

# Interactive Event ITS2010—Situating Scenario: Collaboration and Content Recognition Features in an Inquiry Tutor

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## Introduction

We demonstrate an intelligent tutor that detects the content of collaborative behavior and offers relevant domain level interventions. Rashi is a domain independent intelligent tutor providing visitors with practice using inquiry skills. When working on human biology, visitors interact with a virtual sick patient whom they must successfully diagnose. Rashi supports visitors as they create hypotheses and collect data to support and refute these hypotheses. In order to increase the efficacy of Rashi, we incorporated collaborative tools that support group efforts by supporting visitors to dynamically share experiences and work together to reach a diagnosis. In addition to this, Rashi contains an intelligent agent that examines collaborative efforts and automatically detects the expert knowledge visitors are working with. Visitors to this demo will first explore these collaborative tools in detail. Two people will collaborate about a diagnosis and the intelligent agent will examine their collaborative activity and compare it with an expert knowledge base, to determine what domain content is relevant to their activities. The tutor will provide interventions to the visitors that leverage this content recognition.

## 1) Exploring Basic Rashi Features: Collecting Data and Forming Hypotheses

### Overview

- *Users will meet a virtual patient and learn about his or her symptoms*
- *Users will explore the Rashi environment and collect data by:*
  - *Interviewing the patient*
  - *Examining the patient (Blood Pressure, Examining Body Parts, etc...)*
  - *Performing lab tests*
- *Users will create hypotheses and relationships between data and hypotheses to form an argument for a diagnosis of the patient*
- *Coaching support will guide users to relevant data and hypotheses that have not yet been considered*

### Details

Visitors to the demonstration begin to investigate a virtual patient's symptoms through interviews and lab results, see Figure 1. Visitors use several widgets to collect information about the patient that are relevant to the diagnosis. Visitors also use their notebook to organize and manage this information. They create hypotheses regarding the patient's diagnosis in their notebook, and can show how data supports and refutes these hypotheses. As users work within the notebook, a coaching system will suggest data, hypotheses, and relationships relevant to the user's current efforts.

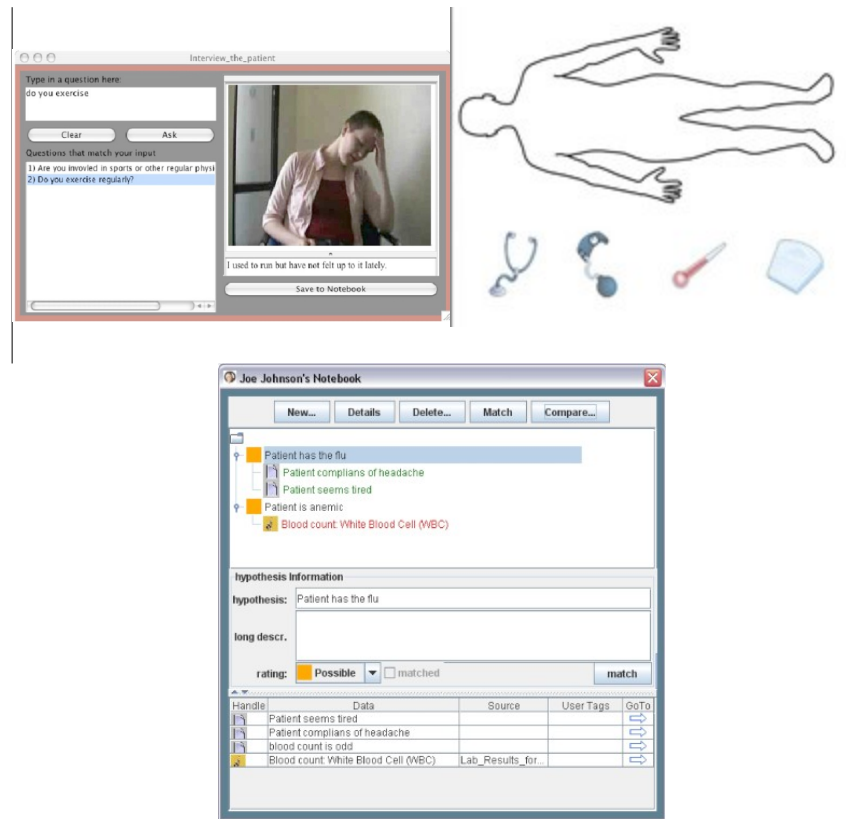


Figure 1: Top Left: Visitor interview the sick patient to obtain information , top left perform a physical examination top right manages data and hypotheses in his/her notebook.

## 2) Collaboration: Viewing Another User's Notebook

### Overview

- Users will use a feature that allows them to view the notebook of another user
- Users will see how ideas from other users can be easily “dragged”, and thus incorporated into their own project.
- Coaching support will indicate opportunities for discussion

### Details

The demonstration next proceeds to the collaborative features. The Rashi system enables visitors to view and share work within a group. The two visitors will view each others' notebooks and drag and drop both data and hypotheses from others' notebooks to their own. This supports a variety of collaborative activities ranging from people working in tightly knit groups, where each person takes on a role and contributes in a specific manner, to people working mostly independently but sharing ideas and thoughts when reaching an impasse. As users view other notebooks, the coaching system will encourage discussion by highlighting connections between user's work. For example, the system might prompt discussion when one user needs support for a hypothesis and the other user has found that support.

### 3) More Collaboration: Free Text Chat

#### Overview

- Users will use a free text chat tool that allows them to easily communicate with their group members
- Users will explore various extra features of this chat tool:
  - Setting the subjects of messages both manually and directly from a notebook item
  - Directing messages to particular group members
  - Filtering the chat for better readability

#### Details

The system also provides a chat facility that enables users to discuss issues with members of their group, Figure 2. Several features, including text coloring, filtering, and new message notifications increase the usability and quality of the discussion tool.

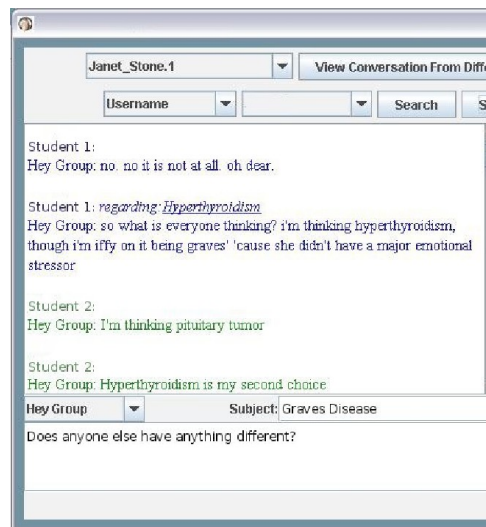


Figure 2: Visitor use the open forum chat room in Rashi

Visitors can create a subject for each message, which allows the team to focus on a specific topic, Figure 2, bottom panel. Chat messages can be filtered by these topics and visitors can easily respond to the subject by clicking on it. In addition, Rashi allows users a one-click method of automatically setting the subject of a new conversation to the contents of an existing Rashi notebook item.

### 4) Content Focused Dialogue Using a Novel Critique / Rebuttal Tool

#### Overview

- Users will open a group members notebook and select a hypothesis from their group members' notebook
- Users will provide a critique of the selected notebook item.
- Users who receive critiques will be notified, and will select the same hypothesis from their own notebook to offer a rebuttal.
- Users will continue this argument, and see how the tool drowns out “noise”, and focuses discussions on the selected content.

## Details

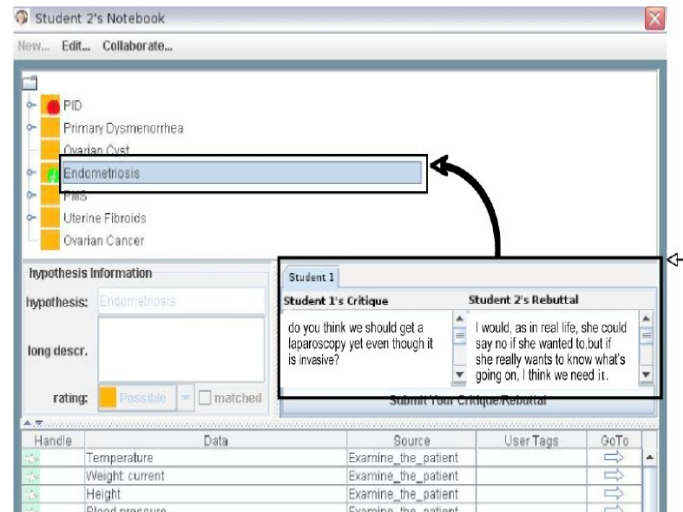


Figure 3: The critique rebuttal feature is embedded into the notebook. Visitors can select a notebook item and critique it.

Rashi contains a unique critique-rebuttal feature that supports people's engagement in topic-oriented discussions, Figure 3. Built into the notebook, this feature enables visitors to select any item or topic in a group member's notebook and to offer critiques. When a critique is given, the owner of the notebook item is notified, and he/she can respond with a rebuttal, a defense for the position, Figure 3, middle panel. This back and forth discussion is by definition focused around subject matter. The two parties can continue to update and resend their critiques and rebuttals, but only the most recent version of each is shown on the interface. This helps to avoid the drowning out of another user. Since this feature is embedded directly into the notebook, it more tightly couples conversations to visitors' work, thus helping visitors engage in constructive criticism and organize discussions around content.

## 5) Suggested Links: A Passive Intervention Utilizing Recognized Chat Content

### Overview

- Users will view the chat window, and witness how Rashi attempts to understand their conversations
- Users will see a list of suggested links to items in Rashi that are relevant to the ongoing discussion
- Users will click on these links, and see how they can easily add the item to their notebook, chat about the item, or sometimes find the source of the item in Rashi
- Users will see how this suggested links list is updated dynamically as more chat conversation unfolds. The suggested links will update themselves to remain relevant to the thought process of the users.

## Details

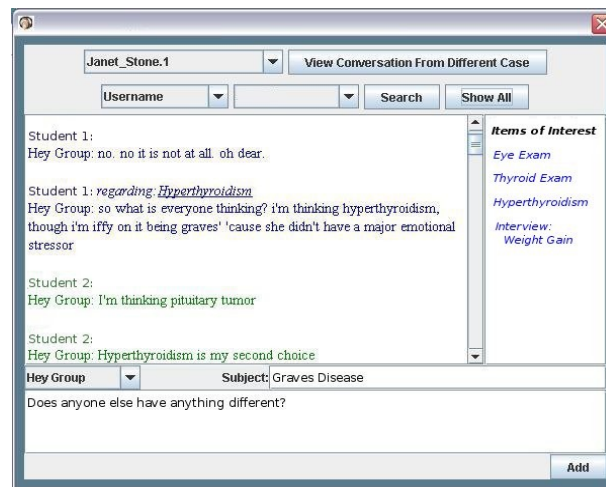


Figure 4: Another view of the chat facility in which, right panel is dynamically populated with items related to the chat content.

In the example above, two visitors chat about their hypotheses, including thyroid problems, Graves' Disease, and pituitary tumors. The system detects this and provides interesting links, Figure 4, right panel. For example, the 'Eye Exam' link leads to physical exam info revealing that the patient has lid lag. This data supports Graves' Disease and thus would be helpful to the participants. The 'Weight Gain' link brings visitors to an interview question where the patient admits to gaining excessive weight without trying. This data supports their theory of thyroid problems. Our demonstration will show how a conversation develops, and we will see this list populate and evolve dynamically as the subject of conversation changes. We will show that even when the content is slightly incorrect, the items of interest are typical still relevant and are not detrimental to learning.

## Conclusion

This demonstration provides evidence that complicated NLP techniques are not always necessary; a tutor can understand domain level user activity and provide useful interventions using a well-built expert knowledge base. In addition, we show that even though the lack of more complicated techniques may lead to some error in content recognition, we can provide unique forms of feedback that are not detrimental to users when the content is incorrectly recognized, but is significantly helpful when it is correctly recognized.