are mismatched to the schools; the schools are mismatched to the children. Only by revising educational practice in light of how our culture has changed can we close this gap, and reunite our schools with our children and the rest of our society.

In the following chapter I will present an argument in favour of introducing Electronic Communication in the Communication Science curricula of Further Education and Training band.

Chapter 5

ELECTRONIC COMMUNICATION IN THE COMMUNICATION SCIENCE CURRICULA OF FURTHER EDUCATION AND TRAINING BAND

Preview

In this chapter I will discuss the importance of introducing communication science as part of the school curriculum. LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html state that through public and private investment, the information infrastructure is evolving into an interconnected network of networks, allowing us to share information and to communicate as local, national, and global communities. Economic competition in the 21st Century will demand that our public institutions be on the cutting edge in preparing society for the future. As computers and advanced telecommunications are now essential tools in the workplace, it will become increasingly important that individuals obtain the necessary training and education to become computer literate and to be able to "navigate" information networks. Because digital electronic communication is by far the fastest evolving facet of communication I am to a significant extent using information off the Internet so that the most current information is available.

The diminishing demand for the study of grammar, literature among learners

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html add that instruction must keep pace with the growing and novel demands made by learners who are no longer content merely to be exposed to the language through grammar practice and literature study. According to LeLoup & Ponterio learners now insist on language instruction that will "translate" into language usage in practical, real-life situations. While literature still plays a cen-

tral role as a representation of the cultures studied in a classroom, the focus has swung towards oral and written communication, and to digital electronic communication outside of the classroom.

Klopper 2002 (manuscript) argues that increasingly more complex, new forms of knowledge generation and communication arise in cultures in response to more complex forms of existence. Klopper further states that subsequent knowledge systems and forms of communication do not displace preceding ones, but incorporate and relatives them in relation to the features of the new forms that have arisen. He for instance argues that the nomadic hunter-gatherer phase of human existence, which is said to have lasted for about a 150,000 years, was characterised by the use of direct nonverbal and verbal forms of communication—facial expressions, gestures, body stance and body movements, tone of voice and speech sounds. Only with the formation of pastoral settlements, said to have taken place about 10,000 years ago, did writing systems and public communication emerge in response to more complex living conditions of people who had to share resources around their settlements.

Due to more complex forms of living caused by the emergence of regional urban settlements through medieval times, written and public forms of communication became evermore complex. With the invention of the printing press by Gutenberg in 1452, written and public communication, which until then was in the control of the Roman Catholic Church, became secularised under the influence of the mass publication of knights' tales, travel epics, poetry and plays. Due to a steady increase in the mass production of literature, the actual study of contemporary literature, literary genres, literary interpretation and theories of literature gained prominence over the study of philology (the comparative study of languages and their literatures in historical contexts) early in the 20th Century. According to Klopper literary study started gaining prominence roundabout the onset of the mechanical technological era about four hundred years ago, reaching it peak in the latter half of the 20th Century. Klopper argues

that cinematography was firmly established as the major medium of fictional narration at the beginning of the 20th Century, at about the same time as several forms of Electronic Communication (see chapter 7) were invented. It is generally conceded that the increasing use of electronic forms of communication, such as the telegraph, the telephone, the Telefax, radio and television gave rise to a new phase of cultural development, the electronic technological era, also known as the information age, and as the third wave era (see Toffler 1991a, 1991b, 1991c).

According to Klopper the production of narrative fiction became subsumed in cinematography as major medium of fictional narration at the onset of the information age, so that the study of narrative fiction in book form now has to find its place relative to cinematographic fictional narration, just as philology had to find its place relative to narrative texts over the past two centuries.

According to Klopper the recent successes of films like *Harry Potter and the Philosopher's Stone* and *Lord of the Rings*, both based on popular fiction texts (Rowling 1997, and Tolkien 1991), and the increased sale of these books in the wake of the films, show that cinematography has not supplanted narrative fiction in text format, but that it has incorporated it in a mutual benefit partnership.

The telecommunications infrastructure that makes electronic communication possible

As far as oral communication is concerned, the emergence and convergence of digital communication technologies over the past two decades have played a major role in the perception of young people that communicative aspects of language are as important as, and more interesting than, the study of grammar and literature.

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html the telecommunications infrastructure has been developed to such an extent in the past twenty years that contacts that once were quite difficult if not impossible have now become commonplace. Telephone calls have become much easier and much less expensive, foreign television images are accessible via satellite, foreign films can be bought or rented on videocassette, fax machines link professionals from around the world, and through the Internet one can routinely exchange electronic mail (e-mail), texts, sounds, images, and even video. These are no longer the tools of the future; they are the tools of today. Learners need to develop competencies for participation in an information society, for the job skills of a global economy, for lifelong learning, and for personal pleasure. Exposure to, familiarity with, and regular use of information on the Internet is paramount to learners' and educators' professional development.

The comodification of 21st century learning

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html believe that learners need to develop competencies for participation in an information society, for the job skills of a global economy, for lifelong learning, and for personal pleasure. Exposure to, familiarity with, and regular use of information on the Internet are paramount to learners' and educators' professional development.

According to Skinner 1999:126, education as part of the mathematically calculated market economy must produce people to fill the appropriate niches. Where machines fill the niches more effectively and efficiently, people must reskill or drop out. Where people are prepared to do the same job for less, industry must move to the more favourable location. The current terminology for each of these is 'rationalisation', 'lifelong learning' and 'flexible labour policies'. South Africans are currently faced with mounting levels of unemployment. The comodification of education is not new but it may be the first time in history that a society has been prepared to

rationalise education down to this simple deployment of isolated profit-maximising individuals. Educationists and policy makers are accepting these conceptual shifts.

The 21st century classroom

As the transition to a knowledge-based economy accelerates, learners must have access to communication and information technologies in the classroom. Without these tools, learners will lack the necessary computer skills to compete in a digital world. Deploying computers in classrooms and connecting them to the Internet will enhance the learning process by providing learners and educators with access to information and teaching materials from around the world. In addition, as a result of the fiscal constraints and rising costs facing public schools, information technologies that offer new opportunities, efficiencies, and improvements in the education process are highly desirable.

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html it is not suggested that every classroom needs to be outfitted with the entire panoply of state of the art electronics. Learners can have accounts and from computers in their labs they can exchange e-mail with other learners from around the world.

Since local learners cannot learn to use the network in school, only learners whose families have the resources to provide electronic links at home have the opportunity to develop these skills. Therefore the lack of access in schools widens the gulf between the privileged and the economically disadvantaged in society. In addition to equipment purchases and network access, educators must receive additional training if they are to use these technologies and teach their learners to use them.

The impact of electronic communication on language teaching

As the role of language instruction in an overall school curriculum changes, alternative-scheduling methods are being explored, and many have far-reaching ramifications for language teaching.

Knight, S 1994: http://hflrc.hawaii.edu/NetWorks/NW03/k-L.html state that projects using Internet resources can be exciting for educators and learners alike. The ubiquitous pen pal scenario takes on new meaning, as communication becomes nearly interactive due to the speed at which e-mail "letters" are transferred. Many educators have already incorporated this aspect of the Internet into their instruction and have generously related their experiences, expertise, and suggestions.

Educators can devise creative cultural interchanges that make the language become even more meaningful and alive to their learners. Ambitious learners can even create their own home page on the Net complete with photographs of themselves and detailed information about their school and community.

Many websites exist that have links to foreign language resources all over the world. These Web sites are usually produced and maintained by educators who have culled useful sources for instruction from the Internet. Educators can devise numerous activities for learners using the collection of Web sites, limited only by one's imagination. Learners can be given an assignment such as finding a document, downloading the text, and summarising it for class presentation. In a variety of language classes and levels such materials could range from an historical document to a movie review. Learners could even be given leeway to incorporate their own interests into the Internet search, providing an additional motivational factor.

Integration of subjects

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html say that taking advantage of the resources on the Internet can facilitate integration of other school subjects with language learning. Educators can combine the study of language with current events, history, politics, and geography, for example.

Breaking barriers with electronic communication

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html state that another important use of electronic communications technologies of specific interest to foreign language educators lies in the organisation of foreign exchange programs. Electronic mail, in addition to fax and the telephone, has made it much more practical to exchange up to the minute information with colleagues abroad and to reassure parents because the ability to communicate quickly and easily makes it seem that the foreign site is not quite so far away. As better communication improves the organisation of such programs, more and more learners are able to take advantage of these opportunities for foreign travel, improving the motivation factor in language classes and perhaps even saving some language programs.

Internet relay chat

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html Internet Relay Chat (IRC) and other chat systems allow a number of users from around the world to communicate with each other in real time. Each of the people connected to a chat area sees what any of the other participants has typed and can respond accordingly. The immediacy of these interactions creates an atmosphere of intimacy that is in some ways similar to small group class work. The messages typed can be saved and later used in developing reports or other written assignments for the group. This activity has the potential for allowing learners from different schools to work together on projects.

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html says that in addition, IRC encourages participation in spontaneous authentic contextual written communication. Although the computer intimidates some learners, others report feeling freer to participate and in fact get more involved and ask more questions through the machine than in person. As with most teaching tools, the success of "chat" sessions will certainly vary among learners. Kimoto, L 1994: http://maxkade.miis.edu/JResources/communication.html reports that some educators have reported seeing learners find chat sessions and participate on their own, conversing with other learners from all over the world.

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html Multi-user dimension, Object Orientated Environment (MOOs) are similar to chat sessions in that they are configured as areas with rooms in which participants can communicate with each other. A MOO also has a theme and a "virtual reality" that the "visitors" create through their participation in role-playing, as in a game.

Chat rooms are housed on some server that maintains these virtual rooms. Cybertown Plaza is an example of an interactive chat room. Users are presented with the webpage below (figure 2) and they can click on active links on the picture in order to enter into conversations of their choice.

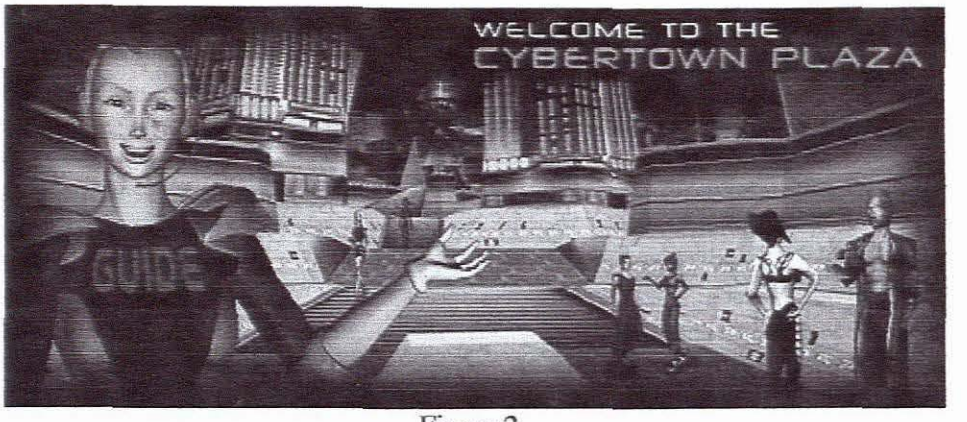

Figure 2

Video conferencing

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html another innovation in electronic communication technology is on-line two-way video conferencing. The advent of software to permit video conferencing over the Internet will eventually bring it within the reach of language learners. Video links between classrooms for distance learning have been possible for some time, but real two-way links are not common and are generally too expensive for the tight budgets within which most educators must work. With software such as Cornell's CU-SeeMe, it will some day be feasible to allow learners from across the world to interview each other in an authentic face-to-face conversation. Although most network connections now in place are inadequate to this task, the future in which this will be a reality is not so far away.

Access to computer technology

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html state that computer ownership is highly correlated to family income and education. Therefore, public institutions will play a critical role in assuring public access to the economic and social benefits of the Information Age, especially for those who do not have computers at home. Low-income

groups and rural areas tend to have less access to information technology at home and in public schools and libraries.

Virtual libraries

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html state that public libraries have traditionally served as a repository of information for citizens. In the Information Age, libraries will play an increasingly important role because a changing economy requires that workers continuously learn new skills. Connecting libraries to the Internet is critical to ensuring that all learners can obtain information and services and benefit from lifelong learning opportunities, regardless of economic circumstances and geography. Individuals who are well trained in using information technology gain important economic benefits.

Libraries augment ordinary books with digital electronic texts available on an institution's Intranet, and with online subscriptions to current affairs journals and scholarly journals via the Internet. Contract access to Encyclopaedia Britanica, Scientific American online, National Geographic and Neuro Science for Kids is available from virtual libraries.

Virtual libraries overcome "bricks and mortar" library limitations.

Health care organisations

According to LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html in health care, information technology is also playing an increasingly important role in helping people access quality health care and in enabling health care providers to streamline their eligibility determination and billing procedures. These cost reductions in the health care industry will flow to patients, employers, and government. Advances in data storage and communications technologies are also improving access to quality health care services through applications such as telemedicine.

The information age

LeLoup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html state that the rapid development of communications and information technologies heralds an age of enormous economic and social opportunities. The Information Age has arrived. Powerful and revolutionary technological and economic forces are driving a transformation of our economy and our lives as the rigors of competition increasingly supplant a system of regulated monopolies. The most dominant forces are:

- Technological advances (e.g., digital compression, more powerful computers, and new wireless services)
- Decreasing prices for computers and telecommunications services
- The convergence of information and communications services and technologies

The information age has ushered in new generation of working environments. Offices have become smaller and even decentralised because of the advent of offices. Many people are using their homes as offices because of advanced communication enabled by the Internet and extranet.

Hirt And Carter (PTY) LTD (Durban): a case study

Hirt And Carter (PTY) LTD (Durban) is an example a new generation that depicts integration of working environments due to revolution in digital communication. I used this company as a case study to show how integration of manpower and skills can be incorporated under one building because of advancements in digital communication. Hirt & Carter incorporates e-commerce empowered companies that integrate its various working environments electronically by utilising the revolution in digital communication. These satellite companies function interdependently yet autonomously. These companies provide in-house services for one another at cost

and by referring prospective clients to one another they can maintain their financial viability. The mother company houses the following subsidiaries:

- Rob Print – This company is involved in high tech printing, using digital scanners and printers than print at extremely high speeds.
- Fast Print – This company specialises in silk screen printing.
- Pixel Arts – This company is involved in sales and support of computer equipment.
- Hirt & Carter instant – This company is involved in large format digital design.
- Hirt & Carter Training – This company is responsible for overall training of personnel for all satellite companies. They focus on the following fields of training Desktop Publishing (DTP), graphic design and web design.
- Lava Flow – This company is involved in web page design. It has an ultra modern sound and video laboratory. They produce computer-generated advertising for prestige companies.
- Gerrays – This company focuses on digital photography.

One of Hirt and Carter's major clients are the "Spar Supermarkets". Hirt & Carter compiles adverts for Spar. Hirt & Carter have installed software on computers of both companies. This software enables both companies to do business faster and efficiently without the need to physically meet each other. Digital communication and electronic publishing is used to do all the communication.

When Spar requires an advert for a product (for example dog food), it makes a digital request via the extranet to Gerrays. Gerrays will create a sample advert and most probably refer them to

a digital library that is housed by Hirt & Carter. The digital library houses preset templates relevant to specific companies and an image database that can give clients the opportunity to browse "ideas". Overall sampling, conferencing and confirmation of orders are done virtually and are not restricted by geographical boundaries and time.

Hein Jonker, the companies' integration manager, explains that electronic transfer of information is enabled by the use of ISDN.

Hirt & Carter is an example the powerful influence of digital communication on integration of business in order to allow companies to be economically viable on their own. They are able to render services to one another before being outsourced. Whilst one company creates digital adverts of supermarkets such as Spar, another company does the printing and another company prepares television adverts for the same company and another company may do the street billboards for the same client.

The salient features of such integration are that such companies often tender for contracts on the Internet. If a contract is successful then communication is done electronically. This expedites processing and completion of the job at hand. Management does not have to physically go on the floor. Inspection of job performance is enabled virtually.

Web cameras are used to monitor progress of work done by management and by the customer. This allows the customer to be in any part of the world and still be able to inspect the quality of products being produced. Digital communication allows Hirt & Carter the ability to take on high-end jobs at quick notice from customers across the globe.

The "Hirt & Carter" case study displays changes in management strategies as a result of advances in digital communication. Managers do not have to be physically on the floor. Job inspection and progress can be monitored via the Internet or extranet.

Conclusion

This chapter demonstrates that Electronic Communication has an impact on all spheres of life and as such, its implementation in the FET band of the Communication Science curricula will ensure that learners are adequately prepared to enter the vocational world with the necessary confidence and skills.

Learners need to develop competencies for participation in an information society, for the job skills of a global economy, for lifelong learning, and for personal pleasure. Exposure to, familiarity with, and regular use of information on the Internet are paramount to learners' and educators' professional development. Electronic Communication has modified 21st Century learning. I have effectively demonstrated that the diminishing demand for the study of grammar and literature among learners needs to be supplemented by the relevant science of communication

As the transition to a knowledge-based economy accelerates, learners must have access to communication and information technologies in the classroom. Without these tools, learners will lack the necessary computer skills to compete in a digital world. Deploying computers in classrooms and connecting them to the Internet will enhance the learning process by providing learners and educators with access to information and teaching materials from around the world.

The impact of electronic communication on language teaching has transformed the way we write and communicate. Electronic Communication can facilitate integration of other school subjects with language learning. Educators can combine the study of language with current events, history, politics, and geography using Communication Science as the effective bridge between learning areas.

I have used the case study of "Hirt & Carter" to illustrate how Electronic Communication has transformed the way in which we work. The case study effectively portrays how Electronic

Communication can transcend barriers of time and distance. The case study has also been included to demonstrate the need to equip learners in the FET phase for real life skills.

With advanced information technology, we not only can benefit economically but also can enhance the overall quality of life. We can create a government that costs less and is more responsive to public needs. We can improve the delivery of quality health care through technologies that allow rural and remote communities to have access to specialists in urban medical centres. We can and should improve access to education for those in rural, remote, and disadvantaged areas because no child should be deprived of equitable opportunities for education.

In order to help prepare and train much of tomorrow's labour force, educational institutions will need to be equipped with information technologies and communications networks that are integral to these processes. The availability if communication science in the further education and training band of the school curricula will create awareness within the learner of factors that contributes to success in life vocations. Electronic communications relate to life skills orientations will have a worldview of vocation structures available to them. Communication, as reflected in this chapter is about skills. Learners who do not learn to use computers and information technology in schools will not be competitive in the job market.

In the next chapter I will discuss Internet Communication in South African schools.

Chapter 6

INTERNET COMMUNICATION IN SOUTH AFRICAN SCHOOLS

Introduction

There is a perception that the mix of first and third world conditions in South Africa is hindering the progress of digital communication in the rainbow nation. In this chapter I will show how problems of isolation, especially in rural communities, can be overcome by the use of digital electronic communication, and why this form of communication should form part of a Communication Science curriculum in the FET band.

The rural-urban divide in South African education

South Africa can be characterised as a country where people in urban environments suffer from cognitive over-stimulation, caused by information overload, while at the same time rural people suffer from cognitive under-stimulation. It is not unusual to find an urbanite engaged in conversations with more than one-person at the same time while watching television, listening to the radio or driving in a busy street. Audiovisual stimuli are presented almost everywhere in cities and constantly tug at our sub-consciousness.

At the same time rural inhabitants complain of the drudgery of daily routine, with nothing to do for recreation after work or during weekends. This has led to a century and a half of steady migration from rural areas to cities. When rural people move to the urban areas they of course are even more prone to suffer from an information overload than their urban counterparts. If a person does not have the ability to grasp this information, information becomes the equivalent of noise. People who are subjected to information overload display stress symptoms. The

knowledge that a child from a rural area has is not inferior to that of an urban child, just different, because knowledge is optimised for the environment in which a person subsists.

In order to minimise the disparity of opportunities at the disposal of urban and rural children we need to introduce them to digitally relevant information. This has been accomplished in the Technology learning area in the GET band by using a low-tech approach to the subject. The child can come to some understanding of technology in the school. Understanding of low technology is however not enough for learners in the FET band. One form of high technology that is available to study in present-day FET curricula is information technology, or its communication-based equivalent electronic communication.

Computers in South Africa

Computers are increasingly reshaping the kind of country we live in. This chapter shines a light on the role that computers play in widening social gaps between the haves and the have-nots, and how the promotion of electronic communication can help narrow the digital divide. By providing equitable and meaningful access to communication technology we can ensure that all children have a foothold in 21st Century modes of communication. It is only after access to communication technology is assured that computer literacy can begin. Access is not simply having access to up-to-date technology; it should also includes access to qualified educators, appropriate software and Web content, as well as a climate of learning, which fosters inclusion. Integral to this issue is the quality and quantity of access.

Most South African families do not have a home computer, making friends' computers, work computers and educational institutions their only access points to computer literacy training, let alone access to electronic communication over the Internet. Yet with educational resources determined by ad hoc amounts, such as occasional funding provided by the DoE, by fundraising drives, or funds provided by school governing bodies, the divide is growing between up-

market schools that can afford to install and computer networks and schools in economically depressed areas that cannot afford such facilities.

Computer technology is not a silver bullet for whatever may be ailing public education today. Computers are tools, not ends in themselves. The challenge is to make sure that we don't become slaves to our tools. If we are wiring our classrooms, we have a choice: either that we leave it totally to the market resources of each school, or we establish that this is a set of tools that develop and cultivate a set of expertise that we want all learners to have. This becomes the new baseline for what it means to have basic educational skills that we want learners to leave high school with.

If we go with the former, that is, wealthy schools can have it, just like they may have more uniforms for the football team and newer textbooks, then we say that those learners who have greater advantages at the beginning will have even greater advantages at the end. They will know much more about the basic tools of opportunity, of wealth creation, of political engagement that we'll be having in the 21st century.

If we go the other way and we establish that these are the new tools of opportunity, then we have a heavy burden. One will have to ensure that electronic tools of learning are used effectively, that they form part of pattern of overall wise investment.

Creating a virtual planet

According to Dogar & Power 2000:89, an information divide still hurts the prospects of the planet's poorest people. But where there is literacy, and even a small amount of capital, the Internet has created a cyber land of opportunity for poor people that got access to it. Power further goes on to say that many Ugandan villagers have solar panels rigged on to the roof of their huts in order to power satellite links to the Internet. These Ugandan villagers are an anomaly in

Africa, but one that shows that Africa need not be on the wrong side of the digital divide. Africans represent a minuscule portion of the worlds wired. Of the estimated 6 billion people on the planet about 2 billion people on the planet have never made a phone call, let alone dialled in to the Internet.

An African village with a net connection represents cyber enthusiasts' greatest hope—that the new world currently being created online will be bound not by geography but by technology. That dream has already come true in parts of the developed world, where telecommuting, borderless business and 24-hour connectivity are taken for granted by a mobile executive class. The challenge for the next decade is to make sure that the rest of the planet does not get left behind.

Efforts to globalise South Africa

Sebe Zwane is the information officer who is responsible for information dissemination in the Government communication and information system of South Africa (GCIS). According to Zwane GCIS is on the verge of launching a project of connecting rural South Africans to communications networks. The GCIS is working in conjunction with the Department of Communication and Telecommunication of South Africa. Multipurpose centres (MPPC) will be set up in municipal districts where people can visit these centres to gain access to communication systems. These MPPCs will operate on the similar principles as libraries.

A pilot phase of a MPPC is already in operation in a rural area at Adams Mission, south of Durban, with the intention of resolving implementation problems before the process is implanted countrywide. This centre has telephone facilities; fax facilities, computer and Internet facilities. The aim is to make information and electronic communication easily accessible to people who are far removed from the urban environment, thereby eliminating the digital divide between urban and rural communities.

The first phase of implementation of the actual project will be officially launched in March 2002 in the Umkhanyakude district in northern KwaZulu-Natal. The project is referred to as 'Mbazwane,' after the name of the rural settlement in the Umkhanyakude district where it will be launched. This MPPC will boast the following facilities: telephone, fax, computer and Internet. Provision is also being made to house all government documents on a website so that people in rural communities do not have to make long journeys to government offices to collect, fill/complete or return such documents. All this will be done on the Internet.

The GCIS also has plans to set up community media support centres in rural areas. The aim of this project is to get the community involved in setting up their own local radio stations and local newspaper. The idea is to provide a support system for members of the community. This type of communication will assist in promoting local business, promoting entrepreneurship and encouraging support of local non-government organisations such as senior citizens and churches.

The above-mentioned information indicates that the full spectrum of the envisaged Communication Science and Media Studies modules can be implemented in the Language, Literacy and Communication learning area in the Further Education and Training band, so that particularly technology-based modules will not become the privilege of learners in urban communities.

According to Quadir 2000:84 successful business realise that the broader the base of talented workers and prosperous customers, the greater their own rewards. Henry Ford made cars cheaper so that lower-income people could afford them. Mohammad Yunus founded Grameen Bank in Bangladesh to make loans to poor people to start micro enterprises. Today similar opportunities exist worldwide. New computing and communication technologies offer an unprecedented chance to create vast new markets while lifting billions out of poverty. According to Quadir India has taken great strides in reducing the cost of electronic communication so that

even the poor could communicate using cell phones. Such initiatives have fed through to new investment and more business start-ups. The crucial poverty in the world today is one of imagination.

According to Booth 2000:8 there is a concerted effort in South Africa to provide telecommunications to people in previously under serviced areas. Vodacom's subsidised public-access community phones are generating in excess of 30 million calls per month in South Africa's disadvantaged areas at affordable rate for the users

Myeka High School: a case study

In the Valley of a Thousand Hills is, Myeka High School, one of more than 16 400 schools in South Africa without electricity. From this fact one will assume that it also is without the sophisticated technologies that are today accepted as standard in the modern world. (Highway Mail, 15 September 2000)

In 2000 Myeka High School was selected as a prototype school by a number of organisations that have successfully implemented a cocktail of technologies whereby it can now harness the Internet and introduce remote access to information resources for its 850 pupils.

This project is the collaborative effort of a Texas based funding organisation (Solar Electric Light Fund) SELF, Dell Computers South Africa, four local academic institutions (the Universities of Natal, Pietermaritzburg campus, the University of Durban-Westville, the University of Zululand, Durban-Umlazi campus and Mangosuthu Technikon, and finally, a Durban based non-profit service provider, Solar Engineering Services.

Through the convergence of solar, cellular and satellite technologies (a first in South African Schools), Myeka boasts a computer laboratory equipped with the latest in PC technology sponsored by Dell Computer to the value of more than R70 000.

The classroom comprises five personal computers linked to 20 monitors. The environment is sophisticated because it was not a simple matter of plugging the computers into a wall socket and connecting to the Internet via the phone line. The school is located in a remote area that does not have electricity or any telephone links.

Solar panels were erected by a Durban based non-profit organisation, Solar Engineering Services. Greg Austin, the company's rural electrification manager ensured that the Dell computers were connected in a specific configuration saving 44% of the power that would be required if they were connected individually.

A hybrid system of power sources is used to fuel the computers. Solar power is used in conjunction with a low-tech biogas generating plant that converts toilet effluent to methane gas, which is then used as energy source.

When Gareth Martin, the South African Managing Director of Dell Computers, visited the school in the course of 2000 to ascertain what his company's contribution had achieved, he commented that while it was easy to just donate computer equipment, a more engaged approach should be followed. Consequently Dell Computers have now become involved in eight other projects involving educational institutions thanks to of the technological breakthrough at Myeka High.

To enable Internet connectivity cellular technology was used for outgoing signals and satellite technology provided by InfoSat was used to transmit incoming signals. This technology can be used anywhere in the world through the combination of solar, cellular and satellite technologies. It is cost effective where there are no modern facilities available.

The corporate social investment role of Telkom in the promotion of digital communication

According to the Telkom Foundation 2001: http://www.telkomfoundation.co.za/homes.asp it has been proactively involved in improving the quality of life of South African communities. Forming part of the public relations activities of Telkom, this foundation is active in promoting science and mathematics in disadvantaged communities as part of its social investment mandate.

To this effect Telkom has committed R100 million over a five-year period on boosting the quality of the mathematics, science and technical education in disadvantaged communities, and supporting social development through childcare and job creation.

According to the information on the above-mentioned website Telkom, as a major participant in the technology sector, is committed to improving the quality of teaching and learning in the country. In its efforts to fulfil its commitment to address disparities between the rich and poor, urban and rural communities, the Telkom Foundation, is reaching thousands of disadvantaged South Africans through its community development programmes.

The mission of the Telkom Foundation is to pro-actively identify, develop and implement community development initiatives, which respond directly to the needs of the communities, which lack infrastructure, services and skills, through sustainable community programmes. The Telkom Foundation focuses on Education, Job Creation and Childcare.

In identifying projects to fund from their five-year budget of R100-million, starting in 1998, the Telkom Foundation follows clear-cut criteria. According to the Foundation 2001: http://www.telkomfoundation.co.za/homes.asp, Telkom has spent in excess of R120 000 installing the latest computer hardware and software at St Francis College, one of 138 schools in KZN, among 1 338 schools nationally that has benefited from this initiative. In the case of St

Francis College this entails sponsoring 21 computers as well as free access to the Internet for a 12-month period via three lines for Internet dial-up access. The school, which caters for pupils from Grades 8 to 12 (Standard 6 to Matric), has produced several distinguished black leaders in politics, sport, culture and business, including Telkom CEO, Sizwe Nxasana.

In 2001 Telkom's R450 000 investment in eight computer centres benefited 137 schools in under-serviced areas of KwaZulu-Natal and East Griqualand, and connected more than 100 000 pupils to the Internet.

Conclusion

From the above-mentioned information it is clear that a combination of technologies exists in South Africa today, and that policies are in place to give rural people access to electronic communication facilities. The Myeka case study, and the Telkom Foundation initiative demonstrate that electronic communication is within reach of even the remotest rural schools.

With the aid of the media and other channels of dissemination policy makers need to create an awareness that electronic communication is of primary importance in bringing South African schools in line with current global educational trends.

The involvement of local and multi-national corporations in financing electronic learning networks, as part of their cooperate social investment policies, needs to explored more vigorously to the benefit of South Africans who do not yet have access to electronic communication resources. The Myeka project has proven to be a success because of collaboration between and international funding organisation, the local arm of a computer manufacturer, four local academic institutions and a local non-profit specialist service provider. This is a successful leap in terms of ensuring that rural South Africa becomes part of the global village. The project indicates an overall application of modern technology to overcome grass root problems

In the following chapter I will examine the role of communication in OBE.

Chapter 7

THE CRUCIAL ROLE OF COMMUNICATION IN OBE

Introduction

According to Mayer 1999: 59 only the insect *Blastophaga grossorum* pollinates the fig tree. The lava of the insect lives in the ovary of the fig tree, and there it gets its food. The tree and the insect are therefore heavily interdependent: the tree cannot reproduce without the insect; the insect cannot eat without the tree; together, they constitute not only a feasible but also a productive and flourishing partnership. This cooperative living together in intimate association, or even close union, of two dissimilar organisms is called symbiosis.

Similarly there exists a symbiotic relationship between Communication and Outcomes-Based Education. The purpose of this chapter is to analyse this intimate relationship between Communication and Outcomes-Based Education.

Basic communication in teaching

Introduction

According to Hamm 2002: http://sheridancenter.stg.brown.edu/publications/_presS-kills.shtml#basic the purpose of communication is to transmit a message about our experiences or perceptions and to express our point of view about those experiences and perceptions. A educator attempts to aid the learners in understanding the meaning of the message through the use of *verbal* and *nonverbal* communication. Language and words are symbolic they represent ideas and things and are the verbal tools the educator uses to convey the true message the meaning of the words to the audience. The speaker also uses nonverbal tools attitude, actions, and appearance to share the meaning with the audience. An inspired presentation leaves the au-

dience imbued with a real understanding of the meaning of the speaker's message, not merely superficial comprehension of the words used.

The fundamentals of communication

Hamm 2002: http://sheridancenter.stg.brown.edu/publications/ presSkills.shtml #basic further states that communication is a complex process, but a communication system is often categorised into six main components. The six components and their public speaking analogs are:

- Transmitter: Speaker
- Channels: Senses: speech, hearing, seeing, etc.
- Message: Speaker's topic
- Receiver: Audience
- Noise: Internal and external factors that affect message reception by audience: e.g., daydreaming, traffic noise, etc.
- Feedback: Audience reaction

Of the six components listed, the speaker has immediate control over only three: self, the methods of communication chosen (visual, auditory, etc.), and the message itself. The speaker can influence, but not control, the last three components: the audience, distractions, and audience response. It is the speaker's role to focus attention on the audience to enhance the probability of the receipt of the message. This is done by selecting the type of communication pertinent to the message, establishing a point-of-view, and communicating its meaning to the audience.

To be effective, the speaker must consciously choose not only the subject matter of the presentation, but the personal impression being made and the rhetorical tools being used. The speaker

must assess his or her audience and decide how best to reach them both verbally and nonverbally.

Fostering collaboration skills

Hamm 2002: http://sheridancenter.stg.brown.edu/publications/presSkills.shtml #basic states that collaboration means working effectively with others to achieve a common goal. *Communication* with peers and educators is one prerequisite to successful collaboration. Basic collaborative skills include those required for management, supervision and participation in-group activities. The following collaborative skills are identified:

- Bringing new members into the group
- Assigning work tasks to members of the group under your supervision
- Assessing the progress of work performed by the members of the group
- Knowing what the group's outcomes are and what it will take to satisfy these outcomes
- Making and grounding assessments
- Participating in an effective review meeting

Added to these is, of course, the ability to get along with one's colleagues! These skills must become part of the curriculum for Communication in an OBE environment. In addition to the basic skills listed above, specific collaborative roles can be identified; two examples are given below.

Facilitator. It may be fruitful to view the learner's collaborative role as that of a *facilitator.* Facilitation can apply to all sorts of activities. Learners may be required to facilitate their own develop-

ment efforts. It is often important for the *facilitator* to take a back seat when it comes to discussion of particular issues, so as to retain a position of impartiality.

Catalyst: It is obvious that certain project teams work together more smoothly and more successfully than others. The *catalyst* is an individual who improves communication between team members and generally helps to create an optimistic mood. The *catalyst* is often not officially in a management position, but nevertheless manages to influence the thinking of other team members and helps to produce a positive outcome. A positive outlook and generally optimistic attitude can be one of the chief critical success factors, which determine the difference between success and failure in a project. Perhaps even learning how to be a *catalyst* should be on the curriculum.

Nurturing communication skills

I believe that communication will aid interaction between the facilitators of OBE and the learners. Effective communication between learners, educators and other role players is important if fundamental errors in a new system are to be avoided

Very few computing learners are trained to interpret non-verbal communication. It is often assumed that proponents will find it easy to express their requirements verbally, and when requirements fail to come up to scratch, blame may be placed on the learners rather than on the proponents.

Communication and collaboration in the curriculum

Existing courses in languages and computer studies are product-oriented rather than process-oriented. They focus on end results - the information systems - rather than the processes used to arrive at them. They also concentrate on technical rather than social aspects.

Practical skills, especially collaborative ones, can be developed best through practice. Teamwork and role-playing exercises are therefore fruitful. Learners benefit greatly from practical communication exercises, such as making presentations and then discussing their performance with their peers. Theory is relevant too, in areas such as Arts and culture, body language and group dynamics. The learner is therefore given a framework for increasing the effectiveness of his or her own communication.

The model of OBE

According to Van der Horst and McDonald 1997: 19 there is no single, authoritative model for Outcomes-Based Education. Frameworks for OBE share an emphasis on observable, measurable outcomes and the belief that all learners can learn.

William Spady's model for OBE urges schools to generate "exit outcomes" based on the challenges and opportunities that learners will face after graduation, and then begin to "design down" from the outcomes for all other aspects of educational delivery.

A key component of Spady's model is expanded opportunity and instructional support. Learners are given more time if needed to master material, and they are offered second chances or given a grade of Incomplete until they succeed. Educators use "coaching" as well as grouping and team teaching to provide additional assistance.

The crucial role of communication across the OBE learning areas

In this section I will briefly outline the eight learning areas of Curriculum 2005, and emphasise the place and role of communication in them – particularly in the Language, Literacy and Communication learning area.

Language, Literacy and Communication

According to Lubisi et al 1998:60-61 people interact with the world and each other through language. They go on to say that the more we are able to communicate, the better we are able to understand each other. Improved communication can only lead to a South Africa free from intolerance, misunderstandings and prejudice, which is the focus of this learning area.

Numeracy and Mathematics

Numeracy and mathematics is a way of understanding the world. Maths encourages logical thinking, problem solving and teaches people analytical skills that will allow them to make critical decisions. This learning area will equip learners to cope with a rapidly changing technological environment. With the diversity of cultures coming together in our South African classrooms it is imperative that communication skills be improved in order to facilitate the acquisition of numeracy and mathematical skills.

Human and Social Sciences

South Africa needs responsible citizens who are able to operate in a culturally diverse, democratic society. Human and Social Sciences is therefore an important area of study. Here learners will learn how to interact with each other and the environment. In order to foster interaction with one another educators and learners need to acquire skills in interpersonal communication. Interpersonal communication involves communication between individuals e.g. communication between educator and learner.

Natural Sciences

In order to manage the resources of the world effectively, people need to understand the universe – both natural and created by people. This learning area will equip learners with the ability to understand our natural resources and manage them effectively. Increasing the development of sustainable resources and the access of ordinary people to such resources is becoming an im-

portant theme in the natural sciences. Public communication plays an important role in the consultation and negotiation process to determine the needs of ordinary people. At the same time mass communication (the print media, radio and television) are becoming important tools in informing ordinary people about developments in the natural sciences that affect their lives.

Arts and Culture

Culture and the arts are important areas of life. Through developing creativity and exploring the diverse cultures that exist, the spiritual, intellectual and emotional aspects of our personalities will be promoted. Intercultural communication skills are a prerequisite in excelling in the arts and culture learning area.

Economic and Management Sciences

South Africa needs to have a sustainable economic plan in order to survive. The Economic and Management Sciences develop all people into economically active citizens able to participate in and lead the economic development of our country.

Access to the institutions that manage the South African economy is a basic desire and demand of all citizens. Effective small group communication skills are effective for barter and trade in the informal sector of the economy. Communication through the mass media play an important role in the formal economy where products are advertised, share prices are listed, unfolding economic trends are debated and economic policy is assessed. Without these forms of communication there will be no economy to manage scientifically.

Life Orientation

We live in a rapidly changing society. To cope with these challenges, learners need to develop life skills. Life Orientation includes the building of self-esteem, survival skills and healthy lifestyle.

The development of life orientation skills has two facets: A social process where the individual negotiates his/her position in the social hierarchy of the local community where s/he subsists. An equally important aspect of the development of life orientation skills is mastery of intrapersonal skills, which allows the individual to engage in realistic self-assessment with regard to her/his knowledge and skills and her/his relationship to others in her/his local community.

Technology

We live in a technically advanced society. Without accessing this new technology, we will be unable to compete internationally. This learning area will promote all aspects of technology: planning, design, and manufacturing.

Digital communication is used in almost all forms of modern technology. Most technical instruments and machines are computer based and communicate with each other or with humans in digital format. There exists a powerful link between digital communication and technology education, industry and the medical world. Machines can be controlled remotely from close proximity or across the globe. Surgeons can perform operations on patients even if they are situated in different countries. Humans communicate digitally with robots, which in turn communicate with other robots in order to facilitate mass production of cars.

Technology and communication are inseparable. In order to facilitate technological growth in this country communication channels need to be developed and sustained through education.

The crucial role of communication during assessment

Continuous assessment

According to Manganyi 1997(a): http://www.polity.org.za/govdocs /misc/curr 2005.html the Continuous Assessment Model (CASS) has been proposed as an assessment model for South Africa.

The practice of continuous assessment will underpin all assessment across all education and training bands at all levels. Therefore the paradigm shift from promotion decisions based on the results of a single test or examination (summative evaluation) will be replaced by the ongoing formative assessment of the learner. This will enable the educator to monitor the strengths and weaknesses of the learners' performance. Recorded evidence on the learner's progressive achievement will include portfolios of the learners work, as well as documented records of the educator's appraisals, both verbal and scored on which promotion decisions will be made.

All assessment will be underpinned by the criteria of the critical and specific learning outcomes. The emphasis of assessment will therefore be placed on formative assessment of the learners work over a period of time, rather than on performance in a once-off achievement-based examination.

It is vital that educators should not merely interpret CASS as being the culmination of a series of traditional test results. Assessment should, however, be aimed at knowledge, skills and attitudes.

A formative assessment model, which rests on the principle of continuous assessment, will include using the following assessment methods:

- Continuous (formative) assessment
- Diagnostic assessment
- Achievement-based assessment
- Self assessment
- Peer assessment
- Portfolio assessment

- Performance assessment
- Observation Sheets
- Journals
- Educator made tests
- Assessment of Prior Learning.

The principle of criterion-referenced assessment will underpin all classroom assessment i.e. measuring individual performance against the defined NQF standards.

According to Stuter 1996: http://www.icehouse.net/ lmstuter/page0006.htm assessment is also a teaching tool, structured to instruct learners as well as assess. They also teach to the test, providing information then directly assessing learners on the information provided. There are several types of assessment:

- *Alternative assessments* is a catch all term for assessments that depart from the traditional multiple choice, norm-referenced tests;
- *Performance assessments* measure content and process – what the child *knows and can do*;
- *Portfolio assessment* is a picture of the learners classroom work over time, much as the artist's portfolio of best pictures drawn;

Authentic assessments are assessments based in the context of *social issues* – simulations of problems, issues, or challenges that a person might encounter in real life.

The old system of assessment had three key characteristics:

- It focused on the input by educators and learners;

- It assessed learners' learning by comparing individual learners against a norm;
- It used assessment primarily in a summative way (to measure what learners had learnt at the end of the process).

Outcomes based assessment on the other hand focuses on the outcomes that learners demonstrate after learning, it asses by comparing individual learner's work to a set of criteria (called learning outcomes) an it uses assessment primarily in a formative way (as a means of improving the learner's ability to learn during the learning process).

Feedback loops are deeply entrenched in continuous assessment. Any place that has feedback loops has communication. All forms of assessment, whether class tests, oral assessment, a final examination or portfolio evaluation should contain feedback loops from assessor to learner. From this it can be concluded that assessment is a form of communication.

The concept of continuous assessment is that the learner must get feedback from the assessor. None of the forms of assessment are authentic if there is no feedback to the learner. In all forms of assessment outcomes and forms of assessment must be stated upfront. Learners must be informed as to what extent they have achieved outcomes.

Conclusion

OBE is a very sophisticated approach to learning. It requires a range of communication skills on the part of both the educators and learners. Communication plays a crucial role in continuous assessment. It is embedded in all forms of assessment.

OBE entails the use of different forms of communication. As explained in this chapter, there are alliances between all the learning areas in OBE and communication.

Persuasion is an important part of communication, which the educator uses to motivate learners. In order for motivation to take place, the status of the educator is not fore grounded. If the educator is, however, involved the process of asserting order and discipline or formally assessing the learner, the higher the status of the educator must be fore grounded for such activities to succeed.

In the following chapter I will examine benefits of Communication Science to subjects in other learning areas.

Chapter 8

BENEFITS OF COMMUNICATION SCIENCE TO SUBJECTS IN OTHER LEARNING AREAS

Preview

In this chapter I will discuss how communication science could form part of the school syllabus. I will illustrate the outcomes, which all learners need to achieve in order to become life-long learners. These outcomes will help them reach their goals in their individual and working lives. The outcomes are relevant across all learning areas and it is therefore imperative that educators instil these values, knowledge and skills in their learners.

The interrelatedness of knowledge

It is clear that the language–using mind is dynamic, not only in its ability to produce and comprehend texts, but also in its adaptability to new information. According to Lamb 1999: 206 this relatively uncreative process may be called *guided structure building* in which the incoming message tells the hearer's system just where to connect new *nections*[3] and what they must be connected to. Probably all new structure is metaphorical to some extent in the sense of having shared properties with already existing structures. The relatively less creative process of structure building is that which departs only slightly from its exemplars, with substitutions based on high degrees of similarity, while the more highly creative build on more tenuous strands of similarity as in the case of "hearth dog" for a dog that mostly lies in front of the fire.

Lamb 1999: 216 goes on to say that if the learning process does work in the way proposed here, it can account for the adaptability of the system throughout its life, as well as for new situations

[3] Lamb coined the term ***nection*** to account for integrating nodes on a network of interrelated language forms. The term "dog" for instance forms an integrating node to individual compounds such as "lap dog, underdog, puppy dog" and "hotdog," to the phonemes /d/ and /ɔg/ as well as to the conceptual category DOG.

and changing conditions. This is the case for both latent needs and established connections whose strengths have been altered, in response to new situations and changing conditions. It will allow it to refine and otherwise alter concepts already present, to learn new lexical items, etc. According to this hypothesis, the learning that occurs in children is not fundamentally different from that which continues to occur throughout life, or until senile dementia sets in, a condition that evidently interferes with the recruitment of latent needs and the strengthening of latent needs.

The implication of the above is that knowledge is interrelated in the mind of the learner. Disciplinary boundaries, to a large extent are non-existent, making teaching more manageable. One theory that deals with knowledge construction is constructivism.

Children viewing letters, words, and sentences often need help recognizing repeating patterns. Many teaching techniques help children identify patterns by making them more noticeable. Printed instructional material uses colour, style, size, or font to make target patterns stand out visually from surrounding letters or words. This highlighting technique can emphasise a pattern as small as a single letter or as large as a group of sentences. In addition to locating patterns, it can show relationships between text elements.

Seeing or hearing highlighted patterns supports the brain's recognition systems. Manipulating patterns – building them, changing them, and playing with them -- brings the strategic systems into action. Collaboration between these systems is critical to learning. The skill-building activities that engage the strategic systems provide essential support to the recognition systems, developing the solid, sure knowledge of patterns that eventually makes recognition automatic.

According to Meyer & David 2000: http://www.cast.org/udl/index.cfm?i=18 mastering pattern recognition requires persistent practice, especially by learners who do not pick up patterns readily. Appealing, meaningful activities support learners' affective brain systems, and motivate

them to engage in the necessary practice. Some educators draw patterns from learners' own reading materials or written work, making practice more personal and meaningful.

The interrelatedness of knowledge that I have described in this section demonstrates that in principle all forms of learning are integrated on the same conceptual network in the minds of learners. Particular disciplines, such as language study and communication, or information technology and electronic communication, show a clear affinity for one another.

The educator's role in knowledge integration

Cheek 1992: http://www.towson.edu/csme/mctp/Essays/Constructivism.txt explains that learners actively take knowledge, connect it to previously assimilated knowledge and make it theirs by constructing their own interpretation.

The role of the educator is to organise information around conceptual clusters of problems, questions and discrepant situations in order to engage the learner's interest. Educators assist the learners in developing new insights and connecting them with their previous learning. Ideas are presented holistically as broad concepts and then broken down into parts. The activities are learner centred and learners are encouraged to ask their own questions, carry out their own experiments, make their own analogies and come to their own conclusions.

The goal is for the learner to play an active role in assimilating knowledge onto his/her existing mental framework. The ability of learners to apply their school-learned knowledge to the real world is valued over memorising bits and pieces of knowledge that may seem unrelated to them.

Acquiring and applying knowledge in the way described above, does not only depend on conceptual processes, but on the role of communication as a cognitive tool during the social construction of meaning. To this effect the educator can use the following basic forms of communication.

- Non-verbal communication
- Small group communication
- Public communication
- Organisational communication
- Mass communication
- Digital electronic communication

Each form of communication is characterised by different communication codes. Small group communication is as old as humankind itself. It consists of speech sounds, tone of voice features such as pitch, stress and tempo that combine to form auditory codes consisting of words in utterances. A range of non-verbal communication codes such as facial expressions, pantomimes, body movement and proxemics augments such auditory codes. Because auditory aspects and nonverbal aspects of communication form part of another thesis regarding the introduction of Communication Science, I will not analyse them any further. It is important to note that they however do figure in emerging forms of electronic communication such as video mail, Internet based videoconferencing and the soon-to-be-deployed cell phone video telephony.

Electronic Communication in the classroom

On examining all the learning areas I found that of digital electronic communication could be used effectively in all the learning areas. Electronic communication has meant a transformation in our culture that has significant implications for teaching and learning in higher education. As our communities and our schools at every level move on line, educators are looking for ways that new technologies can help learners learn biology, history, management, mathematics, accounting, art, engineering, philosophy, and English.

At the same time, educators are looking for applications that encourage learners to communicate, think critically, and collaborate—to become literate, lifelong learners. Recognizing that resources in education vary widely, ways to use and to share both the most widely available, most accessible, and most affordable electronic tools is emphasised. There are also some of the technically complex, expensive forms of information technology that support instruction in any discipline and across disciplinary boundaries. Included are word processors; electronic mail; newsgroups; multi-user dimension object orientated environments (MOOs), and other synchronous conferencing systems; multimedia development systems; and World Wide Web (WWW)-related applications.

The conceptual bases for writing and electronic communication have common origins: the use of written, oral, and visual language in ways that support learning as well as communication and the use of interactive pedagogy that promotes active learning. Most early writing programs follow the pioneering work in England of James Britton and Nancy Martin, who sought to establish programs on two of the primary functions of written language:

- Writing to learn, in which the main goal of the writing is to help writers learn what they are studying

- Writing to communicate sometimes referred to as "learning to write," in which the main goal of the writing is to help learners learn to communicate to others what they are learning and what they have learned.

In theory and in practice, of course, these two functions often overlap in important ways depending upon the purpose, audience, and context for writing, especially with electronic writing.
Educators need to see the direct usefulness of these resources in their classroom in order to be persuaded to make the time investment necessary to learn to navigate the Internet, find materi-

als, and employ them in the curriculum. It does take time initially to familiarise oneself with the workings of the Internet and a direct access is paramount in facility of use. Given the communicative goal of teaching, however, educators cannot ignore the valuable electronic resources that are now so readily available. The suggestions below will hopefully provide the impetus for further investigation on the part of the reader.

LeLoup & Ponterio 1995:http://www.cortland.edu/www/fteach/articles/nyscea.html states that perhaps the most simplified use of the Internet is direct communications with other colleagues through e-mail and membership on language lists. The information and dialogue encountered through participation in these forums can provide educators with a wealth of materials, knowledge, and expertise that can be directly applied to their classroom. The range of topics is wide, from information about learner trips and recommended sponsors to esoteric theoretical discussions.

It is appropriate to take note at this stage that there is a bouquet of websites that foster interactive learning. One such example is laboratories or virtual physical science laboratories. These laboratories allow learners to go online and perform experiments in a virtual environment.

According to Bridges 2002: http://canada.com/news/story.asp?id={C04DC32E-C06D-4719-80D3-9DB4FF792BCD, it is possible to do experiments from a laptop computer whilst resting on an armchair. He makes reference to the field of physics-based experiments. The technique strives to create a virtual world consistently guided by the same physical laws that give order to the real world.

Virtual learning such as virtual physics or virtual chemistry allows learners free reign to experiment and learn without fear of causing catastrophic disasters or incurring huge financial setbacks in setting up real experiments. This encourages learning whilst excluding the principle of

fear. Learning becomes an enjoyable event, which is a positive emotion that is associated with learning.

A further benefit of virtual learning is that pupils in rural areas, who do not have access to laboratories, can work in virtual laboratories. The financial gains will be beneficial especially for the poorer schools. This virtual climate is possible to create as indicated in my case study of the Myeka School in chapter 6.

Social benefits of Electronic Communication

Leloup & Ponterio 1995: http://www.cortland.edu/www/fteach/articles/nyscea.html in order to help prepare and train much of tomorrow's labour force, educational institutions will need to be equipped with information technologies and communications networks that are integral to these processes. Learners who do not learn to use computers and information technology in schools will not be competitive in the job market.

With advanced information technology, South Africans not only can benefit economically but also can enhance the overall quality of life. We can create a government that costs less and is more responsive to public needs. We can improve the delivery of quality health care through technologies that allow rural and remote communities to have access to specialists in urban medical centres. We can and should improve access to education for those in rural, remote, and disadvantaged areas.

Electronic communication provides opportunities for distance learning so that learners will be able to communicate with educators and learners in other schools, as well as take courses that are not available in their communities. Linking schools to each other and to the best educational resources will help in providing industry with a well-trained labour force. Educators will find that their job functions will expand, since they will need to become more creative in supplementing their curricula with multimedia technology.

Besides helping to create a computer literate work force, information technology in the classroom can help level the playing field for learners of different socio-economic backgrounds and reduce the divide between information "haves" and "have nots." By having access to information in voice, data, full-motion video, and/or multimedia format, learners can explore new ways of learning and communicating.

Communication of ideas and information

Parker et al 1998: 20 state that learners understand and use visual images and symbolic forms, such as numbers, musical notation, diagrams, graphs and tabular information: for example, learners may ask directions from someone; contribute appropriately to a discussion; describe an experience using sign language; explain a mathematics operation to another learner; prepare a chart which explains a scientific phenomenon; write a set of directions for using a machine; write a letter requesting information from an organisation; explain why people vary their language in different social situations; critically analyse the language in a newspaper article; or present the findings of a project on the Internet and call for comment.

Learners describe, reason, understand, interpret, justify and make predictions

Parker et al 1998: 22 explain that learners describe and reason about patterns, structures and relationships in order to understand, interpret, justify and make predictions. One of the main ways in which we make sense of the world is by observing similarities and connections between objects and events and making generalisations about them. Learners recognise, describe, explain and project patterns in a wide range of phenomena. They also classify things, recognising, developing and using structures and forms.

The above-mentioned discussion of Parker et al clearly emphasises the importance of small group communication (for instance conversation and brain storming). Public communication,

such as making presentations or debating issues clearly demonstrates that adeptness at small group communication and public communication are prerequisites for learners to succeed in classroom settings.

Contribution to the global community

Parker et al 1998: 24 say that learners who interact with people and cultures other than their own and are equipped to contribute to the global community.

The Internet allows learners are able to communicate effectively with people from other cultural groups and countries. They understand the relationship between language and its social and cultural contexts and the importance to all people of their own linguistic heritage. They are able to apply this knowledge to communicate effectively. They appreciate the common humanity of all people and understand the interdependence of countries in many areas, including the environmental and economic spheres.

Individual and group work

Electronic communication fosters communication skills in children in that choice of associations is not coloured by physical distracters or status. Parker et al 1998: 26 explain that learners are self-motivated and confident in their approach to learning and are able to work individually and collaboratively. Learners plan, reflect on and direct their own learning. When needed, they seek help from adults, peers, and print resources and technology. They have available a range of communication strategies to help them get started, work through, persist with and learn from problems independently. They also recognise when collaboration will enhance their work. They work well with others and contribute in various ways, sometimes leading and sometimes following, accepting, sharing, integrating or adapting ideas from others and building on various positions flexibly and responsively.

Recognition and sharing of information

According to Parker et al 1998: 21 learners recognise when and what information is needed, locate and obtain it from a range of sources and evaluate, use and share it with others. Learners frame and clarify questions, collect information, organise it and represent it in ways suited both to the type of information and to their purposes. They analyse and interpret information, judge its quality and decide what conclusions or inferences might reasonably be drawn, taking into account the element of chance involved in its collection: for example, learners may find out a fact about an animal; search the Internet for information on the effect of a recent volcanic eruption on weather patterns; integrate information from several brochures to plan a trip; reorganise data about favourite foods to answer new questions; investigate immunisation practices in South Africa and prepare a poster to communicate conclusions to peers; produce statistics and graphs to compare responses of learners and parents to a survey on the age of transition to secondary school; review the evidence ins foreign newspaper article on; the impact of industry on the environment; or use the Internet to work with and share information with learners in other schools.

Learners can select, use and adapt technologies

Parker et al 1998: 22 continues to say that learners have the motivation and confidence to develop and use technological solutions to meet needs. They apply or operate a specific technology and choose between or integrate various technologies for a purpose. They adapt familiar or existing technologies to meet the demands of new tasks or situations. As confident and capable users of a wide range of technological applications and processes, they critically appreciate the consequences of technological innovation. They have the skills to acquire and evaluate information in order to take ethical advantage of technological change: for example, learners may use a concept computer keyboard; word-process a document; design and make a stage lighting system; make an ethical judgement shoot the school's choice of using scheme or bore water; use a

computer package to understand a science idea; make a skateboard tamp; produce a multimedia presentation; or use a range of communication technologies to establish relationships with others outside the school.

Communication and collaboration

According to Stemberg 1998: 483 communication appears to be a key to success in relationships of many kinds. On a close comparison of all the learning areas it is evident that learners in all areas of learning have to compose and make oral presentations as part of the social construction of meaning. Learners use effective research and information management skills, including locating primary and secondary sources of information with traditional and emerging library technologies while also reading and using a variety of methods to make sense of various kinds of complex texts.

Parker et al 1998: 27 explain that while the eight learning areas have been identified, knowledge, skills, understandings, values and attitudes should be integrated across all learning areas. Learners should be given frequent opportunity to see the connections between different areas of knowledge. They should be encouraged to understand the contingency of any de division of knowledge into learning areas, subjects or other categories, and to appreciate the interconnectedness of all knowledge and the indissoluble relationship between knowledge and values. They should see learning areas and subjects as vehicles for understanding the world in which they live. Their education should help them to see the content of their learning areas and subjects at work in their own lives and the world around them. The holistic nature off human learning and knowledge should be emphasised throughout learners' schooling.

Conclusion

I this chapter I have explained that all forms of knowledge are integrated in the individual mind. Although disciplinary boundaries exist in school curricula we know that the human mind

organises and integrates knowledge when people learn. We can determine strategic alliances between learning areas in school curricula because of the interrelatedness of forms of knowledge.

While the eight learning areas have been identified, knowledge, skills, understandings, values and attitudes should be integrated across all learning areas. Learners should be given frequent opportunity to see the connections between different areas of knowledge. They should be encouraged to understand the contingency of any division of knowledge into learning areas, subjects or other categories, and to appreciate the interconnectedness of all knowledge and the indissoluble relationship between knowledge and values. They should see learning areas and subjects as vehicles for understanding the world in which they live. Their education should help them to see the content of their learning areas and subjects at work in their own lives and the world around them. The holistic nature off human learning and knowledge should be emphasised throughout learners' schooling.

Communication appears to be a key to success in relationships of many kinds. It is important that learners realise that a common frame of mind is the pathway to the communication process.

In the next chapter I will proposal a curriculum for teaching Electronic communication as part of a Communication Science curriculum in the Further Education and Training band.

Chapter 9

PROPOSALS FOR TEACHING ELECTRONIC COMMUNICATION AS PART OF A COMMUNICATION SCIENCE CURRICULUM IN THE FURTHER EDUCATION AND TRAINING BAND

Preview

In this chapter I will propose a curriculum for electronic communication in the further education and training phase of school Communication Science curricula. Mersham & Skinner 2001: 139(a) state that if we look carefully at how knowledge is created within an organisation, it becomes obvious that it is closely connected with the forms and structures of communication that are in everyday use within the organisation. From our studies of communication, we know that in order to become shared knowledge, information has to be transmitted and understood. To move from being tacit knowledge to explicit knowledge, it must be externalised first in some kind of medium.

Information society and knowledge management

Williams 1992: 339 believes that many have come to call ours the information society because of the vast expansion of information technologies in our lives. This expansion includes the application of these technologies — computers, satellites, videotape, compact disks, fibre optics, integrated circuits, artificial intelligence, and robotics — in the home, office, and public environments. It has become imperative that people develop strategies to manage knowledge. According to Mersham and Skinner 2001: 139(a), knowledge management has two main aspects to it:

- The first is the technology aspect that concerns the technicalities of capturing, storing, accessing and disseminating knowledge

- The second is the human management aspect or how we encourage a knowledge-sharing culture within an organisation.

Restructuring of the curriculum

C2005 rev overview doc 2001: 19 states that the Revised National Curriculum Statement aims at the development of a high level of knowledge and skills for all. This is part of the goal to achieve social justice, equity and development. Social justice requires that those sections of the population previously disempowered by the lack of knowledge and skills should now be empowered by it. If social justice and equity are to be achieved, then the curriculum needs to be structured and designed in such a way that all, and especially those with special needs and least resources and skills, are empowered by it. Lack of adequate specification of requirements can place those with minimal access to educational and other resources at a disadvantage.

The curriculum for Communication Science for teaching electronic Communication could include the following:

- Conceptual framework for electronic communication
    - Introduction to the digital age
    - Characteristics of electronic communication
    - Communication networks
    - Theories of electronic communication
- Electronic communication
    - The information age
    - E-mail

- Web browsing
- Electronic collaboration via intranets and extranets
- Web publishing versus print publishing
- The telecommunications infrastructure
- Internet Relay Chat
- Videoconferencing
- Maintaining Pre-existing Communities
- Satellite communication
- E-journals
- Status and information accessibility
- The information age comes to the assistance of primary health care
- Online auctions
- Smart cards
- Digital signatures
- The multilingual Web
- The semantic web
- Music, youth and the digital revolution

- Movies on the Internet
- The Internet and video
- Interactive advertising
- Interactive television
- What the digital future holds

- Developmental communication
  - Development in electronic communication
  - Communication — an agent for change
  - Primary, Secondary and Tertiary Orality

- Emerging communication technologies
  - Converging electronic communication technologies
  - Electronic Communication: issues, prospects, and pitfalls
  - A Transition from Face-to-face to computer-to-computer communication
  - Building Virtual Communities

- Organisational and Entrepreneurial Communication
  - Enterprise resource planning
  - Customer relationship management

- Marketing and promoting a website
- Technology and business services integration
- E-banking
- Modes of electronic payment on the Internet

- Educational communication
  - Knowledge management in the information age
  - E-learning in virtual classrooms
  - Virtual Libraries
  - Electronic research
  - Educational research facilities on the Internet

- The internet and governance
  - Legal issues in the digital media
  - E-government
  - Legislation and Internet content

Electronic Communication as part of Communication Science curriculum squarely forms part of the imperative that learning programmes should be firmed in the direction of Science and technology by filling the yet unexplored no mans land between the humanities and natural science.

Conclusion

In this chapter I proposed a curriculum for teaching Electronic Communication as part of a Communication Science curriculum in the FET phase. The curriculum has been engineered to focus on the South African scenario of OBE and is based on suggestions, which I had made concerning curriculum and syllabus planning in earlier chapters. It is envisaged that the above curriculum will create a field of study that will adequately prepare individuals for the 21st century where people have become technologically active. It will equip learners to enter vocations with confidence since they are coming to grips with current trends in society. Learners will be able to focus on the impact that digital electronic communication has on the way we live and work.

In the next chapter I will summarise my finding of this thesis and provide recommendations.

Chapter 10

CONCLUSIONS AND RECOMMENDATIONS

Preview

In this chapter I will present my conclusions and recommendations concerning the role of Electronic Communication as part of a secondary school Communication Science curriculum in the Language, Literacy and Communication Learning area of the Further Education and Training band.

In my thesis I identified five problems and show how the acquisition of a range of communication skills by the educator and learner will contribute to resolving the problems and how the introduction of Communication Science as a formal subject within the Language, Literacy and Communication area of the Further Education and Training band could help resolve some of the problems that I identified.

Summary

Since its introduction in 1996, OBE in South Africa has remained stuck on the web curriculum design. Consequently, little has been done regarding other essential aspects of education reform that are required for OBE to succeed. An important issue is inattention among educators and educationists regarding the range of sophisticated communication skills that educators as well as learners must be in command of for OBE to succeed. Besides identifying such communication skills, I also presented cogent arguments why Communication Science should be formalised as a school subject in the Further Education and Training band to equip learners with the cognitive and communication skills that they require as responsible citizens in their work places or in the pursuit of further studies in higher education.

In chapter 1, I provided a brief outline of the structure of this thesis.

In chapter 2, I stated the problems to be investigated and I motivated why it is important to focus on Communication Science in an Outcomes-Based Education (OBE) environment. I outlined the nature and stated the value of my research with regard to giving expression to the communicative principles underlying OBE and specifically the benefits of Electronic Communication in the Further Education and Training band of the school curricula.

In chapter 3, I defined and discussed the key elements of the communication process in electronic communication in an envisaged Communication Science curriculum for the Further Education and Training (FET) band of Curriculum 2005. I briefly discussed the revised national curriculum statement and the role of OBE in the classroom.

In chapter 4, I traced the development of Electronic Communication and its impact on society. I focused on current issues such as *interactivity* and *convergence* of new communication technologies. I have illustrated how digital communication overcame constraints relating to distance and time.

In chapter 5, I presented an argument for including Electronic Communication in the Further Education and Training band of a Communication Science curriculum. I examined issues such as the diminishing demand for the study of grammar and literature among learners and breaking cultural, geographical and time barriers with Electronic Communication. I included a case study to show the real impact of Electronic Communication on how we live and work in order to justify that Electronic Communication has to be taught and learnt in our schools. This chapter demonstrates that Electronic Communication has a positive impact on all spheres of life and as such, its implementation in the FET band of the Communication Science curricula will ensure that learners are adequately prepared to enter the vocational world with the necessary confidence and skills.

In chapter 6, I examined the state of Electronic Communication in South African schools. Issues such as the rural-urban divide in South African education and efforts to globalise South Africa were examined. I examined key issues such as the role of Government Communication Information System (GSIS) in reaching rural communities. I discussed initiatives taken by the Ugandan and Indian governments to globalise their countries. With he Myeka case study, and the Telkom Foundation initiative I demonstrated that electronic communication is within reach of even the remotest rural schools.

In chapter 7, I examined the role of Communication in Outcomes-Based Education.

In chapter 8, I examined the benefits of Communication Science to subjects in other learning areas. I explained that all forms of knowledge are integrated in the individual mind. I stated that although disciplinary boundaries exist in school curricula we know that the human mind organises and integrates knowledge when people learn. I emphasised the educators' role in knowledge construction, the social benefits of Electronic Communication and recognising and sharing of information. I further stated that the holistic nature off human learning and knowledge should be emphasised throughout learners' schooling.

In chapter 9, I proposed a curriculum that could be used for teaching Electronic Communication as part of Communication Science in the Further Education and Training band of the school curriculum. This curriculum would create a field of study that would adequately prepare individuals for the 21st century where people have become technologically active. It would equip learners to enter vocations with confidence since they are coming to grips with current trends in society.

In this, the final chapter of my thesis I present the conclusions of my research and make recommendations with regard to the development of Electronic Communication as part of a secondary school Communication Science curriculum in the Further Education and Training band.

This thesis stresses the impact that Electronic Communication has on all spheres of life and as such, its implementation in the FET band of the Communication Science curricula will ensure that learners are adequately prepared to enter the vocational world with the necessary confidence and skills.

It is necessary for learners to develop competencies for participation in an information society, for the job skills of a global economy, for lifelong learning, and for personal pleasure. Exposure to, familiarity with, and regular use of information on the Internet are paramount to learners' and educators' professional development. Electronic Communication has modified 21st Century learning. I have effectively demonstrated that the diminishing demand for the study of grammar and literature among learners needs to be supplemented by the relevant science of communication.

As the evolution to a knowledge-based economy accelerates, learners must have access to communication and information technologies in the classroom. Without these tools, learners will lack the indispensable communication skills to participate in a digital world. Deploying computers in classrooms and connecting them to the Internet will augment the learning process by providing learners and educators with access to information and teaching resources from around the world.

The brunt of electronic communication on language training has transformed the way we write and communicate. Electronic Communication can facilitate amalgamation of other school subjects with language learning. Educators can coalesce the study of language with current events, history, politics, and geography using Communication Science as the effective link amid learning areas.

The case study of "Hirt & Carter" was used to demonstrate how Electronic Communication has altered the way in which we work. The case study effectively highlights how Electronic

Communication can surpass barriers of time and expanse. The case study has also been incorporated to reveal the need to equip learners in the FET phase with real life skills.

With advances in information technology, we not only can benefit economically but also can enhance the overall quality of life. We can create a government that costs less and is more responsive to public needs. We can improve the delivery of quality health care through technologies that allow rural and remote communities to have access to specialists in urban medical centres. We can and should improve access to education for those in rural, remote, and disadvantaged areas because no child should be deprived of equitable opportunities for education.

In order to help prepare and train much of tomorrow's labour force, educational institutions will need to be equipped with information technologies and communications networks that are integral to these processes. The availability if Communication Science in the further education and training band of the school curricula will create awareness within the learner of factors that contributes to success in life vocations. Electronic Communications relate to life skills orientations will have a worldview of vocation structures available to them. Communication is about skills. Learners who do not learn to use computers and information technology in schools will not be competitive in the job market.

Recommendations

1. Besides explaining concepts and administration procedures that relate to OBE, the Department of Education must take the initiative in providing in-service training for teachers with regard to teaching strategies that are relevant to OBE. OBE cannot survive on traditional styles of teaching. Motivational Learning needs to be entrenched as a powerful in OBE. In this light it is recommended that the theory of Constructivism be part of teacher training OBE.

2. Communication Science should be formally included as a discipline in the Language, Literacy & Communication Learning area in the Further Education & Training band.

3. Because one can in principle communicate in any language, research needs to be done on the languages in which the envisaged new Communication Science curricula could be offered, and how the learning materials and methodology for constructing the learning material and translating to indigenous language could be implemented.

4. Retraining of educators for Communication Science should be examined in relation to at risk subjects such as the phasing out of Afrikaans in certain schools. Teachers affected by such phasing out initiatives should be given the option of being retrained to offer Communication Science.

5. A course focusing on the methodology of teaching Communication Science should be included in teacher training diploma curricula.

6. Prospective Communication Science teachers should be allowed to do a Bachelor's level degree in Communication Science, Media Studies or Communication Studies as qualification to teach Communication Science in the FET band, provided that they also have a teacher-training diploma. New teachers who will want to teach Communication Science at senior level should be given the opportunity to study the subject up to third year level.

7. Electronic Communication should form part of such a Communication Science curriculum, also in rural schools to help overcome the negative impact of the digital divide on South African rural communities.

8. A broad policy should be developed the role of electronic communication that integrates information gathering and distribution across schools.

Conclusion

There are distinct obstacles to implementing the dramatic changes our educational system needs. The first is the systemic lack of awareness of the appropriate uses of electronic communication in our schools today. There is a long historical precedent for this lack of knowledge. The classroom has traditionally been the last institutional space in our society to be penetrated by any new electronic communication, be it calculators, VCRs, or computers. This is partially the result of limited budgets, and partially the result of limited experience on the part of educators and administrators - it is difficult to conceive of pedagogically sound ways to apply electronic communication when you are not familiar with it. Similarly, our teacher's colleges and institutions of higher education have not made it a priority to reflect on the pedagogical potential of electronic communication when teachers are trained. The normative tendency in education has been, unfortunately, to treat computers and other electronic communication as add-on. The result of this practice is that computers become little more than "electronic workbooks," bearing an awkward and peripheral relationship to an otherwise unchanged curriculum.

In order to incorporate electronic communication more fully into the classroom, several changes are needed. Teachers must be provided with the time and support to explore electronic communication on their own. Administrators must provide the time ands pace for teachers, who now suffer from larger classes and more responsibility than ever, to take a break from teaching to start learning. Teachers must be treated like the professionals they are. Teacher creativity is a powerful force for positive educational change, but it can thrive only if it is unleashed and supported by strong institutional commitments.

The introduction of electronic communication as part of a Communication Science curriculum in the Further Education and Training band will contribute towards resolving some of the systemic problems that I have pointed out in the preceding paragraphs.

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