

# METTLE

## Medical Emergency Team Tutored Learning Environment

### Web-Based Training Simulations with Automated Tutoring

METTLE is an authorable and extensible framework for training simulations that makes it easy to deliver richly interactive scenarios over the web—scenarios including embedded assessments that enable contextually appropriate coaching and instruction. In a METTLE scenario, a student can interact with simulated characters using language, forms, graphics, and other media. METTLE was developed for medical training scenarios, and provides interaction modes and pre-built content relevant to diagnostic/treatment encounters. However the framework is general and can be applied to any training application that requires (1) practice on decision-making informed by character interaction, (2) distributed web-based delivery, and (3) automated tutoring to compensate for lack of available instructors when students take advantage of *any time/anywhere* web training.

### Multimedia and Language Interaction with Simulated Characters

METTLE presents its runtime user interface in a set of pop-up browser windows. The main window is divided vertically: basic interactions with simulated characters happen on the left, interaction with the embedded Tutor on the right (mostly covered by overlapping windows in Figure 1 below). Basic interaction relies on language—text type-in and output, with optional speech input and/or output—supplemented by checkbox forms. For simulated patients, additional windows can present an automatically updated Patient Chart, an interactive graphical Patient Examination, and various Test and Treatment Order Forms. Characters in METTLE are scripted using sets of condition/action rules that test for user actions or scenario history, and cause the character to say and do things.

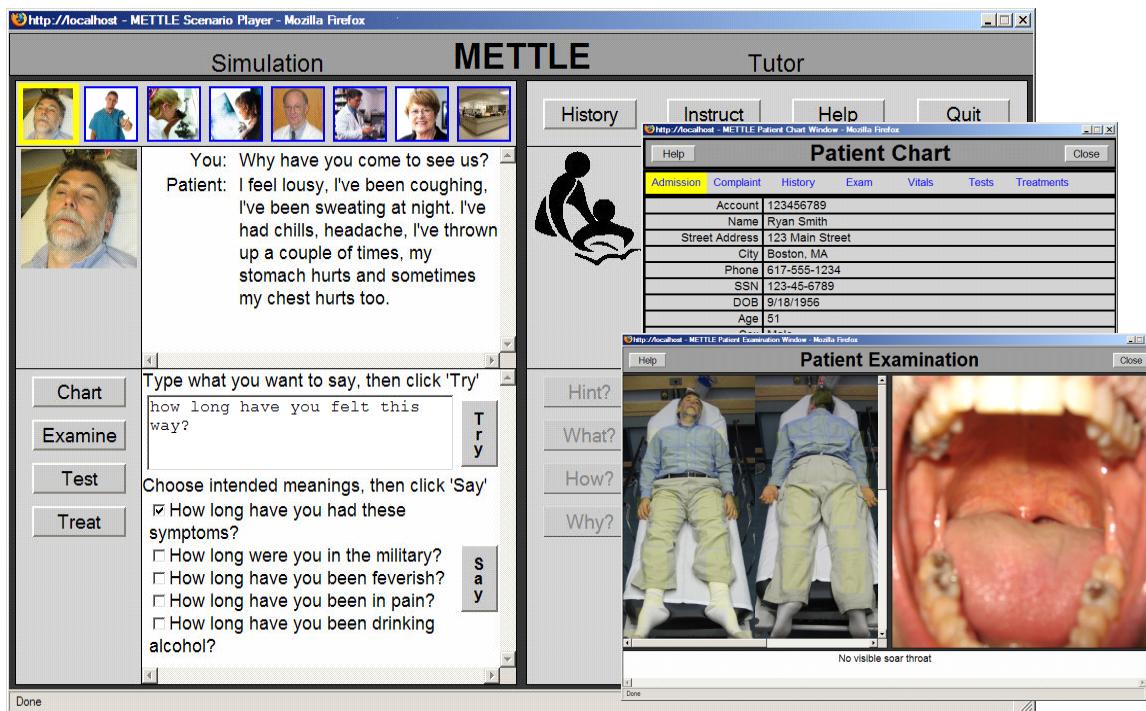


Figure 1 – METTLE Runtime Screens Showing Patient Simulation: Language-Based Interaction, Patient Chart, and Graphical Patient Examination.

## Automated Assessment and Individualized Instruction

Characters behavior rules can be annotated with Tutor instructions—notes on when the action is expected, desirable, or undesirable, and what the Tutor should say to hint or provide feedback on student actions done or undone. In addition, the Tutor can be scripted with behavior rules of its own, up to an including launching into Tutor-controlled Socratic dialogs that exploit the same language and form interaction modes as normal Student-controlled dialogs. In general, Tutor interventions can be tied back to pre-defined curriculum elements, and contribute to production of an after-scenario Student scorecard that links to the curriculum and related instructional materials.

## Authorability and Extensibility

METTLE provides a web-based authoring tool suite that provides tools for viewing and editing many of the underlying data elements that define METTLE courses and scenarios, including curriculum trees, concept spaces (e.g. for diseases, tests, and treatments), scenario setups and casts of simulated characters. The structure of media directories and script files is designed to make it clear where each piece of content has to go, and to facilitate reuse across scenarios.

In addition, the METTLE code base is designed in layers that facilitate reuse and extension as needed to support new content, displays, and forms of interaction. METTLE is built on top of more general capabilities such as an extensible rule interpreter, the GRAIN course definition layer, the Discuss character-initiative dialog engine, and the Enact character behavior framework.

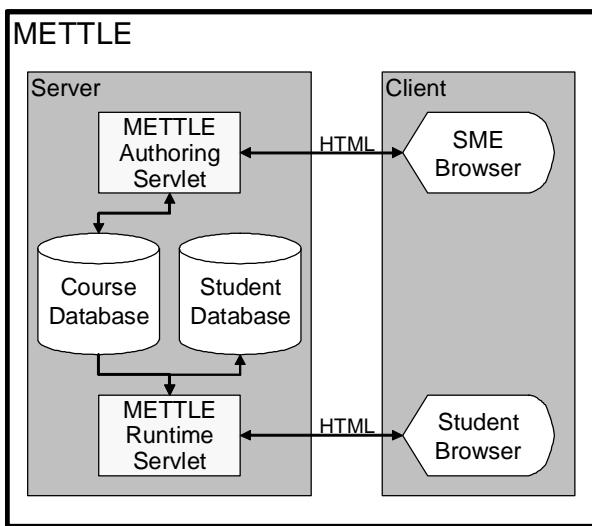


Figure 2 – METTLE High Level  
Web-Based Client/Server Architecture  
with SME Authoring and Student Runtime.

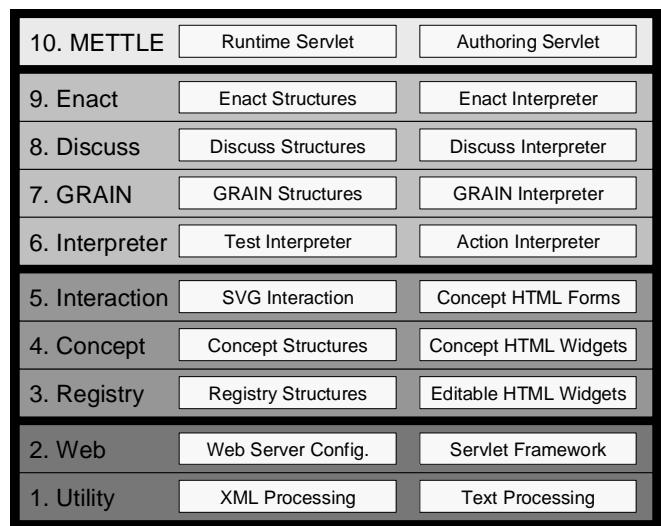


Figure 3 – METTLE Layered Architecture  
Supporting Extensibility and  
Alternate Applications.

## System Requirements

The METTLE suite runs on Windows XP and provides its own web server. METTLE presents its runtime user interface in a standard web browser, such as MS-IE v7 and Firefox v2, primarily using HTML and CSS, with light JavaScript and SVG to support interaction. It manages graphics (JPG) and sound (WAV) files, and in principle can make use of any other common media formats (e.g. AVI) likely to be supported by commodity browsers.

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