

SOCRATES - MAILBOX

THE CONNECTED TEACHER

Using ICT in school for teachers in training

MAILBOX GUIDELINES

AUGUST 1998

The Socrates - Mailbox project

A two-year Observatory project in the context of the ODL sub-programme of the SOCRATES Programme of the DG 22 of the European Commission, the Socrates - Mailbox project started in September 1996. It aims at studying the use of electronic communication systems in Primary and Secondary school environments, through an ethnographic approach. The experiences of 17 schools have been studied in six European countries.

The Socrates - Mailbox partnership

Seven organisations contribute to the Socrates - Mailbox project:

Eric Barchechath, Associate in **Atelier** (Italy) — formerly OpenStudio — is main Contractor and Project Manager of Mailbox. An international consultant, he has expertise in the field of innovation in education and training, engineering of Open and Distance Learning (ODL) systems, Information and Communication Technologies (ICT) and social acceptance of technology.

Rossella Magli (Researcher), *Stéphanie Laurent* (Assistant Researcher) and *Yves Winkin* (Director) of the **Laboratoire d'Anthropologie de la Communication-LAC** at the Université de Liège (Belgium). The LAC is in charge of Scientific Coordination for the project. The expertise and main research domains of the LAC focus on: ethnographic approaches to communication in urban settings, inter-cultural communication, sociology of education, innovation in education and training.

Janet Jenkins, **Consultancy in Distance Education** (CIDE) (UK) has been for long involved in Open and Distance Learning. An international consultant, she developed her activities in designing and implementing Open and Distance Learning systems in diverse educational contexts, and now spends much of her time conducting feasibility and assessment studies for ODL and working on technology-based development in education and training.

Inger Lise Stieng (Researcher) and *Sigmund Lieberg* (Director) are part of the **Nasjonalt LaeremiddelSenter-NLS** (National Centre for Educational Resources) (Norway). NLS is concerned as much with pedagogical documentation as with technological resources for education. The centre also conducts research in specific pedagogical questions and produces learning support for distance education.

Dagmar Hexel, *Olivier de Marcellus*, *Marc Bernoulli* (Researchers) and *Fiorella Gabriel* (Director) in the **Centre de Recherches Psycho-Pédagogiques - Direction Générale du Cycle d'Orientation** (CRPP-DGCO) (Switzerland). CRPP is a research department internal to the Geneva Lower-Secondary school system (17 lower-secondary schools, 11,000 pupils, 1,700 teachers). CRPP develops a wide range of research on pedagogical engineering, educational use of technology in school contexts, classroom organisation and its impact on learning performance, etc.

Pierre Dunand-Filliol (Researcher) and *Raymond Morel* (Director) of the **Centre Informatique Pédagogique** (CIP) in Geneva (Switzerland). The CIP is the resource centre which manages educational technology for all the Geneva area and has special responsibility in teacher training related to technology.

Michel Arnaud (Researcher) and *Jacques Perriault* (Director) at the **Laboratoire de Recherche sur l'Industrie de la Connaissance of the Centre National d'Enseignement à Distance** (CNED, France). Their role in the project is that of advisers and assessors of project results and performance.

This document is written thanks to the contributions of all the SOCRATES Mailbox Partners. The opinions expressed and the analyses put forward fall under the exclusive responsibility of the editors-in-chief:

Janet Jenkins, Sigmund Lieberg and Inger Lise Stieng

Table of content

Préface (<i>French introduction</i>)	2
Prefazione (<i>Italian introduction</i>).....	7
 Introduction	 12
 Communication	
1. Using new communication possibilities in school.....	15
2. Communication technologies and their applications.....	16
3. What new communication possibilities do ICTs bring to the classroom?.....	18
4. On-line learning and its potential.....	19
5. Reflecting on the impact of ICT.....	21
6. The context: the classroom as mirror of changing society	22
7. Linking communication to learning: the Swiss experience.....	23
8. Getting started: some examples	23
9. Accessing new communication possibilities: A pedagogical framework.....	25
10. Implementing the framework: introducing new communication possibilities	27
11. Pedagogy into practice: some issues for reflection.....	28
12. Achieving Quality: using new communication possibilities to add value to your work as a teacher	29
13. Extension	35
 Enriching learning	
1. Using ICT to enrich learning: introducing some possibilities	32
2. Is learning in the information age different from before?	34
3. ICT and quality of learning.....	39
4. Reviewing your own ways of learning: an activity.....	41
5. Focus on school learning	42
6. Using ICT to enrich pupils' learning: an activity	43
7. Extension	43
 Glossary	 45

Préface

Eric Barchechath et Rossella Magli

Sans doute faut-il ici tout d'abord rappeler que MAILBOX est un **projet d'observation** du sous-programme EOD (enseignement ouvert et à distance) du Programme SOCRATES¹. Un projet d'observation assez innovant cependant, dans le contexte de l'enseignement ouvert et à distance et ceci à plusieurs titres :

- L'objet de l'observation : l'utilisation réelle des technologies de communication (messagerie et courrier électronique, téléconférence, visioconférence, usages de l'Internet et du Web).
- Les lieux d'observation : 17 classes de l'enseignement primaire (6) et secondaire (11) qui utilisent les technologies de communication de façon usuelle en Belgique, France, Italie, Norvège, Royaume-Uni, Suisse.
- La nature de l'observation : une approche de type ethnographique² qui a amené les observateurs à s'immerger sur des périodes assez longues au sein des classes et des établissements qui ont servi de terrain à l'observation³.
- Le partenariat qui a conduit le projet : composé de chercheurs (en psychopédagogie et en anthropologie de la communication) et de praticiens (consultants et décideurs en matière d'enseignement ouvert et à distance).
- Le point de départ du projet : non pas la technologie mais bien l'éducation. Avec ces questions : quels sont les usages dans l'éducation des technologies de communication ? Quel est l'impact et la contribution de ces usages sur les apprentissages ? Comment ces technologies sont-elles mises en œuvre dans les expériences qui apparaissent exemplaires ?

Notre interrogation part donc de l'éducation et de sa finalité. Quelle est en effet la vocation des appareils de formation initiale ? S'agit-il de satisfaire aux besoins en main d'œuvre du monde économique, aux exigences de la société civile, au développement et à l'épanouissement des personnes ?

Il faut accepter toutes les réponses car il faut tout à la fois : faire des citoyens, faire des travailleurs, faire des hommes et des femmes :

- socialiser les enfants et les jeunes pour en faire des citoyens qui maintiennent l'ensemble de valeurs démocratiques qui fondent nos sociétés européennes en leur léguant un ensemble de valeurs, de comportements et d'attitudes ;
- leur donner un bagage de connaissances et de savoir-faire pour qu'ils puissent s'insérer dans la vie économique de la cité et contribuer au mieux être tant individuel que collectif ;
- permettre, autant que faire se peut, l'épanouissement de leur personnalité, l'expression et le développement de leurs talents et de leurs qualités individuels.

Le plus souvent lorsqu'on se pose la question de l'usage des technologies dans la sphère éducative, c'est à la seconde des finalités de l'école que l'on pense et l'essentiel du discours sur

¹ DG22 de la Commission Européenne.

² Nous renvoyons ici pour les aspects méthodologiques au Rapport de synthèse, Socrates-Mailbox, Août 1998, que l'on peut se procurer au choix en anglais ou en français en version électronique sur le site Web du projet (à l'adresse <http://tecfa.unige.ch/socrates-mailbox>). Egalement disponible dans ces deux langues une version papier éditée par NLS, Nasjonalt Læremiddelsenter, Grev Wedels plass 1-Militærhospitalet, P.O. Box 8194 Dep, No-0034 Oslo. Fax : +4722476552.

³ Les monographies qui rendent compte de nos observations sont également téléchargeables sur le site web du projet : <http://tecfa.unige.ch/socrates-mailbox>

les technologies de l'information et de la communication les destine prioritairement à l'acquisition de connaissances.

Contre toute attente, les résultats du projet MAILBOX tendent à montrer que c'est justement sur les deux autres axes (socialisation, individuation) que l'impact de l'usage des technologies de communication semble être le plus important. C'est en tous cas ce que découvre l'observateur qui sans trop d'a-priori va séjourner sur une longue période dans une classe.

Si l'on peut avoir l'illusion qu'il existe des classes où les enfants utilisent tout le temps des moyens technologiques (dans des classes qui sont données en exemple dans les médias notamment) l'observation longue met en évidence la multiplicité des activités qui sont conduites dans la classe et la complexité du cahier des charges qui pèse sur l'enseignant et donc le réel statut de l'usage des technologies dans cet environnement et la place à laquelle peut prétendre cet usage. Les questions auxquelles essaie de répondre le plus clairement possible l'approche ethnographique que nous avons choisie ont été les suivantes :

- En situation de fonctionnement réel d'une classe, quelle est l'incidence de l'utilisation des technologies de communication en terme de temps d'utilisation, de gestion de l'espace, mais aussi en terme d'impact global sur le déroulement de l'activité d'apprentissage, sur le contenu de l'apprentissage, sur les apprentissages implicites (ce qui s'apprend à l'école mais qui n'y est pas enseigné) repérables ?
- La disposition d'outils de communication technologiques dans la classe se suffit-elle comme moteur d'une transformation des usages pédagogiques ou bien à l'inverse, la réorganisation de l'activité dans la classe¹ est-elle un préalable à une mise en œuvre sensée des technologies de communication dans l'environnement scolaire ?
- Quels sont les nouveaux rapports qui se constituent entre les élèves ? Quelles sont les nouvelles relations qui s'organisent entre l'enseignant et les élèves ? Qu'apprend-on avec les technologies de communication que l'on apprendrait pas sans elles et autour de quoi se structurent leurs usages ?

On ne peut analyser l'impact des voitures sur notre société en les considérant seulement comme des "*chariots sans chevaux*" et en posant les mêmes questions que celles que l'on poserait à propos des chariots, en mettant simplement les chevaux de côté. Les voitures sont des véhicules différents des chariots, leur valeur symbolique est différente. De la même manière, les ordinateurs sont différents des livres, de la télévision et des cahiers. Et il en va de même pour leurs valeurs symbolique et métaphorique ... C'est précisément ce que nous avons essayé de mettre en avant et de développer dans le travail de MAILBOX.

Est-il possible de parler des usages éducatifs et de les prendre en considération prioritairement pour remettre à sa juste place l'émergence du fait technologique dans l'école ? Nous avons répondu "oui" à cette question et voulu montrer avec le projet MAILBOX qu'il était possible de se dispenser du discours promotionnel et idéologique qui tient encore aujourd'hui lieu de réflexion en matière d'usage des technologies dans l'éducation.

Cet usage des outils technologiques de communication, tel que nous avons pu l'observer, se structure autour de problématiques-noyaux qui sont développées dans le Rapport de Synthèse² de MAILBOX et que l'on peut brièvement résumer ici:

- Le statut de la relation à soi-même et aux autres est changée pour les élèves, qui font le double apprentissage de l'autonomie et du travail en équipe.
- "Apprendre à apprendre" pour être plus qu'une formule requiert qu'on s'interroge sur les catégories de connaissance, qu'on change le statut de l'erreur dans l'apprentissage (donner le droit à l'erreur), qu'on mette les élèves en position de réduire leurs doutes. De telles stratégies sont aujourd'hui observables.
- Développer la confiance constitue la colonne vertébrale de tout système d'échafaudage cognitif. Ceci requiert d'abord la confiance de l'enseignant à l'endroit de chacun de ses

¹ La centration sur le formé, la plus grande attention portée à l'activité d'apprentissage de l'enfant (learning) plutôt qu'à l'activité d'enseignement (teaching).

² Références données à la première page de cette introduction.

élèves pris individuellement et de tous ses élèves considérés collectivement. Ceci requiert aussi que s'instaurent entre les élèves des relations de confiance et que chacun soit mis en position de "se" faire confiance.

- Le plaisir est une chose sérieuse lorsqu'on utilise les outils technologiques dans l'environnement éducatif, pour les enfants et les adolescents, leur perception est oscillante entre un outil pour travailler et un outil pour s'amuser. Le plaisir apporté par l'utilisation de la machine et par l'échange au moyen de la machine est complexe et multiple allant du simple plaisir d'une écriture propre et correcte jusqu'au plaisir fantasmatique nourri par les rêves que suggère l'infini puissance symbolique des machines.
- L'échange de correspondance par des moyens électroniques va bien au delà de ce qui est visiblement échangé (des banalités), en fait ce sont les racines du fait social lui-même que l'on retrouve dans la pratique de ces échanges : la trilogie du donner-recevoir-rendre nous ramène aux sources mêmes de la socialité. C'est donc un rituel social essentiel qui se met en place dans ces usages et qui permet de bâtir un cadre conventionnel qui donne du "sens". Cette dimension très profonde de l'usage rend difficile certaines formes d'échange artificielles parce qu'insuffisamment préparées.
- Quelle est la réalité de la réalité ? C'est à de telles questions que conduit l'usage des machines communicationnelles. La magie des machines d'une certaine façon ramène le merveilleux et autorise des formes nouvelles de jeu sur l'identité avec soi-même et avec les autres.
- La gestion de l'incertitude devient un argument dominant dans l'environnement éducatif : incertitude quant au comportement pas toujours prévisibles des machines, incertitude aussi sur le monde extérieur et les paramètres sociaux deviennent ici part de l'équation. On apprend à identifier l'incertitude, à la reconnaître, à la maîtriser en s'en jouant, en s'en arrangeant ou en cherchant à la réduire. Elle devient ainsi outil pédagogique.
- Les relations de pouvoir au sein de l'institution éducative expliquent beaucoup des fortunes et infortunes du développement des usages. Dans le monde des adolescents, ces relations de pouvoir sont aussi reproduites entre ceux qui détiennent du "capital" technologique (équipement ou savoir-faire) et ceux qui en sont dépourvus.
- Ainsi beaucoup de choses changent dans les écoles et les établissements secondaires où l'usage des technologies de communication vient renforcer des stratégies pédagogiques cohérentes et avancées : nouvelle définition de l'enseignement, nouvel environnement de l'apprentissage, nouvelle organisation de l'espace et du temps.
- Le déplacement enfin du lieu de l'autorité et l'attribution à l'élève d'un statut de personne.

Ces résultats nous ont convaincu qu'il peut exister des usages des TIC qui peuvent aider à changer en profondeur les formes de la socialisation en milieu scolaire et, par suite, contribuer à modifier la façon dont les systèmes éducatifs attribuent et transmettent des structures psychoaffectives et intellectuelles aux enfants qui les "traversent". Nous avons pu constater que ces modifications ont lieu davantage par ce qui est implicitement appris dans la classe que par l'entremise de ce qui y est enseigné explicitement. La dimension "communication" pourrait être la clé ouvrant à cette transformation.

Il est clair qu'une telle analyse rend davantage compte de ce qui se produit au sein des écoles primaires (lorsque les usages des technologies de l'information et de la communication sont intégrés aux pratiques quotidiennes) qu'elle ne rend compte de ce qui se produit dans l'enseignement secondaire. C'est qu'en effet, une réelle intégration des usages de communication dans les établissements d'enseignement secondaire est gravement obérée par les découpages disciplinaires et les très inflexibles modes de gestion de l'espace et du temps qui ont cours dans la plupart des pays européens. Les féodalités disciplinaires et les modes d'organisation internes de l'institution éducative constituent aujourd'hui les principaux obstacles à l'usage des technologies dans l'éducation, des obstacles sans communes mesures avec la pseudo résistance au changement des enseignants, toujours incriminée par ceux qui n'y ont pas été voir.

Dans leur introduction aux Guidelines (sans doute faudrait-il traduire le terme par "Manuel"), Janet Jenkins, Inger Lise Stieng et Sigmund Lieberg, les auteurs de ce document, développent les arguments suivants.

Ces Guidelines sont destinés aux enseignants qui n'ont pas encore recours aux technologies de l'information et de la communication. Ces Guidelines s'adressent aussi bien aux futurs enseignants qui sont encore aujourd'hui en formation qu'aux enseignants expérimentés qui souhaitent intégrer dans leurs pratiques des usages de ces technologies.

L'ambition de ces Guidelines est essentiellement d'apporter quelque inspiration et d'accompagner une démarche personnelle ou collective. Il s'agit pour l'essentiel d'inviter les professionnels de la chose éducative à réfléchir sur les usages qu'eux-mêmes pourraient ou seraient intéressés à mettre en œuvre.

Les auteurs ne prétendent pas apporter des solutions toutes faites à des problèmes ou même signaler des modèles de pratiques exemplaires, cela n'aurait pas de sens dans un champ qui reste très changeant et animé.

C'est donc davantage à un voyage que sont conviés les lecteurs qui pourront glaner à partir d'exemples réels tirés des observations du projet MAILBOX¹ quelques aperçus pour réfléchir et imaginer des pratiques qui leur soient personnelles.

On progressera dans ces Guidelines, nous disent les auteurs, à travers un questionnement où se rencontreront des concepts à considérer, des suggestions d'activité qui pourraient prendre place dans une pratique réelle. Il s'agit de tracer et d'ouvrir son propre chemin, non pas de reproduire des recettes, afin de pouvoir décider de ce qu'il faut changer dans sa classe.

Les Guidelines se focalisent sur la communication et l'apprentissage, et si bien d'autres questions mériteraient d'être approchées, les auteurs ont jugé qu'il leur fallait se concentrer sur deux questions essentielles pour l'école à leurs yeux : les technologies de communication ont-elles un réel apport au déroulement de l'activité éducative ? les technologies de communication enrichissent-elles réellement l'apprentissage ?

Le guide est conçu pour un usage polyvalent. Il pourra aussi bien être débattu à l'intérieur d'un groupe, dans le cadre par exemple d'un institut de formation des maîtres, ou encore au sein d'un groupe de collègues. Un lecteur isolé pourra aussi en tirer parti et s'en aider pour conduire sa réflexion.

Les ambitions sont donc clairement posées par nos amis britanniques et norvégiens, et leur effort va articuler, comme ils l'annoncent, communication et apprentissage.

Dans leurs développements nos auteurs construisent à partir d'exemples concrets une trame qui passe en revue de multiples dimensions.

Sans vouloir détailler l'ensemble de leurs éclairages, mettons l'accent ici sur quelques-uns des points qu'ils soulèvent sur le versant "communication" de leur travail :

- Les opportunités offertes par l'usage des TIC dans l'école pour l'échange et son ouverture sur le monde extérieur.
- Les différents usages qui sont rendus possibles par les différentes applications (courrier électronique, Internet, etc.).
- Les contributions de ces usages en terme d'enrichissement culturel, d'expérience de l'ubiquité, de diversité des contacts et des relations qu'il est possible d'entretenir, de motivation par l'association forte des élèves à un projet commun.
- Un aperçu, qui appelle la discussion, sur les possibilités d'acquisition de connaissance dans l'accès direct à l'information que permet l'Internet.
- Les nouvelles formes de gestion de la distance. Elles sont porteuses de transformation sociale et ne peuvent pas ne pas s'appliquer aussi à l'école. Des divisions classiques, comme celle d'un espace scolaire protégé en marge du monde, tendront à disparaître, et nos auteurs estiment qu'un continuum se construira entre la vie à l'école et la vie hors de l'école.
- La liaison d'activités proprement pédagogiques et didactiques aux activités de communication. Si les outils de communication valent d'être utilisés en tant que tels pour

¹ Difficulté des coopérations européennes : on constatera que bien peu de leurs illustrations sont tirés des expériences belges, italiennes et françaises ... il est toujours difficile de voir midi ailleurs qu'à sa porte.

communiquer et favoriser les échanges entre les élèves, il appartient aussi à l'enseignant d'organiser les activités pédagogiques de telle sorte que la communication soit un support aux apprentissages requis par l'institution éducative.

- Le souci d'inscrire l'activité dans une finalité éducative. Le souci éducatif peut renforcer le besoin d'organisation et d'anticipation et conduit à mettre l'accent sur un cahier des charges des conditions à remplir.
- Les usages des facilités de communication par les enseignants eux-mêmes. Il ne faut pas croire que seuls les élèves peuvent tirer profit de l'utilisation des technologies de communication : c'est tout autant vrai pour les enseignants qui par ces moyens peuvent partager entre eux leurs interrogations, leurs savoir-faire, les ressources éducatives qu'ils produisent, etc.

Sur le second axe qui porte sur la contribution des TIC à l'apprentissage, deux points méritent une attention particulière :

- Les activités dans lesquelles les dispositifs technologiques sont utilisées. Elles permettent une grande variété de stratégies d'apprentissage individuelles et collectives.
- S'appuyant sur le rapport de la Commission internationale sur l'Education au 21ème siècle, les contributions possibles des TIC sont reconsidérées du point de vue des quatre piliers que sont : apprendre à vivre ensemble, apprendre à apprendre, apprendre à faire et apprendre à être.

Les spécificités de l'approche de nos partenaires britanniques et norvégiens dans la rédaction de ces Guidelines poserait d'importants problèmes d'adaptation. Il y a très clairement des construits sociaux et des consensus nationaux sur la façon de parler des technologies. La lecture anglo-saxonne et nordique nous apparaît, à nous latins, "instructionnelle" plus qu'éducative pour ce qui concerne l'école. Et par exemple la place prise par le "programme" (Curriculum) dans les contextes nord et sud est très différente. Les Anglais et les Norvégiens mettront facilement au programme des établissements éducatifs l'obligation d'usage des technologies¹ tandis qu'en France et en Italie, les usages se constituent principalement dans la pratique sans lien direct avec le programme scolaire (bien évidemment des exceptions existent). Plus encore, on peut penser que leur imposition programmatique pourrait entraîner un rejet tout autant de la part des maîtres que probablement de celle des enfants.

De la même façon, pour ce qui concerne la technologie, le type de consensus social existant au nord ne laisse place à aucune remise en question de son bien fondé. Pour le lecteur Français ou Italien, aucun consensus semblable n'existe. L'intégration des technologies dans l'éducation fait encore problème notamment parce qu'elles sont trop souvent présentées comme devant s'imposer à tous les enseignants. Il y a cependant de bonnes raisons d'en douter : pour des objectifs éducatifs donnés, d'excellents enseignants sauront les atteindre avec leurs élèves sans utiliser les technologies, et de tout aussi excellents enseignants sauront les atteindre en y ayant recours. L'enjeu n'est donc jamais la technologie mais toujours l'éducation.

¹ En avançant notamment la raison d'un accès démocratique.

Prefazione

Rossella Magli e Eric Barchechath

Mailbox é un **progetto di osservazione** del Programma SOCRATES-ODL¹, Open and Distance Learning (apprendimento aperto e a distanza); un progetto di osservazione innovativo in questo contesto, sotto molteplici punti di vista:

- L'oggetto dell'osservazione: l'utilizzo reale, in contesto reale, delle tecnologie della comunicazione (posta elettronica, teleconferenza, videoconferenza, Internet e Web).
- I luoghi dell'osservazione: 17 scuole, ripartite tra elementari (6), medie inferiori e superiori (11), in Belgio, Francia, Italia, Norvegia, Regno Unito e Svizzera, che utilizzano "abituamente" le tecnologie della comunicazione.
- La natura dell'osservazione: un approccio di tipo etnografico² che ha portato gli osservatori a immergersi per periodi prolungati nelle classi e negli istituti scolastici³.
- Il partenariato che ha condotto il progetto: composto da ricercatori (in psico-pedagogia e in antropologia della comunicazione) e di esperti in materia di apprendimento aperto e a distanza (consulenti e responsabili delle politiche a livello nazionale).
- Il punto di partenza del progetto: non la tecnologia, ma l'educazione. Sottintendendo queste domande: quali sono gli usi delle tecnologie della comunicazione nell'educazione? Quali sono il contributo e l'impatto di questi usi sull'apprendimento? Come queste tecnologie sono impiegate in esperienze che sembrano essere esemplari?

Il nostro punto di partenza é dunque l'educazione e le sue finalità: qual é in effetti la vocazione delle strutture di formazione iniziale? Soddisfare ai bisogni di mano d'opera del mondo economico? Rispondere alle esigenze della società civile? Promuovere lo sviluppo armonioso delle persone?

Riteniamo che tutte e tre le risposte siano essenziali: compito dell'istituzione educativa é formare dei cittadini, formare dei professionisti, formare degli uomini e delle donne:

- socializzare i bambini e i giovani per farne dei cittadini che mantengano l'insieme dei valori democratici, alla base della società in Europa, trasmettendo loro valori, fornendo modelli di comportamento e stimolando atteggiamenti;
- dare loro un bagaglio di conoscenze e savoir-faire perché possano inserirsi nella vita economica e contribuire al benessere sia individuale che collettivo;
- permettere, per quanto possibile, lo sviluppo armonioso della loro personalità, l'espressione e lo sviluppo del loro talento e delle loro qualità individuali.

Spesso, quando ci si pone la questione dell'uso delle tecnologie in ambito educativo, é alla seconda delle finalità che si pensa; l'essenziale del discorso sulle tecnologie dell'informazione e della comunicazione le riserva in via prioritaria all'acquisizione di conoscenze.

Contro ogni aspettativa, I risultati del progetto Mailbox tendono a mostrare che é giustamente sulle due altre direttive (socializzazione e individuazione) che l'impatto dell'uso delle tecnologie della comunicazione sembra rivestire la maggiore importanza. E', in ogni caso, ciò che scopre l'osservatore che senza troppi a priori soggiorna per un lungo periodo in una classe.

¹ DG 22 della Commissione Europea.

² Per gli aspetti metodologici, rinviamo al Rapporto di Sintesi, Socrates-Mailbox, Agosto 1998, disponibile in Inglese e francese in versione elettronica sul sito Web del progetto (<http://tecfa.unige.ch/socrates-mailbox>). Una versione cartacea é ugualmente disponibile in queste due lingue pubblicata da NLS, Nasjonalt Laeremiddelsenter, Grev Wedels plass 1 - Militærhospitalet, P.O. Box 8194 Dep, No-0034 Oslo, Norvegia. Fax: +47 22 47 65 52.

³ Le monografie che riportano le nostre osservazioni sono ugualmente disponibili sul sito Web del progetto: <http://tecfa.unige.ch/socrates-mailbox>.

Pur sussistendo l'illusione che esistano delle classi in cui i bambini utilizzano in maniera continua e costante i supporti tecnologici (le classi portate ad esempio dai media, per esempio), l'osservazione prolungata mette in evidenza la molteplicità delle attività condotte in una classe e la complessità dei compiti che spettano all'insegnante; in ultima analisi, un'osservazione prolungata permette di mettere in evidenza il peso relativo degli usi delle tecnologie in contesto scolastico e il ruolo che questi possono ricoprire. Le domande a cui l'approccio etnografico prescelto cerca di rispondere sono le seguenti:

- In situazione di funzionamento reale di una classe, qual è l'incidenza dell'utilizzazione delle tecnologie della comunicazione in termini di tempi di utilizzazione, di gestione degli spazi, ed in termini di impatto globale sullo svolgimento dell'attività di apprendimento, sul contenuto dell'apprendimento e sull'apprendimento implicito (ciò che si impara a scuola ma che non è insegnato)?
- L'esistenza di strumenti di comunicazione in una classe è un motore sufficiente per una trasformazione degli usi pedagogici, o, al contrario, la riorganizzazione dell'attività nella classe¹ è il pre-requisito essenziale ad un uso sensato e proficuo delle tecnologie della comunicazione in ambiente scolastico?
- Quali sono i nuovi rapporti che si instaurano tra gli allievi? Quali sono le nuove relazioni che si organizzano tra l'insegnante e gli allievi? Che cosa si impara con le tecnologie della comunicazione che non si imparerebbe senza di loro, e su cosa sono strutturati i loro usi?

Facciamo un esempio: non si può analizzare l'impatto delle automobili sulla nostra società, semplicemente considerandole come delle *"carrozze senza cavalli"* e ponendosi le stesse domande che si porrebbero a proposito delle carrozze, mettendo semplicemente da parte i cavalli. Le automobili sono veicoli diversi dalle carrozze, la loro valenza simbolica è diversa. Analogamente, i computer sono diversi dai libri, dalla televisione, dai quaderni... E lo stesso si può dire della loro valenza simbolica e metaforica... E' esattamente quello che abbiamo cercato di sviluppare e di mettere in evidenza con il lavoro di Mailbox.

E' possibile di parlare di usi educativi e di prenderli in considerazione essenzialmente per rimettere al giusto posto l'emergenza del fatto tecnologico nella scuola? Abbiamo risposto affermativamente a questa domanda e voluto mostrare con il nostro progetto che era possibile prescindere dal discorso promozionale e ideologico che prende ancora il posto della riflessione in materia di usi delle tecnologie nell'educazione.

Questi usi, così come noi abbiamo potuto osservarli, sono strutturati intorno alle problematiche-chiave, sviluppate nel Rapporto di Sintesi di Mailbox e che possiamo brevemente riassumere:

- Lo statuto della relazione a se stessi e agli altri è cambiato per gli allievi, confrontati con il doppio apprendimento dell'autonomia e del lavoro di gruppo.
- "Apprendere ad apprendere": per essere più che una semplice formula, è necessario che ci si interroghi sulle categorie della conoscenza, e che lo statuto dell'errore nell'apprendimento cambi (dare il diritto all'errore). E' necessario, inoltre, che gli allievi siano messi in posizione di ridurre i loro dubbi. Tali strategie sono oggi osservabili in più esperienze.
- Sviluppare la fiducia negli allievi: costituisce la colonna vertebrale di ogni sistema di strutturazione cognitiva. Ciò richiede in primo luogo la fiducia dell'insegnante verso ogni allievo, individualmente, e verso la totalità degli allievi, collettivamente. Questo presuppone anche che si instaurino tra gli allievi delle relazioni di fiducia e che ciascuno sia messo nella posizione di avere fiducia in se stesso.
- Il piacere è una cosa seria quando si utilizzano gli strumenti tecnologici in ambiente educativo, per i bambini e per gli adolescenti. Le loro percezioni della tecnologia oscillano tra uno strumento per il lavoro e uno strumento per il divertimento. Il piacere derivato dall'uso della macchina, e dallo scambio reso possibile dalla macchina, è complesso e molteplice, andando dal semplice piacere di una scrittura pulita e corretta

¹ Lo spostamento del centro sul formato, la maggiore attenzione portata all'attività di apprendimento dell'allievo (learning) piuttosto che all'attività di insegnamento (teaching).

fino al piacere nutrito dai sogni che suggerisce l'infinito potere simbolico delle macchine.

- Lo scambio della corrispondenza attraverso i mezzi tecnologici va ben aldilà di ciò che è visibile nello scambio (molto spesso delle banalità); infatti, sono le radici del fatto sociale stesso che si ritrovano nella pratica di questi scambi: la trilogia del dare-ricevere-rendere ci riporta alle origini stesse della socialità. E' dunque un rituale sociale essenziale che si realizza in questi usi e che permette di costruire un quadro convenzionale portatore di significato. Questa dimensione molto profonda dell'uso rende difficile certe forme di scambio "artificiali", perché insufficientemente preparate.
- Qual è la realtà della realtà? E' a tali domande che conduce l'uso delle macchine comunicazionali. La magia delle macchine, in un certo qual modo, reintroduce la dimensione "meravigliosa" e autorizza nuove forme di gioco sull'identità, con sé stessi e con gli altri.
- La gestione dell'incertezza diventa un argomento dominante nell'ambiente educativo: in primo luogo, incertezza sul comportamento non sempre prevedibile delle macchine, ma anche incertezza sul mondo esterno, in cui i parametri sociali diventano parte dell'equazione. Si impara così a identificare l'incertezza, a riconoscerla, a controllarla, prendendosene gioco, adattandovisi o semplicemente cercando di ridurla. L'incertezza diventa così uno strumento pedagogico.
- Le relazioni di potere all'interno dell'istituzione educativa spiegano molto della buona e della cattiva sorte dello sviluppo dell'uso della tecnologia. Nel mondo degli adolescenti, queste relazioni di potere si riproducono tra quelli che detengono un capitale tecnologico e quelli che ne sono sprovvisti.
- Molto cambia negli istituti scolastici, in cui l'uso delle tecnologie della comunicazione viene a rafforzare delle strategie pedagogiche avanzate e coerenti: nuove definizioni dell'insegnamento, nuovi contesti di apprendimento, nuova organizzazione dello spazio e del tempo.
- Lo spostamento, infine, del locus dell'autorità e l'attribuzione all'allievo di uno status di persona.

Questi risultati ci hanno convinto che esistono degli usi delle tecnologie dell'informazione e della comunicazione capaci di contribuire a cambiare in profondità le forme di socializzazione nei contesti scolastici e, di conseguenza, contribuire a modificare la maniera in cui i sistemi educativi attribuiscono e trasmettono le strutture psicoaffettive e intellettuali ai bambini. Abbiamo potuto constatare che queste modifiche hanno luogo innanzitutto attraverso ciò che si apprende implicitamente in classe, piuttosto che sulla base di ciò che vi è insegnato esplicitamente. La dimensione "comunicazione" potrebbe essere la chiave di volta di questa trasformazione.

E' chiaro che una simile analisi si basa essenzialmente sulla realtà delle scuole elementari piuttosto che su quella delle scuole medie (sia inferiori che superiori). In effetti, una reale integrazione degli usi della comunicazione nelle scuole medie è gravemente compromessa dalle suddivisioni esistenti tra le diverse discipline, e dai modi di gestione non flessibili dello spazio e del tempo che ritroviamo nella maggior parte dei paesi europei. Le "feudalità" disciplinari e le modalità di organizzazione interna dell'istituzione educativa costituiscono oggi i principali ostacoli all'uso delle tecnologie nell'educazione, degli ostacoli incomparabili rispetto alla pseudo resistenza al cambiamento degli insegnanti, perennemente "incriminati" da coloro che non sono scesi a vedere sul campo.

Nella loro introduzione alle Guidelines (forse potremmo tradurre il termine con "Manuale"), gli autori di questo documento, Janet Jenkins, Inger Lise Stieng e Sigmund Lieberg, sviluppano i seguenti argomenti.

Queste Guidelines sono destinate agli insegnanti che ancora non utilizzano le tecnologie dell'informazione e della comunicazione a scuola. Si dirigono sia ai futuri insegnanti che sono tuttora in formazione, sia agli insegnanti che desiderino integrare queste tecnologie nelle loro pratiche.

L'ambizione di queste Guidelines é essenzialmente di fornire un'ispirazione, dare suggerimenti e accompagnare le pratiche condotte su un piano personale o collettivo. Si tratta essenzialmente di invitare i professionisti dell'educazione a riflettere sugli usi che essi stessi potrebbero o sarebbero interessati a mettere in pratica.

Gli autori non pretendono fornire delle soluzioni pre-confezionate ai problemi, né tantomeno segnalare dei modelli di pratiche esemplari: non avrebbe alcun senso in un campo tuttora estremamente mutevole.

E' dunque innanzitutto a un viaggio che sono invitati i lettori: essi potranno trarre spunti a partire da esempi reali derivati dalle osservazioni del progetto Mailbox¹, per riflettere e immaginare pratiche che siano personali.

Come dicono gli autori, in queste Guidelines si prosegue attraverso una problematizzazione in cui si incontrano concetti su cui riflettere, suggerimenti di attività che potrebbero essere intraprese. In pratica, si tratta di tracciare e aprire il proprio percorso per potere decidere ciò che bisogna cambiare nella classe, e non di riprodurre delle ricette.

Le Guidelines si incentrano sulla comunicazione e l'apprendimento e, anche se altre questioni meriterebbero di essere trattate, gli autori hanno stimato opportuno concentrarsi su due questioni ai loro occhi essenziali per la scuola: le tecnologie della comunicazione forniscono un vero apporto allo svolgimento dell'attività educativa? le tecnologie della comunicazione arricchiscono realmente l'apprendimento?

La guida é concepita per un uso polivalente. Potrà essere discussa sia all'interno di un gruppo, per esempio in un contesto formativo; ma potrà ugualmente fornire un valido supporto alla riflessione di un lettore isolato.

Le ambizioni sono dunque chiaramente definite dai nostri amici britannici e norvegesi, che cercheranno di articolare comunicazione e apprendimento.

Gli autori costruiscono così, a partire da esempi concreti, una trama che affronta molteplici dimensioni.

Senza volere qui sollevare tutti i punti trattati, vorremmo mettere l'accento su alcuni di essi che ci paiono essenziali:

- Le opportunità offerte dall'uso delle tecnologie dell'informazione e della comunicazione nella scuola per gli scambi e l'apertura sul mondo esterno.
- I diversi usi resi possibili dalle diverse applicazioni (posta elettronica, Internet, etc.).
- I contributi di questi usi in termini di arricchimento culturale, di esperienza dell'ubiquità, di diversità dei contatti e delle relazioni che si possono intrattenere, di motivazione per il lavoro collettivo degli allievi su un progetto comune.
- Una rassegna, che invita alla discussione, sulle possibilità di acquisizione di conoscenze nell'accesso diretto all'informazione che permette Internet.
- Le nuove forme di gestione della distanza: portatrici di trasformazione sociale, non possono non applicarsi anche alla scuola. Le divisioni classiche, come quelle di uno spazio scolastico protetto ai margini del mondo, tenderanno a sparire, e i nostri autori stimano che si costruirà un continuum tra la vita nella scuola e la vita all'esterno della scuola.
- Il collegamento di attività propriamente pedagogiche e didattiche alle attività di comunicazione. Se gli strumenti di comunicazione hanno un valore in quanto tali per comunicare e favorire gli scambi tra gli allievi, spetta comunque all'insegnante di organizzare le attività pedagogiche in tal maniera che la comunicazione sia un supporto agli apprendimenti richiesti dall'istituzione educativa.
- La preoccupazione di iscrivere l'attività in una finalità educativa. Questa preoccupazione può rinforzare il bisogno di organizzazione e di anticipazione e conduce a mettere l'accento sul bisogno di specificazione delle condizioni da rispettare.

¹ Difficoltà delle cooperazioni europee: si constaterà che ben poche delle illustrazioni di questa guida sono estratte da esperienze belghe, italiane e francesi.... E' sempre difficile vedere al di là delle proprie esperienze.

- Gli usi degli strumenti di comunicazione da parte degli insegnanti stessi. Non bisogna credere che solo gli allievi possano tirare profitto dall'utilizzo delle tecnologie della comunicazione: ciò vale anche per gli insegnanti, che possono scambiare fra di loro pareri, questioni, i loro *savoir-faire*, le risorse educative che producono, etc.

Sulla seconda direttiva che porta sui contributi delle tecnologie dell'informazione e della comunicazione, due punti meritano un'attenzione particolare:

- Le attività in cui sono utilizzati i dispositivi tecnologici: esse permettono una grande varietà di strategie di apprendimento, individuali e collettive.
- Partendo dal rapporto della Commissione internazionale sull'Educazione nel 21mo secolo, i contributi possibili delle tecnologie dell'informazione e della comunicazione sono riconsiderati dal punto di vista di quattro pilastri dell'educazione: apprendere a vivere insieme, apprendere ad apprendere, apprendere a fare e apprendere a essere.

Le specificità dell'approccio dei nostri partner britannici e norvegesi nella redazione di queste Guidelines ci avrebbe posto degli importanti problemi di traduzione e adattamento. Esistono chiaramente dei costrutti sociali e dei consensi a livello nazionale sulla maniera di parlare delle tecnologie. La lettura anglo-sassone e nordica appare, a noi "latini", più "istruzionista" che "educativa". Per esempio, lo spazio occupato dal programma (Curriculum) nei contesti Nord e Sud è molto diverso. Gli Inglesi e i Norvegesi mettono facilmente nel programma degli istituti educativi, l'obbligo dell'uso delle tecnologie¹, mentre in Francia e in Italia, gli usi si costituiscono principalmente nella pratica, senza legami diretti con il programma scolastico (naturalmente, vi sono eccezioni). Inoltre, si potrebbe pensare che la loro imposizione programmatica potrebbe comportare un rifiuto sia da parte degli insegnanti, sia probabilmente degli allievi stessi.

Nella stessa maniera, per quello che riguarda la tecnologia, il tipo di consenso sociale esistente nei paesi del Nord non lascia spazio ad alcuna messa in discussione della sua validità. Per il lettore francese o italiano, non esiste un analogo consenso. L'integrazione delle tecnologie nell'educazione pone ancora molti problemi, precisamente perché le tecnologie sono spesso presentate come un percorso obbligato per tutti gli insegnanti. Esistono tuttavia delle buone ragioni per dubitarne: a equivalenza di obiettivi pedagogici dati, degli eccellenti insegnanti sapranno raggiungerli con i loro allievi senza ricorrere all'uso della tecnologia, e degli altrettanto eccellenti insegnanti sapranno raggiungerli ricorrendovi. La posta in gioco, insomma, non è mai la tecnologia, ma sempre l'educazione.

¹ Mettendo in avanti la ragione di un accesso democratico.

Introduction

“The challenge of integrating technology into schools and classrooms is much more human than it is technological. What’s more, it is not fundamentally about helping people to operate machines. Rather it is about helping people, primarily teachers, integrate these machines into their teaching as tools of a profession that is being redefined through the...process”¹

Even if pipes and networks are not enough to bring transformation into society, increased communications is one of the biggest opportunities technology offers classroom teachers. This provides teachers with another ways to transcend the walls of isolation that shape the teaching profession and help teachers to converse and share experience with colleagues, school administrators, parents, and experts in the field. Telephones, fax machines, voice mail, local area networks (LANS), wide area networks (WANS) and Internet permit conversation, discussion, exchange of information, and access to information otherwise difficult to obtain.

Using technology can change the way teachers teach and be a valuable resource for improving teacher education. Teachers may use technology:

- In traditional “teacher-centred” ways, such as drill and practice for mastery of skills, or to supplement teacher-controlled activities
- To support more student-centred approaches to learning, so that pupils can take responsibility for own learning activities and engage in collaborative activities while the teacher assumes the role of coach or facilitator.

Many of the most enthusiastic technology users among teachers are falling into the latter group, because technology is particularly suited to support this kind of instruction.

"Information Technology is the medium by which children in one primary school have achieved more than they or we, as their teachers, believed to be possible. We are constantly surprised by the ever-increasing achievements of our pupils. The children are handling sophisticated multimedia packages to produce high quality integrated presentations involving audio, text, graphics, photographs, spreadsheets and databases. They use the Superhighway to access information to support their curriculum and in turn, their work is being featured on the Internet for use by other learners across the world."²

Two teachers wrote this at about the time we visited their school and watched the pupils at work with technology. We too were impressed, surprised, enchanted by what we saw. But we saw too the hard work involved for teachers with the determination and vision to exploit the technology.

“I was really in favour of the use of ICT. But honestly, it is hell! I could not imagine how hard it could be to implement it. I really don’t know how to say the real problem. May be it is a real bias in my pedagogical settings and beliefs. I don’t know exactly what is wrong with me. ...As a matter of fact, for myself I fully integrated the network and the use for my professional need and this certainly changed my life. I used to be very messy, having always hundreds of papers and documents simultaneously opened on my desk and around, hundred of small notes as reminder. And that’s for sure that using ICT

¹ Barbara Means et al., Using Technology to Support Education Reform, OR-93-3231 (Washington DC: U.S. Department of Education, Office of Research, September 1993), pp. 83-84

² Breaking through the glass ceiling, Scottish network for able pupils (SNAP), 1997, Mari Wallace and Maggie Pollard

enabled me to better structure my own work environment. Well may be I exaggerate, but it is better ordered in my computer and in my office that I could imagine.

"Indeed it is very positive, but as far as pedagogical use is concerned I am far from having found my own way of using ICT with my class, and I am really sincere if I tell you I'm pissed off!"¹

To use new technologies well, teachers not only need access to them, but they also need opportunities to discover what the new technologies can do, learn how to operate them, and experiment with ways to apply them. However, the use of new technology in teaching should be considered in light of the unique characteristics of the teaching profession. The question we should ask is: "What do we need in education and how can ICT contribute?"

Though teachers want to make use of all relevant tools for pupils learning purposes, as new technologies have become more advanced, adopting them has become even harder, requiring more training before teachers can integrate technology into the curriculum.

Curriculum integration is a necessity if ICT is to become an effective education resource.

Such integration, however, is a difficult, time-consuming and resource-intensive job.

Teachers, like others, may discover themselves lost in a unknown landscape, where established concepts of and models for teaching is not working and where you will not find a right answer to how ICT can be used to enhance pupils learning. Many are made sceptical by predictions promising that ICT will reform education and change schools, as we know them.

When teachers experience that ICT can support their teaching, help them with their administrative functions and enrich their professional growth, technology starts to make sense to them. It can be a resource for improving the preparation of new teachers as well. However, there are also many teachers who has not seen or experienced this potential, teachers whose use of ICT is marginal, limited, and unenthusiastic.

The experiences of teachers who are adept users of ICT suggest that it is not a panacea for all educational needs. Nor does it appear that there is one best way for teachers to use technology- just as there is no one best technology for every teacher to use. Educational goals, teacher experience, subject matter or curriculum areas, available resources and support, and pupils needs are all factors that should be taken into consideration when thinking of using ICT. However, technology is not a cure-all, nor is there one single technology tool or application that must be used by every teacher.

Pupils' enthusiasm for ICT is a powerful incentive for teachers to adopt. Some teachers in Mailbox report that ICT can make learning more relevant to "real" life and more motivating and engaging to pupils. For pupils to become comfortable and effective users of ICT, teachers should be able to make wise, informed decisions about technology.

Teachers must help children use these technologies, guiding them along the information highways, without themselves being in complete control of what happens or knowing the best direction to travel.

The Guide is intended for teachers new to using interactive information and communications technologies in their teaching. It is aimed at two main categories of teacher: student teachers undergoing their initial training; and trained and experienced teachers who are just beginning to use the new technology applications.

Our aim is to provide both inspiration and guidance. We describe how these new applications are actually used in school, explore their impact on learning and invite teachers to reflect on how they themselves might apply the technologies in their practice.

The approach is - like the technologies we introduce - interactive. We do not attempt to supply solutions to problems or even models of good practice. This is not possible in a field that is

¹ Excerpt from discussion with Jackie, a male teacher in a French primary school. Read the whole monograph at the Mailbox
WebPage: <http://tecfa.unige.ch/socrates-mailbox>

fluid and dynamic. Instead, we invite teachers to begin a journey that will help them gain insights to guide their personal practice. We take real life examples from schools, each illustrating a critical theme. The theme is explored through questions and further examples. The teacher is invited to analyse the concepts and suggestions for activities are offered to stimulate deeper investigation or a practical trial of a new application or approach to teaching.

Our approach is to ask you to “connect and reflect”. We invite you to enter the New World of ICT, and create your own routes. Rather than swamp you with unwanted information, or set out norms where none exist, we aim to show you examples which stimulate you to build on your own experience. Your use of ICT in teaching will be, as a result, rooted in **your** practice and **you** will be able to decide how ICT will change your classroom. As you work through the material and become a “connected teacher”, you will be encouraged to devise your own guidelines for good practice.

This guide concentrates on **communication** and **learning**. There are many other issues not being covered related to ICT. However, we feel that our focuses in The Mailbox project address the core issues for schools:

- Does communication technologies make a difference?
- Does ICT enrich learning?

As you work through the material you do not have to have access to an on-line computer, although you may get more out of it if you can log on from time to time. Rather, it is designed to give you confidence as you begin to explore the potential of ICT.

The Guide has been developed as part of the work of the Socrates Mailbox project, a project, supported by the European Commission, which used classroom observation in six countries to observe how children and their teachers use new technology applications. We have used MAILBOX observations as the basis of the Guide. The schools observed were of all levels and types, and the children we observed ranged from age 5 to 18. Our children include those that are disadvantaged, gifted and disabled.

The Guide is designed for flexible use. It is suitable for use in a group environment - a teacher-training institute, an ad hoc in-service training group, or a group of colleagues in a school. Some of the activities will be more effective with group discussion and evaluation. Some teacher training institutions may adopt and adapt the Guide in their regular training programmes and awarding credit for completion. Others may simply use one element ad hoc. An individual, on a self-study basis can equally use the Guide. It will be of use to those who prefer simply to read it and use it as a reference and source of ideas.

COMMUNICATION

1 Using new communication possibilities in school

New applications of information and communications technologies have opened for schools many new communications potential. Mailbox observations studied what happened in some classrooms when these applications were used. In some cases teachers or pupils were exploring applications for the first time, in others they were more experienced. In the pages that follow we focus on *communication*. We describe and analyse a number of different communication experiences, we set the experiences in context, and offer you suggestions and ideas for your own practice.

Your challenge as a teacher is to discover how to deploy the technology to add value to schoolwork, and in doing so to identify the nature of the value added. The demands made on teachers in the connected classroom are new and complex, and require openness to change and to continuing professional development. Structures are emerging to support the necessary change.

Communication empowering children

Mme M's French class teaches French to young people recently come to live in Switzerland. To support their language learning, the pupils exchange correspondence by email with pupils elsewhere and take part in other activities involving communications technology: an introduction to the World Wide Web and participation in the Kidlink network (see end of section). The nine pupils in the class (five boys and four girls) are aged between 14 and 16. The pupils have to learn 12 hours of French every week. These pupils are strangers to the Swiss culture, using a foreign language and learning in a multilingual environment. In this particular class the range of social background and abilities is particularly wide, from illiterate to mastery of several languages. Nine nationalities, seven languages between them, they are a diverse group in every way.

The present task is for the pupils to prepare web pages for Kidlink. The work lasts over several lessons and is completed bit by bit. On one occasion they are asked to describe their school. Preparatory discussion with the teacher includes comparing the school in Geneva with schools in their countries of origin. Mme M reminds the pupils that pupils in other schools will read their web page. One girl - Russian by origin - wonders whether readers will understand that her Moscow school had a number not a name, the way it is done there.

The pupils start work at computers. They prepare the text off-line on floppy disks. They choose whether to work alone or in pairs. About half work with a partner; the illiterate pupil gets help from both teacher and neighbour. Several use the spell-checker, and take care with their choice of words. As the lesson ends, Mme M. takes in their work. At this stage, she says, they cannot judge their own progress, and she likes to give them feedback to stimulate them more.

When the work is complete, the web pages contain the pupils' descriptions of themselves and of their country of origin. They are very proud to see their name and their class photo on the World Wide Web.

Immediately striking, even from this brief example, is the way pupils are stimulated to communicate in class - in discussion with the teacher and with each other. Several of the pupils in our example did not speak with ease French, their common language, but working with ICT they pushed themselves to talk. Indeed, working with computers appeared to encourage discussion.

What generates the need to communicate? Part of the answer lies in the nature of the activity - a *group* activity to produce a web page; part lies in the requirement for each pupil to make an *individual* contribution. On the one hand, the pupils are learning to work independently, on the other hand, they apparently discover that individually they achieve more when they help each other. The situation stimulates communication, which enhances the curriculum objective - learning the language¹.

On the surface, such effects have little relation to electronic communication. Indeed, we are told that the pupils prepare their web pages *off-line*, on computers, which are not actively connected, to the Internet. But there are several ways in which the ultimate destination of the work - *on-line* - affects the pupils. They are preparing to display themselves and their school to the world, and they have been given responsibility for creating a public image for their school.

Certainly a dream on children side but which allows a strong motivation. Their concern for quality is evident, in their attention to linguistic accuracy and in their wish to communicate something of their home cultures; note for example the Russian girl's awareness of potential for inter-cultural misunderstanding. The pupils are motivated by the task and aware that outsiders will judge them.

The teacher in this class is performing a number of roles: leader, helper, partner, and evaluator. The ethos is one of working together to achieve goals. Each pupil is fully involved in a common task, each individual has an opportunity to extend themselves. They are stimulated to find new confidence and an identifiable role with the help of ICT. It gives them the means to communicate and to control their communication. It allows them time to find the words they need, and offers them an accessible style of language. Their teacher says that they are always disappointed when they don't use the computers! The challenge boosts their self-esteem and gives them a sense of power. The teacher has combined the traditional role of subject expert with that of a manager.

The use of ICT in this case can thus be analysed along two dimensions of communication: interpersonal communication and the use of ICT applications as a means of communication. The relations between these dimensions, human and technological, are complex.

2 Communication technologies and their applications

In our opening example, mention was made of email, the World Wide Web, and web pages. To clarify the variety of communications technologies referred, we start with a summary of the range of technologies and applications covered in this section.

Email

When the Mailbox project was designed, the expectation was that electronic correspondence would be the main computer-based communications application in use in schools. In some of the schools where observations took place this was the case, and in most schools visited it was used, either for correspondence between individual pupils or for correspondence between groups or classes. It was also used for producing documents, drawings, fairy tales, stories, riddles, etc to be exchanged with other classrooms.

In general electronic correspondence seems to be very attractive to school pupils. It offers a new experience of getting individual personal validation from outside the school. Part of the pleasure appears to lie in the relative control pupils have over their communications, giving a sense of power unusual in school. The external correspondent, not the teacher, is the one who judges, reacts and responds. It often stimulates pupils to set high standards for themselves. It can be discouraging when correspondence fails.

¹ The complex questions of relations between the explicit learning that occurs and implicit social learning are explored further in the section of the Guide on Enriching Learning

Internet and the World Wide Web

Other communications applications were important in some schools visited. The use of the World Wide Web for research, to find information, to consult databases or as a basis for inter-school activities was seen in some schools as the main opportunity offered by ICT. MAILBOX observations took place at a moment when many schools were only just beginning to explore the potential of the Internet. Since then, there has been increasing recognition of its potential for education and developments to increase its usability.

Internet Relay Chat

The use of Internet Relay Chat (IRC) was the main attraction for the pupils at the Norwegian lower secondary school. "Chatting" on the many IRC channels was mainly going on after school hours as an extra curricular activity. IRC was also used to a certain extent in the lower secondary about to be used in a primary school in Belgium.

The pupils seemed to "chat" for pleasure, talking with people that they didn't know or with their classmates. Some pupils tried to keep up and extend the communication by using email and some were concerned about finding back to individuals on an IRC channel next time they were logged on. We only observed one effort in a class, learning English as a foreign language, to use IRC for school learning. The class was working on the English Parliamentary election and wanted to get in touch with preferably English speaking people to discuss the subject.

Video-conferences

Several schools used videoconferences, usually for special occasions. In fact, the sense of occasion seems to add to the value. Pupils seem to rate videoconferences highly, they prepare for sessions carefully, and recognise the need for careful planning in order to get their message across and achieve their goals in a very limited time. The conferences allow synchronous visual and audio communications between two sites. One school had a modern portable system, with small cameras linked to computers.

In some cases schools as one of several means of communication used videoconferences. For example a group of pupils in a secondary school in Scotland linked up with a school group in Georgia USA for a practical business studies project - a small trading partnership. Most of the communication was by email, fax and telephone, but a single videoconference gave the pupils a chance to "meet" each other face-to-face, and was a critical boost to the project.

Combining technologies

The range of ICT applications now available to schools is thus increasing. The use of combinations of applications - as in the Scotland-Georgia experiment - is not unusual, with technologies chosen according to purpose as teachers and pupils became familiar with their potential. In many cases, schools were engaged in a process of familiarisation with technology and tasks were designed in order to achieve this end. In others, tasks that required the use of ICT were an integral part of class activity. In such cases we can begin to see how technologies impact on both the organisation of teaching and learning and on the physical environment of the classroom.

In some cases, different computers were used for off-line and on-line activities to increase efficiency and maximise resource use. For example, the texts for email letters might be prepared on a computer unconnected to the Internet, saved on a floppy disk, and then brought to a connected computer for transmission. This means that where only a few computers are connected to the network, these computers can be dedicated to activities, which can only take place on-line, such as web searches. Another timesaving tactic observed was for the teacher or a pupil to find in advance material for use later in a class, and bookmark or download it.

Recent trends

Since MAILBOX observations took place many more schools are connected and some new trends have begun to emerge. The most significant development is the increasing importance

given to on-line learning for schools and the support given by several European governments to the development of a communications infrastructure for its delivery. This interest has been accompanied by the growth of "Intranets" - electronic networks designated for certain target groups. These developments mean that it is increasingly urgent for teachers to learn to access and use the new tools and learning content resources at their disposal.

Two other recent and ongoing developments are related: the extraordinarily rapid increase in home access to the Internet, and - still in its infancy - the emergence of high quality on-line interactive learning resources, often connected to intranets.

Schools were all seeking to exploit the opportunities offered by the communications technologies available at the time of our study. They did so in many different ways, reflecting differences in national and school cultures and environments, teacher motivation and competence. The analysis that follows uses examples of ICT usage from Mailbox, attempts to set these experiences in a broader context, identifies barriers and opportunities that face teachers, and makes suggestions for using new and emerging possibilities.

3 What new communication possibilities do ICTs bring to the classroom?

In what ways may they stimulate learning? What new communication possibilities are open to teachers? How might they be exploited? What value might they have? A few examples follow.

Cultural enrichment

Communication over distance is in one sense now simpler than ever before. Provided you want to communicate making contact is facilitated and may become a mere matter of access to an electronic connection. Making contact is a matter of access to an electronic connection, anywhere in the world. Communication outside the homogenous school cultures can enrich cultural understanding within and beyond one's own social environment. Pupils from inner-city schools for example can discover what life in a small rural school is like, or can compare their own experience with that of pupils in another continent. We came across one city school where pupils were in regular communication with others in a school on a small island, which had less than 20 pupil's altogether. In another case, an Australian exchange teacher had returned home from Britain, and stimulated her new class to correspond by email with the old one - the personal interest helped to consolidate this correspondence.

Actuality/immediacy

New possibilities arise from the potential for synchronous or near-synchronous communication outside the classroom. In one example, two schools in different parts of the country shared, through a videoconference, their celebrations of a national festival, "Pancake day". In some cases, *authenticity* is an important component. We heard of one case where pupils were able to link up with an expedition on its way to the North Pole, and become witnesses of the adventure. Contact with actuality also has its problems. Can you be sure of the reliability or veracity of your contact?

Complexity of interactions - multiple contacts.

Electronic conferencing systems offer some new dimensions of potential interest to teachers: many people are able to communicate directly and simultaneously with a small group or one person, and everyone is able to read all the messages. The interaction is continuous over an extended period of time. The collaborative nature of this communication is something new, rather different from a telephone conversation or an exchange of letters by post. How might you deal with class-work in such circumstances? IRC - Internet Relay Chat - is a type of conference system that is very informal. Many young people enjoy IRC, but the teachers' experiences are less supportive.

Does IRC have a role in school learning?

Inclusiveness

ICT can help to make the class a more inclusive environment. The opening example indicated how ICT can enhance the potential for engaging pupils with widely different capabilities in a common endeavour. Pupils with physical disabilities may also benefit; for example, email, IRC and the Internet offers “virtual mobility” to those who lack physical mobility. Videoconferences can also be used to enhance inclusiveness. We noted that children with hearing, sight or speech impairments were particularly excited by video-conferences and proud of their ability to participate. For example a child who could not speak clearly prepared placards to display his contribution. One teacher aptly described it as “motivating for reluctant communicators”.

Communications technologies can also become a force for exclusion. Pupils are disappointed or frustrated when they encounter language barriers, for example some Norwegian pupils in upper secondary level researching for a Physics project were disappointed to discover that most of the material they found on the Internet was in a highly advanced English. Sometimes enthusiastic pupils push aside those who are more tentative about using computers, while others seem to get a habit of passivity, allowing others to monopolise the keyboard. We saw enthusiastic fifth-grade boys in a primary school monopolising the computers using it for hours to search the Internet before the teacher conducted the activities in a way that allowed the girls to get access and use the Internet a certain amount of time as well. You may be able to cite examples from your experience. On balance, does the potential for inclusion outweigh exclusion?

4 On-line learning and its potential

As the potential value of the Internet for learning is exploited, more attention is being paid to what is called “on-line learning”. What does it add? Does it only add? What is the disadvantage/advantage of being (mainly or always) off-line? Let us start our investigation by listening to the views of some pupils.

Pupils talk about ICT

Example 1

The discussion took place as part of Mailbox research. The extracts are taken from interviews with pupils at a primary school in Norway aged 9. They are talking about the use of Internet when researching for information about Europe for an interdisciplinary project.

C: I have used the Internet to download an article on football. It was fun to use the Internet because then I could go wherever I wanted. With word processing I just sat there looking at my own screen.

F: It is not difficult to read the information on the Internet although it is in English. It's just a matter of using a dictionary and translating. If you know some English, then it's OK.

J: I found information about child abuse in Belgium and 20 pages on German politics on The Internet at home. I did not receive any help in finding this information. I just started by browsing to the newspaper “Aftenposten” on the web.

Example 2

The discussion took place as part of Mailbox research. Eight pupils from the Scottish primary school aged 10 and 11, all experienced users of ICT, discussed their views of different technologies. We talk first about email. They started using it when they moved to the top class. “Internet is easy.” They describe the process of logging on and searching - they know it backwards! They like email.

L: It's easy.

A: It's fun - it's not so much fun just writing a letter - the letter takes longer to go.

L: I like showing other people how to do it.
J: I like meeting other people and helping them. *She is teaching her brother and sister to use a computer.*
K: its exciting sending letters all over the world. But I like working on the website best. *I wants her own web site.*
The Internet? Frustrating! K says he has no patience with it!
They have a sense of pride, of achievement: "Some people haven't even got a computer".

They like working together on the Internet. They can talk to the people sitting beside them. Sometimes they can't do that in class.
They compare video conferencing and email, and list the differences. They really like videoconferences. They would like to have videoconferences with more places, perhaps link up with London. They would like to visit the schools they have videoconferences with - just for a day.

For the pupils, ICT provides a set of tools that help them - more or less - with their school work and - once the technicalities are mastered - make it enjoyable: *"it's easy... it's fun"*. They mention several aspects of on-line activity: excitement, working together and helping each other, meeting other people, pride in their work and - of course - frustration!

But the open communication of on-line learning raises questions of a different order for the teacher:

- questions of pedagogical values and approach
- the relation between access to information and learning
- what children may learn as a result of on-line communication.

One major issue recurs throughout this Guide - changed relations between teachers and pupils when teachers are no longer in control of the content or the activity of a class. On-line communication - when a computer is connected to the Internet - inevitably gives control to the user on what content to watch, explore, search for, or what functionalities to use. It also means that the teachers lose their monopoly as the only authority in the classroom. Are these welcome opportunities? What are the arguments for having on-line communication in the classroom? Is it better to concentrate on using computers off-line?

How is on-line learning different? It is not the same as downloading files from the Internet. One of its key characteristics is the potential for interaction with others and, increasingly, with ready-made learning material. This facility is differently relevant in different subject disciplines. Finding good material on the Internet certainly motivates children. Not finding is frustrating. The Internet can be quicker than searching the library, and more up-to-date than textbooks. However, how should the questions of cost be taken into consideration?

The Internet may be difficult to access and the quality of the material varies. Sometimes, too, several pupils want simultaneous access to material, and access on several occasions. This is easier with the Internet than with one copy of a book in a library. Maybe on-line resources are already becoming of higher quality and more dynamic than books in some subjects.

- Might this be the case in subjects you teach?
- In your subjects, how much focus should there be on on-line learning?
- Would distance learning opportunities be of value to enable greater individualisation of learning?

ICT off-line - for example material on CD-ROM - has to be very high quality, and is designed for mass use. There is in consequence difficult to meet requirements for personal interaction every time. But on-line, the individual can personalise, can probe, search, change, and relate to

personal needs. But there are many problems. As more and more doors open, are they heaven's gates or Bluebeard's castle?

The Internet is not designed with age in mind, although it contains some material designed for children. Free access raises questions of relative maturity of pupils and problems of concept development. In one school older pupils of 14 acted as mediators for younger ones of 10 or 11, thus creating learning groups across age levels. This experience could be compared with research evidence from traditional schools where mixed age groups stimulate pupils to do better than when in single age classes. There is potential of using ICT for inter-age work; for example pupils who are advanced in a particular subject could learn on-line as part of an older group, perhaps in another school. Can you envisage tele learning and class teaching becoming intertwined? Is it happening already? You might like to check how many pupils you know are already following distance courses from home as an "extra" to school, at their parents' wish.

As an "age-free" zone, there is a sense in which the Internet can help children become adults. For some pupils, communication for personal development and exploring their identity is very important. ICT correspondence, use of e-mail and IRC, provides a complement or alternative to drama. Pupils can use the anonymity of the Internet for role-playing.

But of course they can also misbehave. They may send abusive letters, access pornographic or violent material, and find themselves targeted by unwanted correspondents.

- How should teachers and schools approach these issues?
- Should there be control and regulations?
- Or not?
- Should there be censorship of Internet access or should access be it in other ways?

This issue exercises many teachers, and parents too. This is a matter, which you will need to consider carefully within your school. Even if access is restricted within school, pupils may still try these things elsewhere. Several of the schools we studied have approached this issue by introducing a Code of Practice which, once signed by pupils and sometimes also their parents, is a passport to access. Abuse is punished in some cases by withdrawing access. Many schools also use Internet services specially tailored for schools, and some governments are now exploring the idea of extending such services to create national educational "Intranets". You will find in the concluding part of this section some discussion of the development of "intranets" and references to some Codes of Practice which you may find useful as models for your own circumstances.

Let us end this discussion on a positive note. Our opening example was of pupils in a new environment. We saw them creating web pages about themselves and their school. Such activity may have a deep impact, through helping pupils not only to relate better to their new culture but also to build a bridge between their old culture, their original home, and their new home country. We came across some other hints that the Internet may have an important, though not yet explored, role as a bridge between cultures for displaced or mobile pupils. This may be an area that you would like to explore, especially if you work in a locality with a significant immigrant population. Can ICT help pupils keep track of their roots? In the long-term, will problems of free access to the Internet from school be solved, offering a new chance for inter-cultural understanding to flourish?

5 Reflecting on the impact of ICT

In the longer term, what will be the impact of communications technology on school? The examples above begin to hint at some answers. In the broadest sense, communication can be seen as a democratising force - opening up institutions, creating transparency. But what is your view? You may like to think about the following:

- What impact might there be on individuals?
- Do you know of any examples where pupils have become enthusiastic and performed better in a weak subject?
- Do you know of cases where their self-esteem has been strengthened and their sense of identity enhanced?
- Do you know of examples where the pupils have concluded that the use of the Internet was a waste of time?
- What might be the impact of increasing home access to ICT and the Internet? For example, as televisions are connected to the Internet? Could you as a teacher make use of home access in your teaching?
- What might be the impact on the way we live? For example, we may find ourselves using ICT to consult our doctors from home. Should we be introducing into school learning issues about the social impact of ICT? How?

These are open questions, for you to reflect on. Consider whether you think the new technologies will have a lasting impact. What is different about them from other innovations? Why do we put computers in classrooms but not telephones?

6 The context: the classroom as mirror of changing society

Are new technologies bringing about “the death of distance” in our society? This is the theme of a recent book¹, which analyses the impact of communications technologies from an economist’s perspective. The starting point of the argument is the decreasing cost of communicating over distance. The moment approaches when distance will no longer determine the cost of communicating electronically. Meanwhile, communications capacity and technologies will continue to develop. Low costs will rapidly result in a plethora of services of all kinds accessible electronically. Services will have to be of high quality if the businesses that provide them are to survive. Some “big players” are likely to dominate in some markets, while there will also be a thriving infrastructure of “niche market” services. Thanks to the power, spread and efficiency of communications, new ideas will travel fast, new knowledge will accumulate rapidly, new products and services will develop quickly in response to new discoveries and needs, and will quickly reach the people who want them. At the same time social scientists are raising critical comments on how this may increase social distance, creating new differences between those having access to new technology and those without access.

The book is not about education but the argument can be applied to schools. Of course in the most literal sense distance does not disappear. But the new technologies are revolutionising the way in which we can make connections. Services available electronically will include many that have impact on schools, such as information, learning resources and other services to support education, as well as services directly providing education. Learning interactions that use electronic communications need no longer depend on place or time or proximity between an expert source of knowledge and learners. Further, just as more homes are becoming offices, so the boundaries between home and school as a place of study may become blurred. Parents and other members of the community may play an enlarged role in the education of their children, and schools become more the centre of a larger learning environment. The wide range of learning opportunities available will provide scope for greater individualisation of learning. But there will also need to be changed approaches to processing learning. It is likely that classrooms where ICT is fully exploited will in their organisation come more and more to reflect the emerging dominant patterns of adult working life - task-oriented teams with roles assigned to each member according to their strengths, capabilities and aspirations. The role of the teacher in this environment is to set the agenda and manage the activity of the group of pupils.

¹ Frances Cairncross, *The Death of Distance: how the communications revolution will change our lives*, 1997, London, Orion Business Books

This theoretical analysis bears a remarkable similarity to practice as observed in the Swiss classroom. Closer examination of the Mailbox experience now follows, to try to identify more precisely the specific challenges faced by schools and to see what can be learnt about how the potential of communications could be harnessed to the benefit of schools.

7 Linking communication to learning: the Swiss experience

Mme M and several other Swiss teachers analysed their experience with ICT after the Mailbox observation period. They were unanimous that using ICT could be a stimulus to strong enhancement of the curriculum, but in certain conditions. In their view ICT was most effective when its use was tied closely to learning objectives. By implication, when ICT is used, objectives for social and personal development will often need to be explicitly formulated and associated with objectives linked to knowledge and skills. Put another way, the process of learning, with its rich complexity of communication and dialogue, becomes one of the goals of learning. In consequence, a class where ICT has a central function requires very careful planning. At the same time, the unplanned is of importance. The teachers do not wish to sacrifice spontaneity or lose responsiveness. They stressed that to manage a class well along both these dimensions was a difficult challenge.

They offered a number of suggestions from their experience. One approach was through structure. This can include the formal structure of a lesson: preparatory discussion, off-line work, on-line activity, reviews. It can also include patterns or procedures of behaviour. The Swiss teachers identified such patterns as an aspect of communication important to their pupils that appeared to help them gain a sense of security and satisfaction in their electronic communication. The procedures covered events, like logging on or off, receiving mail, and also content, such as using standard ways to address correspondents, or restricting the content of letters to a narrow range of supposedly shared experience - “my house, my family, my cat’s name...”

The Swiss pupils were not alone in developing procedures for email. Pupils everywhere readily embraced the unspoken rules of “netiquette” and developed their own enhancements.

The Swiss teachers also drew attention to the importance of giving the pupils responsibility for the quality of their work. For example, many pupils readily use tools like spell-checkers once they know how. When the pupils work in groups or pairs, they set high standards of quality and work hard to attain them. Does the use of ICT reinforce their aspirations? The question is unanswered, but pupils certainly take pride in those of their outputs that are available for public view.¹

The biggest problem identified was with email correspondents, who could not be relied upon to keep up an exchange of letters. It was particularly difficult to sustain one-to-one correspondence, although there were occasional exceptions. But is it realistic to expect email to continue over the long term? As with other ICT activity, email needs to have a purpose, and as purpose in class changes, so might correspondents be expected to come and go. One solution might be greater reliance on group correspondence as well as one-to-one. The teachers felt it would be helpful to have access to a pool of correspondents and schools. One purpose of inter-school Intranets or networks could be to provide that pool.

8 Getting started: some examples

Examples from other Mailbox communication contexts may help to stimulate reflection on the suggestions above as well as providing some further ideas about incorporating ICT effectively in class.

Communication to avoid or enhance learning?

¹ The question whether searching the Internet leads to learning is discussed in the section of the Guide on Enriching Learning.

The Swiss teachers drew attention to patterns or procedures of behaviour as a support mechanism. In some cases it can be more than that. In the Italian primary school for example the entry into class of the teacher waving aloft the hard copy of emails just arrived was a moment of great significance. It stimulated young pupils, day after day, to make the effort to translate the letters they received in English. The procedure was in this case part of the stimulus to learn.

But might this also serve to hide lack of learning? In one school, pupils vied with each other to get several correspondents. Some pupils composed a standard letter and then sent the same text to several different correspondents. What value does such communication have? Perhaps reliance on procedures may give the illusion that a pupil has acquired competence which is in reality lacking, or may prevent the teacher seeing that the task set is too difficult for certain individuals.

You may be able to think of cases from your own experience where there is a danger that an act of communication conceals lack of substance.

New roles and relationships in class

The pupils in our opening example went on to try an Internet search. It was not a good experience. Some found a bewildering number of pages, others pages in a language they could not read (English), yet others found material completely irrelevant to their search. Without a clear plan, the Internet was of little practical use to this class.

The mixture of rewards and frustrations for both teacher and pupils is typical of the learning with ICT observed in Mailbox. But what should Mme M have done? Should she have given the pupils a clearer plan of action? She had perhaps expected the search process to be more productive. With more experience of the Internet she might have approached the task differently. Or was she right to leave the situation open to exploration and discovery? The shared frustration could be seen as a result of a deliberate shift in relationships in the classroom. Greater responsibility is passed over to pupils, while the teacher becomes more of a guide.

A further different approach might have been to nurture the group dynamic. In another case, from Norway, where a group of pupils was conducting a web search, the pupils realised that they could not complete the task assigned in class time, but then decided for themselves that they would complete it after school. One pupil had access to the Internet at home. He would complete the search. The entire group exchanged phone numbers so they could continue collaborative work from home.

You may be able to identify similar examples of complex challenges to teachers. Can you think of other ways in which the teacher might approach them?

Making correspondence work

It is interesting that, while the Swiss teachers did from time to time mention difficulties with technology itself, the human problems concerned them more. Teachers in several other schools took a similar stance. Human problems were particularly evident in the case of email, where keeping up the correspondence seems to be a common difficulty. Several teachers expressed concern about this and some went to considerable lengths to protect their pupils from disappointment. In one case, admittedly involving a young pupil, a teacher made an evening telephone call to an adult correspondent to ask him to read his email and reply to the pupil.

But could disappointment be turned into a learning experience? If the connected classroom is the mirror of an adult world, perhaps it is valuable to learn that conventions are a condition for social life.

Failed correspondence could also itself be a message. Email activity, like other ICT applications, is more useful, and perhaps in consequence more likely to continue, if it has a

clear purpose. It would help to identify specific learning contexts in which it is likely to be of value.

This leads to the next theme. When should communications technology be used? Which technology, for what purposes, in what conditions? Should technology be used at all?

9 Accessing new communication possibilities: A pedagogical framework

Until recently, such questions were considered to be of little importance and were largely the preserve of distance education. In order to develop a framework, we will explore briefly the experience of distance education. In her book about teaching¹, Diana Laurillard applies the principles of distance education to the traditional university environment and looks at how educational technology might impact on teaching in the future. While written with higher education in mind, the argument is now, with the unanticipated advent of the Internet and on-line learning, applicable to school. Much of the book is devoted to analysing different technologies. It was written before the Internet had a serious presence on the scene, and before access to it throughout education systems (school and universities) seriously envisaged. But it is none the less stimulating in its implications for both new technological developments and also school settings.

She argues that [university] teachers must take the main responsibility for what and how students learn. They do so by creating conditions in which learning is likely to occur. But there is a central paradox to address: “we want all our students to learn the same thing, yet we want each to make it their own.” She suggests that dialogue be at the heart of good university education and draws attention to one-to-one tutorials as the ideal. The traditional lecture - filling the empty jug - is according to her analysis a poor basis for teaching and learning, but with the advent of mass higher education it becomes ever more difficult to replace it with methods that treat students as individuals.

The book then turns to an analysis of learning and of teaching as a science. Drawing on the approach used in the design of distance learning, and on the teaching excellence of the British Open University, where she has worked for many years, she suggests that traditional universities might consider adopting a similar approach. They might first consider the teaching and learning goals to be achieved, and then design means of achieving them using all the resources at their disposal. Her analysis of different media and technologies demonstrates their specific potential for teaching and learning and shows how they might be used to transform universities, especially those technologies and applications that have the most potential for interaction. The “best” technologies go a long way to creating the potential for mass education to be individualised.

An important dimension of the argument lies in the relation between the characteristics of a technology and specific teaching and learning intention. She draws attention to the difference between computer simulations, which copy reality, and Seymour Papert’s Mindstorm², which present models with which the learner can interact in a structured way. The comparison draws attention to an important point: closeness to reality does not necessarily result in more effective teaching and learning.

It is all too easy to conclude that the greater the authenticity the better for education. And yet there are plenty of cases when this is not the case - for example it may be better to watch a video recording (which you can rewind and replay) of a surgeon’s hands performing a delicate operation than to peer over the surgeon’s shoulders in an operating theatre.

¹ Diana Laurillard, *Rethinking University Teaching: a framework for the effective use of educational technology*, 1993, London and New York, Routledge

² Seymour Papert, *Mindstorms : Children, computers and powerful ideas*, (2nd Ed), Basic Books, New York, 1980.

The Internet can now give access to genuine authenticity, direct links into the real world. For example, watching the space scientist in Mir, communicating with the polar explorer. It is easy to suppose that the essential artificiality of school environment is undesirable, and that classrooms would be improved by interaction with the outside world. Both the “special” protected environment of school and the openness have their value, laboratory experiments, simulations and real-time observation and interaction are complementary. But in what circumstances is “real” communication outside the classroom valuable? We need a framework to help us decide.

Diana Laurillard’s hypotheses lead towards such a framework. She argues that teaching and learning can be improved by the use of media and technology. More recent evidence, including that from Mailbox itself, suggests that new ICTs have potential for enriching learning.

Laurillard argues that dialogue is integral to good university education. In the school context we might add to dialogue the terms communication and interaction. Technologies that support dialogue, communication and interaction can help the class teacher to cope with multiple demands and large classes. For teachers- with or without experience in using them- some of the key questions to be reflected upon are the following:

- When should they be used?
- For what purposes should they be used?
- For whom should they be used
- How should they be used?

Are you as a teacher experienced enough to decide on when and how to use ICT and motivated for using it? How could you as a teacher systematically build up experiences in using ICT in a way that develops your professional competence to reflect on these issues ?

We offer a framework for decisions consisting of four conditions - the four Ps that may help to reflect **some** of the issues involved in relating to ICT:

- Purposeful
- Planned
- Possible
- Productive

Purposeful in that ICT adds value to the classroom only when it adds value to learning. ICT is an instrument for learning, not an objective in itself.

What potential value could the technology give to the learning activities for the pupils? How does it match earlier learning experiences and pupils motivation? Is it appropriate to the task? Is the communication element relevant to the learning activity? Or is it an unnecessary distraction? Does it increase access to valuable learning content?

Planned in that the use of technology should be reflected in preparing the process of teaching and learning. However, there is value in uncertainty. Planning for the use of technology also implies thinking of how to cater for creativity and spontaneity, using and building on what children bring into the teaching-learning process. Is it possible to combine the use of technology with a modern learner-centred educational philosophy?

Possible in that the potential offered by the technology needs to outweigh the constraints. Will computers and/or connections be available in the right place, at the right time, in the quantity required? Will the computers work when you want? Is the technology reliable? Will the proposed respondents reply when you expect (for example have you taken into account time differences in international projects)? Can the software applications deliver what you want? Are there any other practical constraints? Will the pupils be able to finish the task in the time

available? Can the learners manage the technology? Can you manage the class? Or is the plan unrealistic?

Productive in that the use of technology contributes to achieving the intended objectives to a reasonable extent. Was it motivating, effective, frustrating or unproductive? Were there any unanticipated effects? Was it possible to turn this to good effect? Or did unexpected outcomes destroy the value of the activity? In other words, the whole activity should be worth the effort and result in relevant learning.

The strength of Laurillard's analysis lies in its use of a systematic approach, enabling technology to be integrated within teaching and learning rather than remaining at the periphery. The weakness - a weakness shared with traditional distance education - is the over-strong reliance on advance planning and on the system being watertight. Using ICT in the classroom is far from watertight - there are leaks all over the place! The framework proposed, which gives the teacher responsibility for balancing potential against constraints, derives in large part from analysis of the experience of teachers and is intended as flexible and robust.

10 Implementing the framework: introducing new communication possibilities

Let us now turn to your own situation. What new communication possibilities can you envisage using yourself in school? Can you envisage a case that raises issues dealt with above or similar ones?

Use a case to illustrate how you could reflect on pedagogical implementation of ICT. Two suggestions for personal professional development follow.

Get started

We suggest that you start by trying for yourself the technologies that you would like to use. If you are already familiar with the applications, then you are ready to start your planning. But if you would like to use a new application, now is the moment to explore.

Have you tried to use the Internet? What did you do? What was your experience? You may feel anxious to start with. Many people do. One teacher went to the local Internet café for a first try, away from the critical eyes of fellow teachers and pupils; another took a portable computer home to try email for the first time. In both cases, they quickly became confident. Many people are disappointed with the Internet to begin with. It can be slow and frustrating. One teacher described her first experience as a great disappointment. She was very excited about getting on line, had never seen the Internet until she got her connection. On her first try, she found something she wanted to download - it would take 20 minutes. She started it off - and then the computer crashed at 19 minutes 37 seconds! She contacted an adviser who said, why did you try? You've only got copper wires - it's not possible with that technology! But how was she to know? Trial and error has its value, certainly but a special attention needs to be paid to communication with technicians and people in charge of the institution must be aware of the technical constraints.

Exploring communication with other professionals

What queries do you have about your proposals to use new communication possibilities? Can your colleagues help or is the idea new in your school? What might you ask teachers from other schools? What information would you like to get from them?

It is perhaps with such issues in mind that there is now a strong movement to create teachers' communication networks - electronic computer conferences where teachers can communicate with each other and share their ideas and problems. In doing so they also increase through practice their skills in using ICT. Would you use such a facility? How?

Teachers are already using conference facilities for updating themselves, finding ideas for enlivening teaching, reducing anxiety, sharing experiences with peers, sharing work preparation, sharing information about good digital material, transferring material between colleagues. Which of these would you value? Why? Can you add more to the list?

Would your needs be served by a conference group? Would you value one-to-one communication with another teacher by email? What for?

If you would like to explore further, you will find some references to Teachers' Conferences at the end of this section. You will also find references to Mailbox monographs, which refer to School Committees, which assist with innovation in ICT use.

11 Pedagogy into practice: some issues for reflection

At the beginning of this section we pointed out that exploration of the use of new communication possibilities in schools was at an early stage. We have quoted and analysed the Mailbox experience in order to offer some suggestions to teachers venturing into this new territory. The next parts of this section draws attention to some major issues relating to the values and purposes of education and asks how far ICT introduces new perspectives. The issues are considered here from the perspective of a teacher;¹ views on the questions raised are likely to differ according to country and culture.

Empowerment

We have suggested that the reduction and removal of barriers to free communication is empowering. It helps to empower pupils, offering them greater control of their learning and in consequence increasing their confidence and self-esteem. It helps to empower teachers by offering them access to new possibilities for teaching. Do you agree with this view? Do you feel that ICT is a critical factor in teacher empowerment? What are the barriers to its impact? How might they be overcome? Can you envisage further new possibilities for using ICT to empower teachers further?

As a result of our observations, we have suggested that in the connected classroom learning often becomes a collaborative endeavour. In particular, pupils sometimes become experts, teachers become guides and managers of learning. What new demands does this put upon you as a teacher? How will you address them?

Changing culture and organisation

New communication possibilities can potentially have a strong impact on social learning, both for individuals and groups. In many cases, traditional teaching of the whole class at once is unsuitable. Moreover, physical constraints - many pupils, few computers, even less connected computers - push teachers towards different and more flexible ways of organising the learning environment - classroom, school and relations between home and school.

In many schools, ICT facilities are recognised as a shared resource. Some teachers were interested in using the resource for interdisciplinary activity, working with teachers of other subjects. Some schools had committees to plan and monitor developments in teaching and learning using ICT. Does the widespread use of ICT in a school entail the use of new organisational approaches? Can ICT be used effectively if traditional hierarchical structures remain?

How far do you feel ICT could be a tool for transmitting or changing the values and culture of a school?

¹ In other Mailbox publications the same issues are explored from different perspectives. Mailbox web pages:
<http://tecfa.unige.ch/socrates-mailbox>

On-line learning: Would you give pupils free access to the Internet?

This is the most immediate concern for many teachers. In different ways, many are concerned that access to the Internet may lead young people to make undesirable or harmful connections. Similar concerns were expressed with the advent of mass access to television, and the debate on its effects continues today. We explore briefly below the notion of Intranets both as a means of more easily accessing resources and as a regulatory mechanism. But we would like you to reflect on the issue of openness more deeply. You may recall that the Swiss teachers stressed the pedagogic value of the unplanned. How can you create conditions where the unplanned is welcome?

Further, how might you combine focus on the curriculum with openness to the world? Is the consequence of going beyond the immediate face-to-face environment impoverishment or enrichment? Should teachers give preference to local or global issues? Such dilemmas are beyond the capability of any individual, and yet they will not go away.

Intranets

The notion of an Intranet grew up in organisations such as businesses and universities. The original idea was an electronic network serving different places and people within the organisation, and providing gateways to the Internet itself. The idea is now being taken up for education and the concept is broadening beyond a network for a single organisation to comprise groups of organisations (schools). An Intranet potentially offers schools the means to:

- Provide a wide range of high quality learning materials on-line to schools
- Facilitate communication within and between schools and related organisations/people
- Offer access to www and Internet resources
- Provide mechanisms as necessary to guard against unsuitable communication.

The value of an Intranet will thus be to provide schools with access to the widest possible range of resource at the same time as providing safeguards.

One new national initiative is the proposed British National Grid for Learning. This will provide all the functions above and is already under development. You can read about it on the UK Government web-site. Another example is The European Schoolnet. You can find the web addresses at the end of this chapter.

Education Intranets will develop over a period of several years and over that time users - teachers and pupils - will have many opportunities to explore the new communication possibilities open to them and, often, to provide feedback on their experience to inform further development.

What facilities would you like an Intranet to offer? How would you use them? How would they help you? What new resources would you like? How would new resources relate to existing resources - textbooks, video programmes, etc.? Would on-line resources be more useful than CD-ROM, or vice versa? How do you see your role as a teacher developing? What will be your professional development needs?

In this section we have laid emphasis on the idea of selecting and using a communication technology for a purpose. However, in practice, choice is seldom a simple matter. It is through the kind of exploration of possibilities that we have described that you will be able to make your own well-informed choices. The present high-level support for on-line learning and for the development of Intranets derives from conviction that the time has come to exploit new communication possibilities to the benefit of education. But the role of ICT in the classroom of the future is open to shaping by today's teachers.

12 Achieving Quality: Using new communication possibilities to add value to your work as a teacher

We have suggested a framework of four criteria to guide your exploration of communication possibilities in school - the four Ps:

- purposeful
- planned
- possible
- productive

To support your professional practice we propose two further Ps - partnership and professionalism.

Partnership relates to the style of relationship suited to optimal ICT use: collaborative work in the classroom, collaboration across the school, and sharing ideas and experience with other teachers beyond your own school.

Professionalism relates to the need for responsible and reflective exploration of the new communication possibilities. Ready-made answers and guidelines are not available. It is thus a matter for every teacher to design their practice with care, to reflect on its value, and share their experience to the benefit of the professional community.

Exploration of both the potential and the limitations of “connectedness” is at an early stage, but the Mailbox Project suggests that well-managed exploitation of the new communication possibilities in school impacts strongly on personal development and collaborative learning.

13 Extension

Networks and Intranets

Kidlink: Our opening example referred to Kidlink, a children’s network which empowers children. If you want to explore it for yourself, you will find it at:

<http://www.kidlink.org/english/general/index.html>

The National Grid for Learning:

<http://www.ngfl.gov.uk/>

Teacher’s networks: see the European Virtual Teachers College at the site of The European Schoolnet:

<http://www.eun.org/evtc/>

Also see the Richmond Park Primary School monograph on teachers committees

Mailbox reports

Many of the issues introduced in this section are explored from a different perspective in the *Mailbox Synthesis report*.

Mailbox Monographs

On the Mailbox web-site you will also find several monographs about schools, and links to school web pages which often provide further relevant information, as well as examples of pupils’ products. The Mailbox monographs can be found at:

<http://tecfa.unige.ch/socrates-Mailbox>

Ethics and regulation: The Netherhall School, England, and The Norwegian Lower Secondary School

Inclusion and disability: The monograph on Richmond Park Primary School, Scotland, including the annexes with interview with past pupils, elaborates on the importance of communications technology for young people with serious physical disabilities of various kinds.

Email: most reports include much on email, with the exception of Norway

Video-conferences: Shawlands Academy and Richmond Park, Scotland and the Italian primary school all include accounts of video-conferences.

On-line, the use of Internet Relay Chat and the Internet- Norwegian schools

Recommended reading

Berge, Z. L. and Collins, M.(ed.) (1998): *Wired together. The Online Classroom in K-12*. Vol. 4. *Writing, Reading and Language Acquisition*. Hampton Press, Inc. Cresskill, New Jersey. Part III: Online correspondence projects, pp. 93-136.

ENRICHING LEARNING

1 Using ICT to enrich learning: introducing some possibilities

Mailbox experiences tell us that ICT do not impose a way of teaching, learning or a way of reasoning. ICT is a tool for what teachers and pupils build together. Whether it is rich, varied, flexible or rigid, it is the educational environment that brings out the enriching learning qualities of ICT.

Learning can variously be described as implicit, tacit or social learning. We will look at different ways in which the use of ICT influences learning, examine ways in which teachers react, and consider different ways in which these new possibilities can be exploited in schools. The discussion will be set within the context of changing frameworks for learning.

We open with an account of two primary school pupils working on email. In the school described, email arrives on most days, and different pupils each day are assigned the task of collecting the mail and replying to letters. These pupils are replying to a letter received on the previous day.

The daily mail

Jemma (10) and Keith (11years old) are at the computer writing a letter. They are replying to one from Derek in South Africa, who has described his holiday in Cape Town. They have discussed the response beforehand and have some notes on paper to work from. The teacher has left them to work alone.

K: I can write it, you tell me the spelling.

J dictates, K types slowly: D e a r D e r e k ,

J: We wonder

K: I know how to spell "we"

J: w o n

K: d e r and the other word e d. What's on the paper Jemma? Look on the paper.

Teacher returns

K: Mrs N, what shall we say?

T: What would be a more polite way to start?

The children propose - "Thank you for your letter. It was nice hearing from you because we had not been in touch for a while". It is K who comes out with the flowing sentences. They decide they will write something like this and then ask their questions. One question is about why Table Mountain has that name. There is a lengthy debate with the teacher on why it might be - they compare, using sketches, the usual shape of mountains and of tables. J draws a rectangle as a tabletop. The discussion turns to talk of rectangles and squares. They eventually decide the answer might be to do with mountains normally being bumpy and a table being flat. Perhaps Table Mountain has a flat top, like a table. They decide they will look it up later in a book or, better still, in the encyclopaedia on the computer. They might find a picture.

The teacher leaves the children to get on with the letter.

J: Could we say "we are wondering why..."

K: the Table Mountain (*J joins in - they speak as one*) is called Table Mountain?"

Much discussion of wording. K comes up with a proposal: "We are glad you enjoyed your holiday in Cape Town."

J types: D i d y o u e n j y e d

K and J work together till the spelling and grammars are correct.

10.45 Time for break. J saves the letter to finish later. She chooses the name "a letter to Derek".

*Later - J returns to finish the letter on her own. Very confident. She adds a lot to it. When she has finished, she jumps to her feet saying:
I'll go and get Mrs N. to come out and check it for me.
Teacher and pupil run the spell check together: J learns how to add words to the computer's dictionary. Then they check the letter visually and find one or two grammar mistakes. Finally the letter is ready to send.*

In what ways do you feel that computers in this example make a difference to the activity setting in the classroom and evolving learning processes?

Using the computer for text production changes how the pupils develop reading and writing skills. The pupils are given new possibilities for setting themselves standards, correcting each other (scaffolding) and editing their own work. Their sensitivity to language and cultural nuances is focused in their efforts to communicate both politely and clearly to someone far away. They work methodically. The teacher draws out interdisciplinary implications, through the discussion of squares and rectangles, and encourages follow-up research using ICT resources - the encyclopaedia on the computer.

These pupils are also learning in less obvious ways. How important is dialogue in this example? Would the pupils learn as much or the same, working on their own? Is the constant feedback important?

In joint activity, the signs and symbols developed through language, the development of common understanding of the purposes and meanings of the activity, the joint engagement in cognitive strategies and problem solving - all these aspects of interaction influence each pupil. Besides refining their communication skills, these pupils are developing interpersonal skills, related both to working in a team and to communicating with outsiders. Through working without constant reference to a teacher, the pupils develop self-esteem and confidence. ICT is in this context both the stimulus and means to achieving these outcomes.

There are many other different ways in which ICT can stimulate learning. These include:

- learning to evaluate information resources, such as pupils distinguishing between propaganda and fact on the Internet
- providing opportunities to work open-ended, with more complex , interdisciplinary and challenging learning tasks than usually experienced , e.g. the Mars group in a Norwegian upper secondary school
- pupils as coachers of learning processes, such as pupils in different schools setting each other tasks and evaluating performance by email
- pupils teaching each other, such as helping each other to write correct grammar
- producing positive interactions and new rewarding dimensions in the pupil-to-pupil, pupil-to-teacher and pupil-to-knowledge relationships
- coping with communication registers, genres, such as pupils learning “netiquette”, the acceptable styles of communication for email and IRC
- intercultural understanding, such as pupils in a London school explaining through email their multicultural morning assembly to children in an American Bible Belt school
- literacy skills, such as young pupils so highly motivated that they read web pages at the limits of their capacity
- foreign language skills, such as Italian pupils trying to understand and write in English so they can correspond better with pupils in England.
- email stimulating enquiry or leading to follow up, such as the discussion about Table Mountain followed by looking it up in an encyclopaedia
- developing critical faculties, such as pupils deciding which web sites are most useful for their projects.
- providing additional learning situations, e.g. simulations , for promoting analytical skills like deduction, prediction, relationships-seeking, formulation and verification of hypotheses

However, the use of ICT is not without risks. We can avoid uncritical attitudes and behaviour only if ICT is used to support authentic learning, that is, with the aim of coupling the acquisition of information with reflective thinking and action. In most cases, the teacher has an important role in stimulating and supporting such learning. In one case, for example, a group of pupils found some information on the Internet without realising that they had taken it from a site promulgating racist propaganda. The teacher then opened a discussion with the pupils, which led them to understand the mistake they had made, and also made them think about evaluating information. This teacher had not expected this event, but was quick to react and use the opportunity. In the connected classroom, teachers need to be alert and ready to deal with the unexpected and unplanned.

Pupils tend to work at computers individually or in small groups. This separation means that each individual or group will work at its own pace and find its own directions. The teacher has an opportunity to stimulate and help pupils on an individual basis. In our opening example, the teacher comes and goes as the two pupils work at the computer. She is constantly circulating in the class attending to each group.

What might be the new demands of teaching in such an environment?

We noticed that teachers had to have a clear vision of learning objectives, combined with an open and flexible approach. They needed to combine clear planning of learning with flexibility organisation which would allow each pupil freedom to find their own pathway and adopt their preferred learning style, towards those objectives. They needed too to give pupils the opportunity to learn at the pace that suits them. Young pupils learn quickly, picking up language and developing “extra-curricula” skills e.g. search skills.

Are you familiar with any examples of pupils learning from using the Internet? What did they learn? Did they explore for themselves? Was the learning in any way different from what they might have learnt without the Internet? What was the role of the teacher and the pupils in the learning process?

2 Is learning in the information age different from before?

It is now generally accepted that children in school should acquire ICT skills. It is assumed that these skills are important, for learning and for life. What is their importance? Why are they important? In the paragraphs that follow we explore these questions, through considering whether learning in the future will be significantly different from learning in the past. Our opening example suggested that there are differences in how, when, and where learning takes place. What is the teacher’s role? Asking such questions begins to reveal the subtle changes in the learning process that take place when ICT is used.

To what extent do these changes meet new requirements in an age of boundless information, constant change and accessible global communication? The ability to learn throughout life is seen as critical. The skills necessary to face the future go beyond the knowledge-based learning of the traditional school environment. What skills to prepare for such a life might the pupils in our example acquire? There is concern amongst educators internationally about the implications for learning of global change. The International Commission on Education for the Twenty-first Century recently proposed one framework for educational reform for the new environment.¹ It forms a good basis for discussing the relations between ICT and learning.

The key idea of the report is a powerful one - a framework for learning of four fundamental pillars of knowledge:

- Learning to live together
- Learning to know

¹ Delors et al 1996 (p37)

- Learning to do
- Learning to be.

The vision of the four pillars suggests a new agenda for education. The Commission has put greater emphasis on the first of the four pillars that it proposes and describes it as the foundation of education. Learning to live together refers to family and community as well as the global context: “developing an understanding of other people and an appreciation of interdependence... in a spirit of respect for the values of pluralism, mutual understanding and peace.”

The second element, learning to know, is the basis of most traditional education, but in the new framework also comprises “learning to learn”. The third, learning to do, is conceived broadly, including “the competence to deal with many situations and work in teams”. Learning to do is closely linked to learning to know. The challenge facing education today is to implement methods that will succeed in transforming school knowledge into practical competence. Finally, “learning to be” relates to the development of individual potential. This last element is particularly important for the theme of this section, suggesting as it does, that the implicit learning, which was the focus of Mailbox will in future have a legitimate place in school.

The four pillars present a powerful image of an empty space within a framework where learning might take on new and different dimensions. In traditional education learning is linear. How might the learning of the future be organised? How could school learning come to reflect more closely the complexity and multidimensionality of life outside school? We saw above how ICT can affect the process of learning. Do you see any relationship between the impact of ICT and the four pillars? What could be the immediate and long-term effects of ICT on pupils learning?

In our view, the way that ICT can help to stimulate interaction is in line with the main idea behind the four pillars: learning results from what pupils do, passivity is discouraged, and pupils develop skills useful for dynamic situations. For example, language tends traditionally to be taught as though it is linear, but the use of language is not linear. Perhaps ICT can help to liberate teaching and learning from artificial constraints of the linear curriculum. ICT may be used as a tool to link together different subjects and to provide different and new pathways towards learning objectives, increasingly important as boundaries between disciplines begin to disappear

Learning to live together

ICT provides a bridge between learning at school and learning outside, at home or farther afield. The institutional setting no longer has a monopoly. The Internet does not “start” and “end” like school. As we discuss in the section on Communication, authentic and immediate experience can already enter the classroom via the Internet. Closed learning is not an option.

One secondary school decided to set up a community information network, linking together local primary schools, parents and teachers. One objective was to find answers to questions asked by the primary pupils. Another was to help pupils about to transfer from primary to secondary school to overcome any fear they might have by creating links. The project is described below.

Setting up the E team

The local secondary school was introducing six nearby primary schools to the Internet. At meetings between the schools, themes of interest to the younger children (10 years old) were identified. The first themes were religion and language.

One primary school had been awarded a small grant to set up a project for bilingual children to communicate with other children from their home culture. The 400 children had 57 different mother tongues. So the school's interest in the project derived from cultural focus. They decided to use the subject of Religious Education. They wanted children to benefit from access to websites world-wide. Also religious education usually

doesn't have an IT focus - they wanted to try it. They wanted to be able to say "look what this community has done".

Each primary school was to use email to send in questions and queries to the secondary school. The questions would then be put to students and parents. The email interface was to be managed largely by children aged 14-15, who volunteered for the task. They would operate in lunch hours and occasionally after school. The group would be called "the E team". The E team was trained to use email, and one pair was on duty each day of week. They got their own Mailboxes.

A few weeks later two boys from the E-team arrived at the computer at lunch break to see what questions had come in. Questions about Islam and Hinduism. The boys discussed the questions with confidence and enthusiasm. They seemed able to distinguish between questions, which were hard and easy to answer, and immediately started to discuss strategies for answering. They started talking about whether they had any personal contacts who were Muslim or Hindu, then spotted one of the Religious Education teachers by chance at one of the computers in the lab and immediately started discussing with her how they might get answers. They went off to class with a diskette, so they could enter each answer as they found it. Later the same afternoon they returned with a selection of questions on disk ready to send off to a parent selected from their register who would be asked for answers.

By now, the list of themes had enlarged, the E team were researching answers to the questions with great vigour, and the schools had already the beginnings of their own information database. Many parents had signed up as willing to answer questions and some very interesting material had been collected.

These schools realised that they could make good use of electronic communication if they ignored the walls of each school and worked as a larger community, sharing expertise between schools and drawing on parents and others in the community. Pupils, teachers and adults outside school were all potential sources of information and knowledge that could be mobilised for learning purposes.

When we talk of children growing up in a global environment we are referring to the access they have to information and, increasingly, personal contacts all over the world. In the excitement this brings it is easy to forget that ICT also makes it easier to connect with the local community. In "learning to live together" there is an opportunity, with the assistance of ICT, to tap the pool of goodwill and expertise in local communities. In a further example from the same project, we see how it is possible through using ICT to stretch the bounds of classroom knowledge and mobilise funds of knowledge outside schools

Parent-expert involvement

One parent dealt with a question as follows:

Question (from an 8-year-old): what is infinity times zero?

Answer: infinity is not a number and so it cannot be multiplied by zero.

This is because multiplication is an operation for combining two numbers to produce a third.

The answer came from a parent who was a member of a University mathematics department. He followed up with a note to the schoolteacher:

As I wrote [the reply] I felt that [the questioner] was going to be disappointed. I thought about writing more, trying to give him an idea of what infinity actually was (or at least how it manifests itself) but then thought it better to keep it short. If he wants the right to reply then I'm happy for him to follow it up. It's the type of subject that still captures people's interest when you raise it in the coffee room here.

Not every parent would contribute so much effort, but you only need a few to change a school.

There are a number of ways in which this experience extended boundaries for all involved:

- primary pupils starting asking new questions, and got answers to them
- older pupils, and all the teachers, developed skills as managers of information
- project participants were drawn together through the communications network
- experience of collaboration across the generations was different and exciting
- the community took on new responsibilities for responding to learning needs of its younger members
- participants enjoyed it.

Learning to know

The pillar emphasises the need to combine a sufficiently broad general knowledge with the opportunity to work in depth on a small number of subjects. Given the exponential rate of information production, children must be encouraged to discover and perfect their own knowledge-seeking skills that they will use for life-long learning purposes. Initial training can neither produce an end product or a sufficient knowledge base that the individual can use throughout the entire life. As a consequence basic education should not have as its only focus the accumulation of knowledge in a teacher-directed environment. Problem-solving strategies, exploration of resources and autonomy in learning take on far greater importance. If pupils are to learn to know, they must be capable of formulating hypotheses on possible solutions to the problems in focus (problem-based learning), be experienced in sifting masses of information for relevance, verity, coherence and appropriateness, organising and applying knowledge needed. This means learning to learn.

In the following example we have an illustration of what this could mean in a classroom setting in a upper-secondary school in Norway where the students are 18 to 10 years old with access to Internet.

THE LASER GROUP

They continue to search the Internet for information and then save it on a diskette. “Wasn’t it Alta Vista where we found such a lot of information?” says one of the boys. *Y. tells them how to write Yahoo! One of the pupils says that they found a lot of information in an encyclopaedia in the school library. I. (teacher) returns.*

“Did you find any good links here?” she asks them to look at some links to newspapers. She believes that the best links will probably appear on the screen in any case. “Our presentation of the problem in the project doesn’t have to be *formulated as a question, does it?*” asks one pupil. *I. replies that it doesn’t necessarily have to be the case, and says that it is also possible to limit the actual approach to the problem to: ‘Do we need lasers today, in what instances are lasers useful?’ There are two areas here too, one of them is for background information and it’s a good idea to search for ‘LASER +HISTORY’,” she says. She asks them if they have tried this, and they reply that it brought up 800 000 links. “What you can also do is to search for some of the people whose name appears in connection with lasers, that could also be a good tip,” says I. The pupils discuss how they will continue their search. “What were those guys’ names?” (the inventors of the laser, sic.), says the boy sitting at the keyboard. They try different spellings. One of the pupils leaves to copy something for the group. The group talks about the man who invented the laser. A search for his name produces 55 hits. “He was born in 1915,” says one of the pupils. Another pupil says that they will browse to a link since they will most likely get lots of information that way. I. stands beside them, watching. I. turns to the group again and says that she is pleased that they have begun to find something of interest. One pupil goes to the library to find information in the encyclopaedia, while another pupil returns with copies. One pupil*

shouts out that it is important for him that he finds something in Norwegian. "It says here that that guy isn't dead," says the pupil who found a reference to the inventor of the laser in an encyclopaedia.

How does this example reflect a greater degree of autonomy in applying basic skills and strategies in pupils learning? What kind of implicit learning is stimulated? What consequences may such a learning-environment have for the teacher role? When knowledge becomes far more than what the teacher says or what the pupils read in a book, how will this influence curriculum? When the ready-made formulae learnt at school becomes part of a dynamic process that links school to the outside world, how could this be used to motivate and individualise learning? What kind of literacy becomes important when children are encouraged to learn to know incorporating ICT in the learning process?

Learning to do

It is generally accepted that the most effective and motivating teaching is that which leads learners to solve problems they face in their lives or being attached to life, rather than rote learning/mechanical repetition. There is a basic need to incorporate doing/action in learning. ICT may offer a learning environment that enables teachers to supply rich, hands-on-learning experiences for all. When pupils are physically and socially involved in the learning process, they develop greater self-confidence to carry out tasks efficiently and a greater sense of autonomy at an early age. Certain ICT applications can enable even severely handicapped learners to learn to do, thereby extending their autonomy in new ways not possible without ICT. An indispensable element of learning is the creation of meaningful connections between individual, academic and social life through the concrete learning activities of pupils. For most classrooms this would mean reorganising the context for traditional school learning from a passive recitation model to an interactive and more holistic approach that would make full use of pupils experience. By developing social networks that connect classrooms to outside resources we may transform classrooms to more advanced contexts for teaching and learning and encouraging more collaborative and co-operative relationships between pupils and teachers working together and learning from each other.

Good technology "leaves" room for interpretation. Thus a technological tool can help generate mental as well as physical activity because it can instantiate formally construed relationships that can then be acted upon by children in unique ways as they encounter it.

Learning to be

Let us explore further the notion of "Learning to be". The Commission report summarises the concept as follows:

"learning to be, so as better to develop one's personality and be able to act with ever greater autonomy, judgement and personal responsibility. In that connection, education must not disregard any aspect of a person's potential: memory, reasoning, aesthetic sense, physical capacities and communication skills."

These qualities and capabilities are very close to the principal concerns of Mailbox. Are such qualities taught or acquired? What is the role of school in developing the personality? Perhaps we can agree that traditional school neglects what the Commission calls "the treasure within", the talents hidden like buried treasure in every person.

Amongst pedagogical theories that address issues of personality development, Howard Gardner's influential theory of multiple intelligences is suggestive in our context. We are sure that your training as a teacher will have introduced you to the idea of respect for different learning styles. If you have not read his work, we give references below. His theory is simple, but revolutionary. He suggests that there is more than one way of learning, and that teaching to be effective must recognise this. He defines seven ways of knowing the world as follows: ¹

¹ Howard Gardner "The unschooled mind" Fontana 1993

“We are all able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems or to make things, an understanding of other individuals and an understanding of ourselves”

He then goes on to consider how teachers can adapt their approach to accommodate to different learning styles. He suggests that one role for the teacher is to open doors to learning. He proposes five doors:

- The narrational or story-telling approach
- The logical-quantitative approach
- The foundational or philosophical approach
- The aesthetic approach
- The experiential approach.

“Students vary as to which entry point is most appropriate for them... Awareness of these entry points can help the teacher introduce new materials in ways in which they can easily be grasped by a range of students”

Different cultures place different values on the five approaches. For example, the “story-telling” approach is very familiar to Nordic countries with the value placed on traditional wisdom, while the experiential approach is strongly associated with Dewey and the North American tradition (to which Gardner belongs). Which of the doors seems most in line with your own values? Which other approaches might you use?

You may find these ideas useful in considering how best to release the potential of every pupil. Awareness of these different doors could also help you decide how to use ICT? Is it possible that, using ICT, you may be able to open several doors at once in a single classroom? ICT could perhaps help you to provide greater variety in class and enable you to attend more to differences between individuals and their needs?

3 ICT and quality of learning

We have begun to explore some of the new doors to learning that may be opened with the help of ICT. But might ICT also close doors? Is there a danger of channelling our efforts too narrowly? Perhaps some blind spots may be developing because ICT is regarded as valuable in itself? Have you noticed any?

Let us turn now to consider some examples, where there are elements of ambiguity. The incidents described below all occurred in the same primary class.

The observations was part of the Mailbox research in a Norwegian primary class working with a interdisciplinary project creating a newspaper about Europe and the pupils could to a certain extend choose themselves what to write their articles about. The 58 nine-year old pupils in 5th grade used the Internet as their main source for information and they had newly become familiar with the new medium through a course provided by the school. What benefit did the pupils obtain from their use of the Internet? What aspects were of little value? Could the teacher have acted differently? What would you have done?

Observation 1

In the library there were 21 pupils working at the computers. The teachers had divided the computers between the editorial teams, and each group/region had two computers at its disposal. One girl was looking for information on tourism in France. Three girls were searching for information on tourism in Italy. One boy was sitting at the next computer and was working on the same topic. Three boys were working together and looking for information on football in France. Two boys were looking into food culture in Switzerland. Four boys were searching on two computers, but it was difficult to find out what they

were searching for. One boy was searching for information on sports in Germany. One girl was using a word-processing program. Three boys were on the Internet trying to find information on sport in Germany. A girl and a boy sitting at separate computers were researching for sports and agriculture in Norway.

This was a situation where learning was controlled by the wish to find new and exciting places on the Internet. The result, however, often had no effect on learning because the pupils were easily convinced that learning was all about finding the largest number of exciting web-sites, and not about working with the content on the pages. It is important that teachers do not believe that their pupils' learning is under control and valuable, simply because the pupils are capable of finding new web-sites. The pupils' feeling of omnipotence and independence in their role as "Internet rider" can easily create an impression of learning. But does the learning go below the surface? Only evaluation would tell.

Observation 2

Two girls were searching for "No Doubt", a pop group. "Look! No Doubt, we're good, we're good!" exclaimed one of them proudly.

Here is another example of how pupils find satisfaction simply in locating sites on the Internet. The actual process of finding appears to give positive reinforcement to the mastery of technology. One of the characteristics of the Internet is that it is easy to confirm whether or not there is something to find. Pupils receive an immediate response to their requests. The question we might ask ourselves is whether it is enough for a pupil to find something on the Internet, without requiring any understanding and use of the content. Are there circumstances in which teachers might properly be satisfied with performance of such a simple task? When a teacher demonstrates through words or actions that the Internet is something that they are unable to use, or they do not think they can use it, the status of those who have command of the new medium is boosted. Is this desirable or not?

Observation 3

After the lunch break, the pupils continued to search for information on the Internet. One of the girls belonging to a group that was supposed to work with France, was originally given the task to look for information on the pop group "No Doubt" but she had altered her assignment to that of searching for information on "Spice Girls" (from England). This episode was later cited by the teacher as an example of an infringement of the project rules.

Is it acceptable that most of these pupils use the Internet to find information about their sports, fashion and pop heroes, and spend most of the time set aside for study on such matters? What can pupils learn from searching the Internet for topics that they already have an interest in? Can we exploit this enthusiasm to meet requirements relating to objectives and content in the basic school curriculum? Schools face a major challenge to build a bridge between curriculum requirements in respect of objectives and content on the one hand, and on the other content that appeals directly to the pupils and is far more representative of their world. How can we create a balance between these considerations?

Observation 4

One of the boys was supposed to be searching for information on football in Italy, but he wanted instead to download something on "Ferrari": "Couldn't find anything about football, so I looked at Ferrari instead," he said with a smile. He agreed that they were not allowed to change topic like that for no reason.

This observation shows how pupils have opportunities to replace their assignment with one, which more closely matches their interests and motivation when they have access to the Internet. This raises questions about the teacher's management and control of the pupils' learning. If we wish to avail ourselves of the opportunities the Internet gives pupils to work

with topics that interest and motivate them, is it then possible for us to define problems and topics as strictly as we have been used to doing? Will the information society of the future increasingly require that pupils develop skills and competence in defining and delimiting problems themselves, and thus also defining the content of their learning? Or does this represent a threat to academic achievement and the curriculum? We must assume that in the school of the future it will be increasingly difficult to assert the advantage of a national curriculum with a strong content framework as the only correct determinant for the pupils' future direction of development.

The four observations indicate the power the Internet has to "trigger" the pupils' attention. Content which manifests the pupils' role models, interests, overstepping of norms, new roles, and which is constantly being updated, represent opportunities for "the living life" as opposed to the static and retrospective content found in textbooks. Since the Internet also utilises graphical and audio tools, and provides opportunities for interaction between pupil and content and between the pupils themselves, we must also assume that the Internet will be increasingly important as a tool for the pupils' learning and socialisation. A major challenge for the school will be to make the pupils and teachers aware of this, and to relate their own practise to the new opportunities, which the Internet provides.

4 Reviewing your own ways of learning: an activity

It may be helpful to review your own preferences in learning style, assess how far using ICT reinforces your normal practice, and consider how far it opens - or could open - new doors. The activity that follows is designed to help you do this, and perhaps to discover something new about yourself and your capabilities.

Reviewing your learning

Identify up to three learning activities that you took part in or know from other sources recently. Include in your list at least one where ICT was used.

What did you learn?

Was it what you intended to learn?

Did you set yourself a precise target or standard to achieve?

What role did ICT play in the learning?

Was each experience valuable or not?

Before you move on, reflect on how you approached this learning.

What matters most to you when you learn?

Do you like to explore different possibilities?

Do you prefer to master the learning as quickly as possible?

Are you more concerned with accuracy and detail, or the broad canvas?

Do you feel you must perform better than other people?

Do you prefer sharing your ideas with others?

Now classify your learning experiences according to Gardner's seven ways of learning.

Which "ways of learning" did your each of choices belong to?

Could ICT have helped you more with this learning? Could ICT made it different? In what ways?

You may find it useful to discuss your thoughts with a group of colleagues

This activity may have given you some new insights into your own learning processes. It may also have set you thinking about your teaching. The next example may give you some further practical ideas.

5 Focus on school learning

Alligator project

"We started our alligator project when we were learning to use video conferencing because we said "See you later alligator" whenever we finished speaking to the other schools on the computer. We found out all about alligators from books, the Internet and from television programmes. We learned lots and it was all very interesting."

The class ICT project excited the 11-year-old boy who wrote this. He was aware of learning "all about alligators". But his teachers had a deeper perception. The project plan goes on to describe cross-curricular extensions - links to language development, mathematics, expressive arts, music. The "Alligator project" was designed as a multidisciplinary project, with ICT as the tool that bound together work in every different school subject.

Here is an extract from the class teacher's plan for the project showing how the project is related in detail to the school curriculum, and how the use of ICT is integrated alongside other methods:

Alligator Project Week 1

Knowledge and understanding: develop understanding of main distinguishing features of vertebrates i.e. reptiles - alligators. Also look at pupils' own distinguishing features and characteristics. Interaction of living things with their environment e.g. farming and climate

Planning: Propose simple categories within which information found can be organised e.g. reptiles - alligators/crocodiles. Use pupil profile to decide which information to gather on selves

Collecting evidence: Extract specific information from reference books, TV programmes, from Internet search. Measure each other to find height/weight etc.

Recording and presenting: record collected evidence in a variety of ways - enter information under headings/ make drawings. Contribute to class & wall display. Database of personal information.

Interpreting and evaluating: Distinguish between fact/opinion e.g. about "myths" about alligators. Discuss how interaction between humans and environment is very different in some parts of the world to others.

Developing informed attitudes: Develop positive attitudes towards endangered species. Raise awareness of the individuality and identity of each person, and the contribution that each person can make to their immediate world.

In this school, each pupil had a personal record for each subject. Here are a few teacher comments on the ICT record of one 11-year-old pupil:

"Work on email/Internet has certainly developed all language skills as well as social/collaboration. It motivates him. The collaborative work to develop self-confidence is a good strategy.

Reading: uses the Internet as a valuable source for locating up-to-date information - he questions the usefulness of information, its relevance, considers how to select etc.

Alligator project/video conferencing: K excelled himself in this topic."

The teachers in this school used a clear pedagogical framework for planning the alligator project. The impact of meticulous design was evident both in the confidence, competence and high standards achieved by the children.

It is interesting at this point to review this example against the seven ways of knowing the world: “language, logical-mathematical analysis, spatial representation, musical thinking, the use of the body to solve problems or to make things, an understanding of other individuals and an understanding of ourselves”.

How do the example reflect the use of Howard Gardner thinking? Do you see possibilities in using this project as a model for other projects? Give an example. If not, try to develop a model for your own use. Highlight where and how to incorporate ICT in your example. How would you describe the role of the teacher?

6 Using ICT to enrich pupils’ learning: an activity

Do we need a new pedagogical approach for the information society? We end this section by asking you to review what you have read and reflect on the potential of the new pedagogy.

Pearn and Downs¹ define competent learners as people who for example:

- Know how they learn best
- Look out for information on their performance so that they can improve it
- Accept responsibility for their own learning and development
- Question authority and information received
- Try different methods of learning
- Make positive use of any mistakes in order to learn and develop greater understanding
- Become experts in “fortuitous learning”, that is they are able to draw lessons from everyday life

How can ICT contribute to developing competent learners for the future? What could new technology contribute to developing competent learners? .

How you would approach the same question *without* ICT. What difference does it make?

By now, we hope that you have identified ways in which ICT can make a difference to learning. You may have recognised ways in which it can help you with your own learning and you may have planned specific ways to use ICT in your practice to enhance your pupils’ learning.

7 Extension

In this document examples have been drawn from several Mailbox monographs, which you will find on the Mailbox web-site together with links to school web pages. Further examples will be found in the other Mailbox monographs, including examples with different age groups. Many of the issues are also explored from a different perspective in the Mailbox *Synthesis Report*. Specific development of themes covered in this section include:

An integrated curriculum: The monograph on Richmond Park Primary School describes in some detail how activity with ICT in the school is related to learning and the curriculum. The school web pages offer displays of school project work, including the alligator project.

Learning and the community: The local school-parent community network is described in detail in the account of The Netherhall School.

¹ In Nyhan, D. (Ed). (1991) *Developing People’s Ability to Learn*. European Inter university Press

Managing learning: The case study of the Norwegian Primary School explores how the management of learning changes with the introduction of ICT

Further reading: We have referred to:

Jacques Delors et al, Learning: the Treasure within, report to UNESCO of the International Commission on Education for the Twenty-first Century, UNESCO 1996.

Howard Gardner The unschooled mind Fontana 1993

Nyhan, D. (Ed). 1991 Developing People`s Ability to Learn. European Inter university Press

Michael Barber, The learning game: arguments for an education revolution, Victor Gollanz, 1996

Glossary

Bookmark

A user's reference to a document on the World Wide Web or other hypermedia system, usually in the form of a URL and a title or comment string.

Browse(r)

A computer program providing access to sites on the World Wide Web. This computer program allows users to build their own route through an application rather than following a pre-determined one. The route so chosen may be remembered by the system so that it can be re-traced back to the starting point of that route.

CD-ROM (Compact Disk - Read Only Memory)

In computers, CD-ROM technology is a format and system for recording, storing, and retrieving electronic information on a compact disk that is read using an optical drive. A CD-ROM player or drive does not allow writing to the disk.

Distributed network

Network that relies on multiple computers to provide various resources to other computers in the network, rather than making all resources available from a single server. The Internet depends on distributing networking.

Download

To copy a file, e-mail, or other information from a central computer to a personal computer.

Electronic mail (e-mail)

A system of world-wide electronic communication in which a computer user can compose a message at one terminal that is generated at the recipient's terminal when h/she logs in. Communication is asynchronous. It can be addressed to an individual, as well as to groups of people.

HTML

Hypertext meta-language.

Hypertext

A database format in which information related to that on display can be accessed directly from the display.

ICT

Information and Communications Technologies.

Internet

International collection of interconnected electronic networks that support a common set of data communication protocols - Transmission Control Protocol (TCP) and Internet Protocol (IP). Internet evolved from ARPAnet.

Intranet

Any network, which provides similar services within an organisation to those, provided by the Internet outside it but which is not necessarily connected to the Internet. The most common example is the use by a company of one or more World Wide Web servers on an internal TCP/IP network for distribution of information within the company.

IRC (Internet Relay Chat)

A world wide "party line" network that allows one to converse with others in real time. IRC is structured as a network of Internet servers, each of which accepts connections from client programs, one per user. The IRC community and the Usenet and MUD communities overlap to some extent, including both hackers and regular folks who have discovered the wonders of computer networks. Some Usenet jargon has been adopted on IRC, as have some conventions such as emoticons. A chat room is an area on a computer network where members "gather" to type in messages in real time. They can receive immediate responses. There are two types of chat rooms; public and private.

Kidlink

A non-profit grassroots organisation aimed at getting as many youth through the age 15 as possible involved in a **global** dialog. Kidlink has activities in English, French, German, Hebrew, Icelandic, Japanese, Norwegian, Portuguese, Spanish, Italian, Danish, Macedonian, Turkish, and Nordic languages.

Local area network (LAN)

A network connecting in close proximity, LANs facilitate communication and sharing of information and computer resources (such as printers or storage by the members of a group).

Multimedia

Transmission that combine media of communication: text and graphics and sound etc..

Netiquette

Etiquette on the network or Internet. The conventions of politeness recognised in e.g. newsgroups.

Network

An arrangement using a Network Operating System in which several computers are linked together so that they can share data and peripheral devices.

On-line

Being actively connected to a network or computer system; usually being able interactively to exchange data, commands, and information.

RAM (Random Access Memory)

The "built-in" readable and writeable data storage that comes with, or can be added to a computer. Having more RAM in your computer reduces the number of times that the computer processor has to read data in from your hard disk, an operation that takes much longer than reading data from RAM.

Wide area network (WAN)

A computer network in which widely dispersed computers, such as those among several buildings or across a city or state, are interconnected. WAN's make use of a variety of transmission media, which can be provided on a leased or dial-up basis.

WWW (World Wide Web)

A collection of Internet sites that offer text and graphics and sound and animation resources through the hypertext transfer protocol. A hypermedia information retrieval system linking a variety of Internet-accessible documents and data files (text and graphics). Often referred to as "the Web".