

# The Classroom of Tomorrow: An Educational Wonderland

Tomorrow's classrooms will provide students and teachers with a profoundly different kind of environment – a dynamic environment that will unleash their intellects and their imaginations. The new classrooms will be equipped with an array of powerful tools that will make learning far more satisfying and fulfilling for their users. This paper describes some of the differences that will distinguish tomorrow's classrooms from those of today.

## The classroom's new tools

The principal learning tool in tomorrow's classroom will be a human/computer interface that we'll call "the telereader terminal." The telereader, a small, low-cost, and screenless appliance, will provide each student with completely and precisely controlled visual and aural environments, a world of sights and sounds over which the student has full control, a focused world in which the student can achieve complete concentration and optimum input/output efficiency. The telereader will be a "transporter" that can take the students anywhere in the universe they want to go. However, the telereader will not transport the students' bodies to other locations, ala *Star Trek*, but will simply extend their eyes and ears (and, when desired, their images and voices) to the places they wish to visit. These digital vehicles will enable the students to visit the world's great libraries, the studies of the world's great scientists and scholars, the world's great laboratories and observatories, other societies, other nations, other planets, the microcosmic world, exotic locations, or any other realm they would like to visit. The telereader will also enable students to travel back in time to make realistic and close-up observations of historical events and the peoples of the past.

## The telereader's parts and pieces

The telereader's components will include (1) a screenless visual display system, (2) an audio output system, (3) a microphone, (4) an input tablet, (5) a pair of optical disc drives (DVD or more advanced), (6) a memory, (7) a multiprocessor, and (8) a trackball. Optional attachments will often include a keyboard or one or more special input/output devices for users with physical or perceptual disabilities. Instead of a display screen, the telereader will deliver its images directly to the user's retinas with retinal projectors like those described in "Tomorrow's Screenless PC" at <http://mudoc.com/screenlesspc.pdf>. The telereader's audio components will include a pair of small acoustic domes that will surround the user's ears and are described in "The 3D Sound Machine," a Web page at <http://mudoc.com/3dsm.htm>. The tablet will be an input-only device and is described in "The Telereader Tablet" at <http://mudoc.com/teletabl.htm>. In mass production a telereader will cost only a few hundred US dollars. Further, the telereader's small size and low power requirements will make it highly portable and inexpensive to operate.

## The telereader chaise

Each telereader in the classroom will be mounted on a "telereader chaise," a comfortable and ergonomically-designed chair that can be readily adjusted, modified, and adapted to the configuration and comfort of each user. Ordinarily the telereader chaises will be arranged so that each student in the room faces the teacher and the room's wall display, a large display that functions as the room's blackboard and its movie screen. The teacher – and, when selected, the students – will "write" on the wall display with their telereader tablets. Class members will have the option of watching the wall display or the same images on their telereaders. This option will allow temporarily homebound students to participate in classroom activities. It will also allow visually-impaired students and students with other handicaps to modify the images to satisfy their particular needs.

For more information about the telereader see "The Telereader: Tomorrow's Interactive Television Terminal" at <http://mudoc.com/teleterm.htm>.

### **The transformation from nonreader to superreader**

The telereader will be each user's personal HDTV, 3D theatre, concert hall, transporter, and time machine. But, as its name implies, the telereader's primary function will be to help users read text. The telereader, along with interactive movable type and reference substructures, will enable most children and illiterate adults to teach themselves to read and, eventually, to become superreaders. Most children who have been playing with stories and games with interactive movable type on telereaders at home (or in day care centers, Head Start programs, kindergarten, or elsewhere) will be reading by the time they enter first grade. The telereader and its reading tools will make the teaching of reading largely a thing of the past. The taxing task of working one-on-one with those who are just learning to read or are having reading problems will be a teaching burden that our new technologies will, to a large extent, eliminate. Only those individuals with difficult perceptual or cognitive problems will require special help in learning to read.

For information about interactive movable type, see the script for the forthcoming movie, *The Coming Revolution in Writing and Reading*, at <http://mudoc.com/crwr/crwrscr1.htm>.

### **The verbal empowerment of the student**

Each student with a telereader will have the use of powerful word processors. Further, the telereader will provide each student with immediate access to reference substructures that include immense repositories of verbal and linguistic data on DVDs or other optical discs. Such data may include information about a given word's origin and history, its pronunciations, definitions, grammatical characteristics and requirements, synonyms, antonyms, homographs, homophones, and examples of use by many different writers. The information about the words in the substructure may include pictures, drawings, maps, charts, tables, computer graphics, voices, music, sound effects, and/or other descriptive tools that could help the reader understand any word or word combination. Dual-language reference substructures will enable most readers to interpret or learn to read text in languages other than their native language. And other telereader tools will help each student avoid the common verbal and linguistic obstacles that impede reading, obstacles described in "How We Handicap Readers" (<http://mudoc.com/handicap.pdf>).

### **The matter of mathematics**

Mathematically tomorrow's students will function at far higher levels than today's students. That's because the students will be employing powerful mathematics machines – the multiprocessing computers that are supporting their telereaders. The computers will provide a wide array of mathematical tools that can solve and explain any math problem that might be considered. The students will have access to math reference substructures comparable to the text reference substructures that support interactive text. The math substructures will include extensive information about the use of mathematics in all the fields of science. The substructures will also include extensive libraries of historical information about those who have created math tools to solve various kinds of problems. Mathematics has a fascinating history and comes alive when seen and understood in its historical contexts. The resources available to tomorrow's students will make math work much more satisfying. Because of lack of support many of today's students experience feelings of frustration and antipathy when involved in mathematical problem solving. But, in tomorrow's classroom, math problem solving will be a highly interactive activity – and most students will find it fascinating, fun, and fulfilling.

### **The teacher's role in the new classroom**

The teacher will play a different role in the telereader classroom. The teacher will spend more time working with individual students, functioning more as a consultant than as a lecturer or "choir director." With telereaders the teacher will be able to address the entire class as a group – selected members of the class as a group – or just one student at a time. The teacher will have access to a student matrix that will show what each student is working on at any particular time. Using the student matrix, the teacher will be able to log in to any student's telereader to observe the student's efforts, with the student being informed that the teacher has logged in and is observing his or her efforts. When the teacher logs in, the student will be able to discuss his or her efforts with the teacher. Further, when the teacher is not logged in, the student will be able to signal the teacher at any time to discuss any question or problem. In some cases, the teacher will simply refer the student to a site or source where answers can be found, but in others, a dialogue will occur either through their respective telereaders or face-to-face.

### **The greater independence of the student**

The personal learning environment provided by telereaders will enable students to work more independently – to work at their own paces and to pursue their own interests. Any isolation of students will be largely of their own choosing, however. Students will be able to leave their private domains to communicate with the teacher – or with another student – or with an aggregation of students with a common interest or objective. The telereader will make it possible for many simultaneous conversations or meetings to take place in a single classroom. So, while tomorrow's students will be able to find a level of solitude not found in today's classrooms, they will also be able to communicate and collaborate with their classmates in intriguing new ways. Another support system that will help the students will be the personal learning records that will be maintained. All the work performed by a student on a telereader will be recorded. This will make it possible for the student and/or the teacher to review and reflect on any of the student's past efforts as well as current activities.

### **The testy telereader terminal**

Instead of testing the entire class as a group, most of the testing in tomorrow's classroom will be done individually. The primary use of tests will be as teaching tools and for self-evaluation, instead of as grading instruments. Students will use tests to assess their own personal progress and their knowledge and/or skill in any particular area. Test results will be used by the teacher to assist and advise the students in their efforts and in achieving their goals. The telereader's basic tools will enable students to test such things as their own reading abilities, visual and aural perception abilities, and computer input/output skills. Special attachments to the telereader will enable users to assess such skills as typing ability, finger and manual dexterity, eye-hand coordination, and other motor and physical agility abilities. Tests delivered by telereaders may sometimes be used for grading, screening, ranking, rating, or qualification purposes, but more often they will be used simply to demonstrate one's knowledge, skills, or abilities in a particular area or field.

Typical of the tests that will be commonplace in tomorrow's classroom will be the 25 tests found in *The Performance Evaluation Kit for The Mu Primer*, a brief description of which is available at <http://www.mudoc.com/newtitls.pdf>.

### **The classroom in the home**

Most of tomorrow's homes will have their own miniclassroom, a room that we'll call "the mu room." The mu room will have telereaders, telereader chaises, and a large display screen. The mu room will be the home's communication, computer, entertainment, and education center. A floor plan that shows a typical mu room can be seen at <http://www.mudoc.com/hmtomrms.htm> and a general description of the home of tomorrow is available at <http://www.mudoc.com/hmoftom.htm>. In the future most children will learn to read in mu rooms and will be reading before ever entering a classroom. After learning to read – and even after starting school – the mu room will be the place where most personal scholarship takes place. School classrooms will merely supplement and support the learning that takes place in the mu room. When most homes have mu rooms, the home's role and the school's role in education will, to a large extent, be reversed – as discussed on the Web page on the home of tomorrow. The classroom will be only a temporary learning place, but the mu room will be a place for a lifetime of learning – learning from the ages of 2 to 102 plus.

### **The new classroom in the LDCs**

In the advanced nations the kind of classrooms described above will be commonplace. But, the limited resources of the less-developed countries (LDCs) will necessitate the development of a different kind of classroom. In the LDCs teacherless and screenless classrooms called "information dispensaries" will be the principal providers of literacy training and of education. Most of the children and illiterate adults in the LDCs will learn to read in telereader-equipped information dispensaries instead of in mu rooms in homes or in classrooms in schools. Information dispensaries will fill the role of public schools and public libraries in the LDCs until they become able to develop the kind of educational and information systems that are now in operation in the advanced nations. The development, functions, operation, and costs of national information dispensary systems for the LDCs are described in *The Mu Primer's* Chapter 3, which is available at <http://mudoc.com/mpms3.htm>.

### **The virtual classroom**

With telereaders the members of a class will be able to participate without being in the same location. For example, a sick student will be able to participate in classroom activities while resting in a bedroom or a mu room at home – or at a telereader terminal anywhere else in the world. Indeed, with telereaders, digital textbooks set in interactive movable type, knowledgeable teachers, and the proper Internet connections, it will be possible to form classes with individuals widely scattered around the world. As in the workplace, where more and more workers will telecommute to work, more and more students in tomorrow's schools will telecommute to school from wherever they happen to be. So, instead of meeting in four-walled classrooms, telecommuting class members will be able to meet in virtual classrooms – unbounded educational edifices in cyberspace.

### **The new world of education**

Education in the 21st century will differ more from 20th century education than 20th century education differed from 15th century education. The advent of printing presses with movable metal type in the 15th century made possible mass literacy and public education. In this century, the advent of telereaders with interactive movable type, along with the Internet and related communications tools, will make possible universal literacy and lifelong educational opportunities for everyone.