

# Technologies

## FOR EDUCATION

POTENTIALS,  
PARAMETERS,  
AND PROSPECTS

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# Preface

The right to education means that educational opportunity must be both equal and universal. Throughout its existence, UNESCO has sought to expand the reach of educational services and improve their quality. Its commitment to innovation, notably through the use of technologies, is equally long-standing. Since the 1960s, UNESCO has supported a variety of specific projects and conducted studies on a range of topics, including use of technologies for primary education in developing countries, expansion of higher education at a distance, and use of technologies in classroom instruction at all levels.

Educational progress in many developing countries faces a severe double bind. While all now accept the notion of the right to education and the expansion of demand at all levels this right implies, widespread economic stagnation or decline prevents action. These opposing trends put intolerable pressures on many countries' educational systems. Traditional expansion of education systems in many parts of the world will be impossible, so new resources and methods must be found. Impressive advances in technology over the past few years provide new hope that technological solutions, intelligently applied, can allow greater access, higher quality, and lower cost per learner. To achieve massive improvements through technologies will require learning from past mistakes and careful analysis of how to innovate broadly and durably.

UNESCO's current program has a strong emphasis on the use of technologies in and for education. This monograph is intended to help educational decision makers survey the technological landscape and its relevance to educational reform. This monograph is firmly rooted in a vision of education that begins with the learner and attempts to understand how technological tools can better contribute to educational goals. It looks at how technology can promote improvements in reach and delivery, content, learning outcomes, management of systems, teaching, and pertinence. In short, it is a contribution to global reflection on how to make learning throughout life a reality.

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# Foreword

For 40 years, the Academy for Educational Development (AED) has devoted itself to fostering worldwide development in education, health, environment, family planning, and the economy, often introducing technology as a means to achieve development goals.

Today the demand for educational technology is high, and when technology is used thoughtfully and is learner centered, the results are gratifying. Again and again, we have witnessed the power of technology to enable people to learn and to interact, even in the most remote areas of the developing world. Through increased outreach we are helping to build the IT capacity of underserved populations such as people in rural areas, women, those with disabilities, and speakers of minority languages.

Lower costs and more flexible, adaptable, and user-friendly hardware are making this possible. So, too, is a new generation of teachers, planners, and administrators who understand the value and utility of the technologies. In its first international ed-tech project—evaluation of El Salvador’s educational TV program—AED witnessed the impact that such thinkers can have on an educational system. In El Salvador a forward-looking minister of education viewed cutting-edge technology not only as an opportunity to deliver innovative programs to school children—the original purpose of the project being evaluated—but also as a means to achieve broader reform of a complex educational system. More than 25 years ago, he demonstrated technology’s potential for educational change.

Long ago we learned that technology is not the answer unless it reflects learners’ needs and suits their environment. Technologists then become their partners, and the new technologies help learners learn, conduct business, advocate for causes, receive information, and participate in the marketplace. AED is one such partner that provides assistance in planning, training, assessment, and hands-on support to ministries, communities, schools, and international donor agencies to help spread the effective use and application of the technologies.

It is imperative for decision makers and practitioners to share their experiences with educational technologies. Thus this book is an attempt to organize what is known in terms of research, thinking, and experience. It captures much of the progress in the field. It also identifies the challenges we still face.

AED, an independent, private, nonprofit organization, is delighted to co-publish this important book with UNESCO. Together we hope to further the dialogue about the promise of the new technologies for learning and development.

Stephen F. Moseley  
President and CEO  
Academy for Educational Development



# ACRONYMS

ACOT	Apple Classrooms of Tomorrow	GLOBE	Global Learning and Observations to Benefit the Environment
AVU	African Virtual University	GLS	Global Learning Solutions
BBC	British Broadcasting Company	GMI	General Motors Engineering and Management Institute
CAGR	compound annual growth rate	GPL	General Public License
CAI	computer-aided instruction	ICT	information and communication technology
CAL	computer-assisted learning	IDB	Inter-American Development Bank
CATT	Computer-Assisted Teacher Training project	IDG	International Development Goal
CAUA	China Association of Universities for the Aged	IESA	<i>Instituto de Estudios Superiores para la Administracion</i>
CBT	computer-based training	ILCE	<i>Instituto Latinoamericano de la Comunicación Educativa</i>
CFI	<i>Centre de Formation des Instituteurs</i>	ILO	International Labor Organization
CIED	<i>Centro Internacional de Educacion y Desarrollo (Venezuela)</i>	IMS	Instructional Management System
CLN	Cisco Learning Network	IP	Internet Protocol
CMC	computer-mediated communications	IRI	Interactive Radio Instruction
CODECS	Center for Open Distance Education for Civil Society (Romania)	ISDN	integrated services digital network
COHCIT	<i>Consejo Hondureño de Ciencia y Tecnologia (Honduras)</i>	ISP	Internet service provider
COL	Commonwealth of Learning	ISTE	International Source for Technology in Education
COLME	Commonwealth of Learning Media Empowerment	IT	information technology
CONNECT-ED	Connectivity for Educator Development, Uganda	ITEK	Institute of Education Kyambogo (Uganda)
COW	computer-on-wheels	ITESM	Technological Institute of Monterrey (Mexico)
CRM	customer management relationship	ITS	intelligent tutoring system
CSCW	computer-supported collaborative work	IVEN	International Virtual Education Network
DANIDA	Danish International Development Assistance	JBTE	Joint Board of Teacher Education
DC	direct current	KRDL	Kent Ridge Development Laboratory
DECT	digital European cordless telephone	LAN	local area network
DHTML	Dynamic Hypertext Markup Language	LGPL	Lesser General Public License
DOS	disc operating system	LTNet	Learning Technologies Network (United States-Brazil)
DSL	digital subscriber line	LTSC	Learning Technology Standards Committee
DVD	digital video disc	LVI	LucentVision Interactive
EBS	Educational Broadcast Services	MBEC	Ministry of Basic Education and Culture (Namibia)
EDC	Education Development Center	MECC	Minnesota Educational Computing Corporation
EdTech R&D	educational technology research and development	MERLOT	Multimedia Educational Resource for Learning and Online Teaching
EOE	Educational Object Economy	MONE	Ministry of National Education (Turkey)
ePOW	electronic Problem of the Week	NASA	National Aeronautics and Space Administration
ERIC	Educational Resource Information center	NGO	nongovernmental organization
ERP	enterprise resource planning	NIED	National Institute for Development (Namibia)
ESCOT	Educational Software Objects of Tomorrow	NOAA	National Oceanic and Atmospheric Administration
FQEL	Fundamental Quality and Equity Levels project		
FRM	Roberto Marinho Foundation		
GDP	gross domestic product		
GNP	gross national product		

NOS	National Open School (India)	SEP	<i>Secretaría de Educación</i>
NSF	National Science Foundation	TCP	transmission control protocol
NSU	Nova Southeastern University	TCO	total cost of ownership
OECD	Organisation for Economic Co-operation and Development	TECSUP	Higher Technological Institute (Peru)
OLA	Open Learning Agency (B.C., Canada)	TIMSS	Third International Mathematics and Science Study
OLI	Open Learning Institute of Hong Kong	TRIPS	Trade-Related Intellectual Property Rights
OSS	open system software	TVRO	television receive only
OUHK	Open University of Hong Kong	UHI	University of the Highlands and Islands (Scotland)
PC	personal computer	UNDP	United Nations Development Program
PC3	Public Computer and Communication Center program	UNESCO	United Nations Educational, Scientific and Cultural Organization
PLN	power line networking	UP	University of Phoenix
POP	point of pressure	UPS	uninterruptible power supply
	post office protocol	URL	Uniform Resource Locator
PSA	public service announcement	USAID	United States Agency for International Development
PTA	parent-teacher association	USB	universal serial bus
PTC	Primary Teacher Training College (Uganda)	UTA	Universities of the Third Age (China)
QOLN	Queensland Open Learning Network	UUCP	UNIX to UNIX copy
RADECO	Radio-Assisted Community Basic Education	VEE	Virtual Exchange Environment
RAM	random access memory	VHS	virtual high school
RASCOM	Regional African Satellite Communications	VITA	Volunteers in Technical Assistance
REDUC	<i>Red Latinoamericano de Informacion y Documentacion en Educacion</i>	VSAT	very small aperture terminal
RIVED	<i>Red International Virtual de Educacion</i>	WHO	World Health Organization
		WTO	World Trade Organization
		XML	Extensible Markup Language