# CEL: A Framework for a Community of Evolving Learners

**http://www.demo.cs.brandeis.edu/cel**


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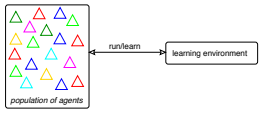
## Motivation

The idea for CEL comes from observing trends in Internet usage. Early on, the Net was accessed as a vast reference medium; now it is alive with users communicating with each other. Today's Internet is seen not only as *distributed encyclopedia*, but also as *distributed community*.

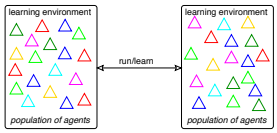
The popularity of the Net has given rise to novel data collection opportunities; it was never before possible to gather such large data sets from a diverse population so cheaply. An Internet learning community breaks traditional barriers of classroom walls, linking students with similar needs but diverse ages, genders and locations — and empowers researchers by affording access to a large population with a broad range of skill levels and demographics — in contrast to typical learning system experiments which generally gather data from homogeneous classrooms.

## Background

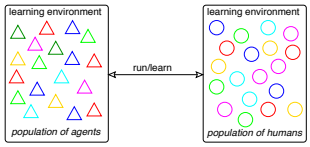
Most *machine learning* and *evolutionary learning* systems have fixed optimization goals.




Learning proceeds when information available in the environment is absorbed by the learner, then halts.




In artificial *co-evolutionary learning* (Hillis, 1992,Angeline and Pollack, 1994), the learningenvironment consists of other learners, resulting in a ratcheted "arms-race" spiral of development




We recently demonstrated a new type of co-evolutionary learning environment on the Internet where agents and humans evolve simultaneously (Funes et al., 1998).

This work expands that result into CEL — a *Community of Evolving Learners*.

## System Overview

CEL is a framework that enables an experimental Internet learning community.

The system is *accessible*, *flexible* and *extensible*.

We highlight four distinguishing elements in CEL:

(1) appropriate learning experiences,
(2) open-ended learning environment,
(3) an outlet for creativity, and
(4) controls for safety.

Techniques from Machine Learning and Adaptive Behavior are used to provide continuous appropriate challenges for users. Software agents sustain the community by maintaining a constant presence. The target audience is primary school children, so CEL users are anonymous and interactions between users are mediated through game content.

CEL is available to anyone with Internet access and a Java-enabled Web browser. Activities inside CEL are multi-player educational games — collaborative or competitive, turn-taking or asychronous.

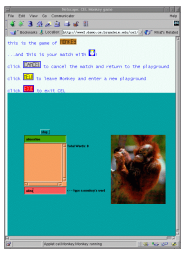
Participants log into CEL with a user name and password, but inside CEL they are identified only by two-dimensional graphical icons called *IDsigns*. Users create their own IDsigns with a tool called the *IDsigner*.
*Credits: Travis Gebhardt.*

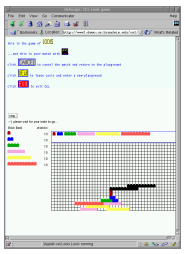
Once logged in, users select a game to play, and they are placed in an open *playground*, showing the IDsigns of others who are also connected to CEL — their *playmates*. By clicking on a playmate's IDsign, a user initiates a match.

*Monkey* is a collaborative word game in which players receive a long word, and they work together to find shorter words by "monkeying around" with the letters from the long word.
*Credits: John Abercrombie.*

*Automath* is a competitive math game in which players are given ten equations to solve, as quickly as they can, and whoever solves each problem fastest "owns" it. The winner is the player who owns the most problems.

*Loois* is a collaborative construction game where players have a set of building blocks, and together they take turns creating a structure, which is tested for stability using Funes' Lego simulator.
*Credits: Louis Lapat.*

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