

Potential to Migrate ElectronixTutor to GIFT

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Andrew C. Tackett

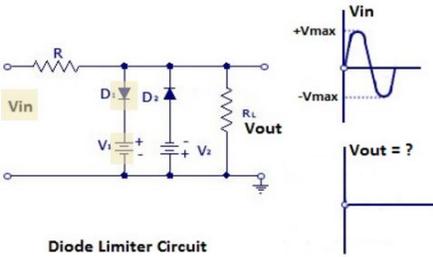


Overview

- Introduction
- ElectronixTutor
- Potential to Migrate ElectronixTutor to GIFT
 - Similar Features
 - Differences
 - Potentials (Solutions)
- Conclusions & Recommendations

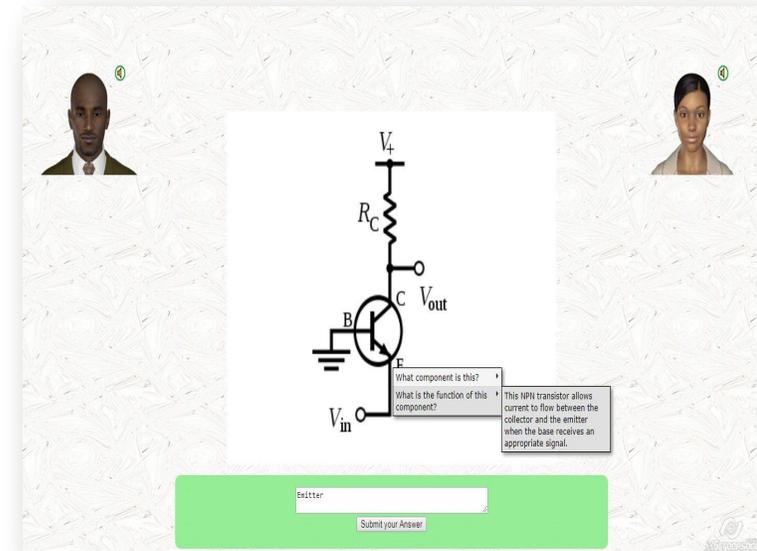
ElectronixTutor Learning Resources

- **AutoTutor** dialogues
- **Point & Query** on diagrams
- **Dragoon** mental models
- **LearnForm** electronics problems
- **ASSISTments** skill builders
- **BEETLE-II** simple circuits
- Readings (NEETS, Overviews)
- Videos

<p>What is the output of the given diode limiter circuit?</p>	
 <p>Diode Limiter Circuit</p>	<p>Tutor: Hello, Kevin and W. Welcome to my class. In this section, we will talk about diode limiter.</p> <p>Kevin: Great! I think diode limiters are a bit tricky. Maybe, W can take the first question and help me out.</p> <p>Kevin: W, you may know more than I do.</p> <p>Kevin: W, What is the output of the given diode limiter circuit?</p> <p>Enter text here...</p> <p>Send</p>

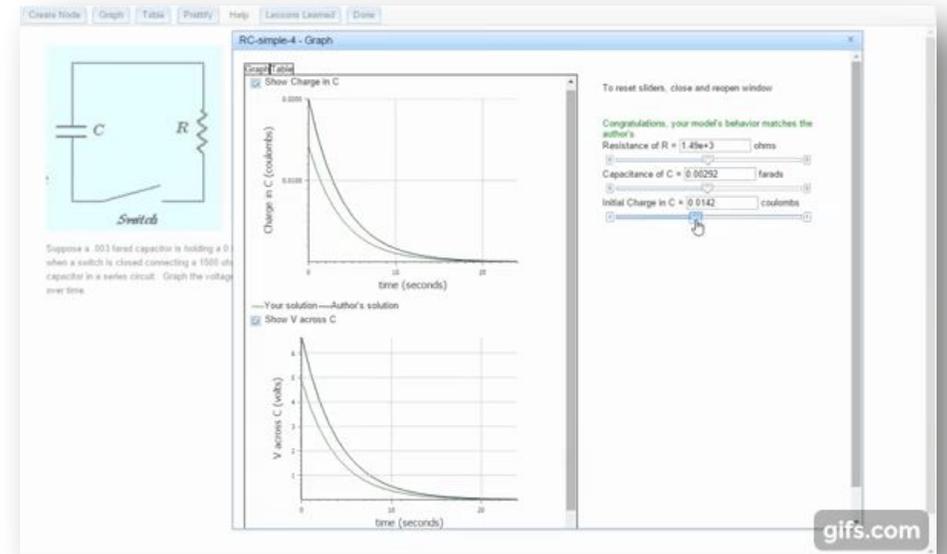
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The screenshot displays the "Transistor Analysis" interface. On the left, a circuit diagram shows a common-emitter transistor configuration. The base is connected to a +15V supply through a 220kΩ resistor. The emitter is grounded, and the collector is connected to a 1kΩ resistor. A 0.7V base-emitter junction voltage is indicated. The problem text asks: "The β of the transistor in the circuit below is 100. What is I_C ?" Below the diagram are four multiple-choice options: A. 0.318mA, B. 6.5mA, C. 6.82mA, and D. 7.14mA.

On the right, the "Calculate I_B " section shows the following steps:

$$I_B = \frac{V - V_{BE}}{R_1} \text{ k}\Omega$$
$$I_B = \frac{\quad V}{\quad \text{k}\Omega}$$
$$I_B = \quad \text{mA}$$
$$I_C = \beta \times I_B \text{ mA} = I_C \text{ mA}$$

Below the equations, a question asks: "What mode is this transistor operating in?" with three radio button options: A. Cut Off, B. Active, and C. Saturation. At the bottom right, there is a "5/5" indicator and a "Help" button.

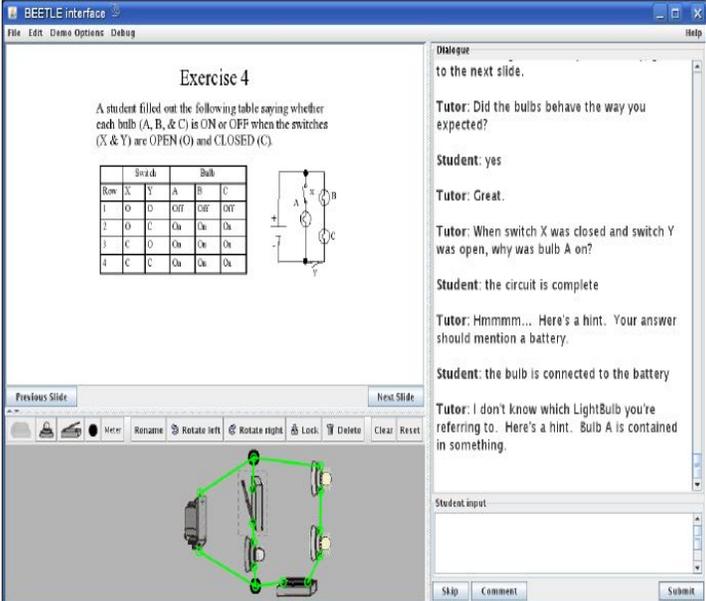
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The screenshot displays the ASSISTments interface. At the top, there are navigation tabs for 'ASSISTments', 'Teacher', 'Student', and 'Builder', along with a 'Logout' link. Below the navigation, there are 'Settings' and 'About' links. A blue box on the left indicates 'Answer 3 correctly in a row'. The main content area shows a problem titled 'Problem ID: PRA696C' with a 'Comment on this problem' link. The problem text asks for the resistance of a wire given its resistivity (0.30 Ωcm), length (10.85 cm), and cross-sectional area (10.79 cm²). A red instruction says 'Round your answer to two decimal places.' A yellow hint box provides the equation $R = \frac{\rho L}{A}$ and defines the variables: R = Resistance, ρ = Resistivity, L = Length, and A = Cross-sectional Area. The hint also shows the calculation: $R = \frac{0.30 * 10.85}{10.79}$. At the bottom, there is a text input field for the answer, a 'Submit Answer' button, and a 'Show hint 2 of 2' button.

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The screenshot displays the BEETLE interface for "Exercise 4". It includes a table, a circuit diagram, and a dialogue window.

Exercise 4
A student filled out the following table saying whether each bulb (A, B, & C) is ON or OFF when the switches (X & Y) are OPEN (O) and CLOSED (C).

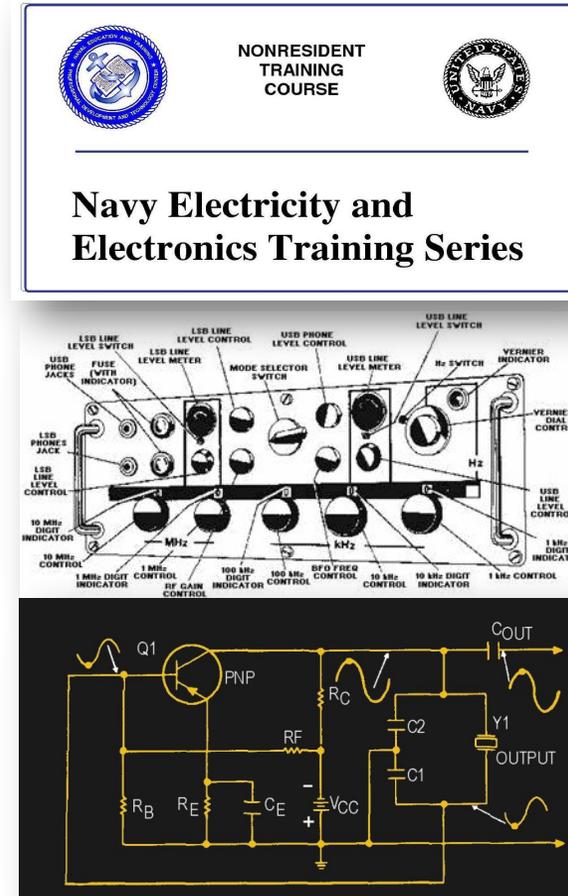
Row	Switch		Bulb		
	X	Y	A	B	C
1	O	O	OFF	OFF	OFF
2	O	C	On	On	On
3	C	O	On	On	On
4	C	C	On	On	On

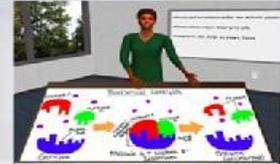
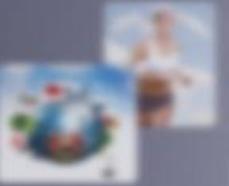
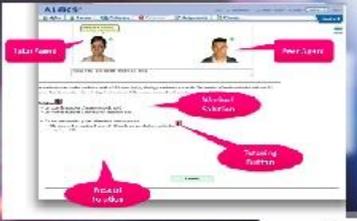
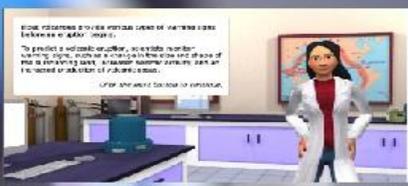
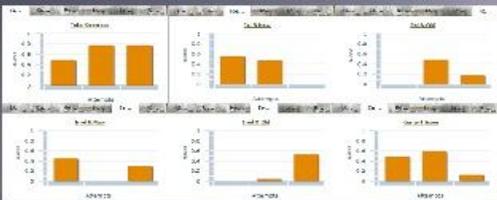
The circuit diagram shows a battery connected to three bulbs (A, B, and C) in parallel. Switch X is in series with bulb A, and switch Y is in series with bulb C.

Dialogue
to the next slide.
Tutor: Did the bulbs behave the way you expected?
Student: yes
Tutor: Great.
Tutor: When switch X was closed and switch Y was open, why was bulb A on?
Student: the circuit is complete
Tutor: Hmmmm... Here's a hint. Your answer should mention a battery.
Student: the bulb is connected to the battery
Tutor: I don't know which LightBulb you're referring to. Here's a hint. Bulb A is contained in something.
Student input:

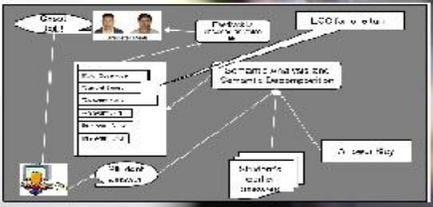
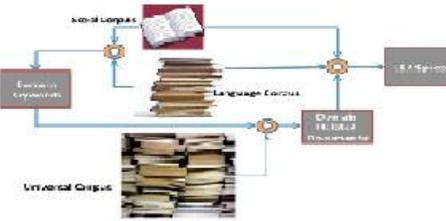
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Domain-specific Semantic Space Generation



User Interface

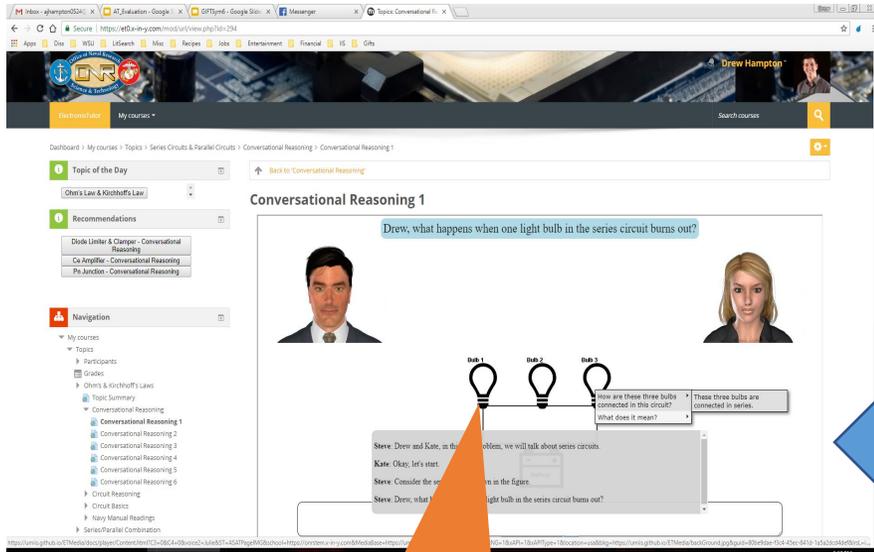


Product	Absorb LMS	Schoology LMS	Instructure Canvas LMS	Moodle LMS	Blackboard Learn LMS	D2L Brightspace LMS	Edmodo LMS	Quizlet	Google Classroom
Lowest Price	SEE IT	SEE IT	SEE IT	SEE IT	SEE IT	SEE IT	SEE IT		
Editors' Rating	●●●●● EDITORS' CHOICE	●●●●● EDITORS' CHOICE	●●●●● EDITORS' CHOICE	●●●●● EDITORS' CHOICE	●●●●○	●●●●○	●●●●○	●●●●○	●●●●○
SCORM Import	✓	—	✓	✓	✓	✓	—	—	—
Bundled Course Content	—	✓	✓	—	—	—	✓	✓	—
Google Apps Integration	✓	✓	✓	✓	✓	✓	✓	✓	✓
Single Sign-On (SSO)	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-Commerce	✓	—	—	✓	—	✓	—	—	—
Developer API Available	✓	✓	✓	✓	✓	✓	✓	✓	✓
LTI Support	—	✓	✓	✓	✓	✓	—	✓	—
Native Web Hosting	—	✓	✓	—	—	—	✓	✓	✓
Read Review	Absorb LMS Review	Schoology LMS Review	Instructure Canvas LMS Review	Moodle LMS Review	Blackboard Learn LMS Review	D2L Brightspace LMS Review	Edmodo LMS Review	Quizlet Review	Google Classroom Review

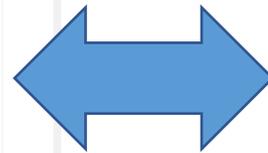
User Interface



The screenshot shows a Moodle course page for 'Conversational Reasoning 1'. The top navigation bar includes 'ElectronixTutor', 'My courses', and a search bar. The breadcrumb trail is: Dashboard > My courses > Topics > Series Circuits & Parallel Circuits > Conversational Reasoning > Conversational Reasoning 1. The main content area is titled 'Conversational Reasoning 1' and features a chat interface with two avatars, Drew and Kate. A question is posed: 'Drew, what happens when one light bulb in the series circuit burns out?'. Below the question is a diagram of a series circuit with three light bulbs labeled 'Bulb 1', 'Bulb 2', and 'Bulb 3', connected to a battery. A text box contains the following dialogue:
Steve: Drew and Kate, in this next problem, we will talk about series circuits.
Kate: Okay, let's start.
Steve: Consider the series circuit shown in the figure.
Steve: Drew, what happens when one light bulb in the series circuit burns out?
A separate text box on the right contains the answer: 'These three bulbs are connected in series.' The left sidebar shows a navigation menu with 'My courses' expanded to 'Topics', which includes 'Conversational Reasoning 1'.

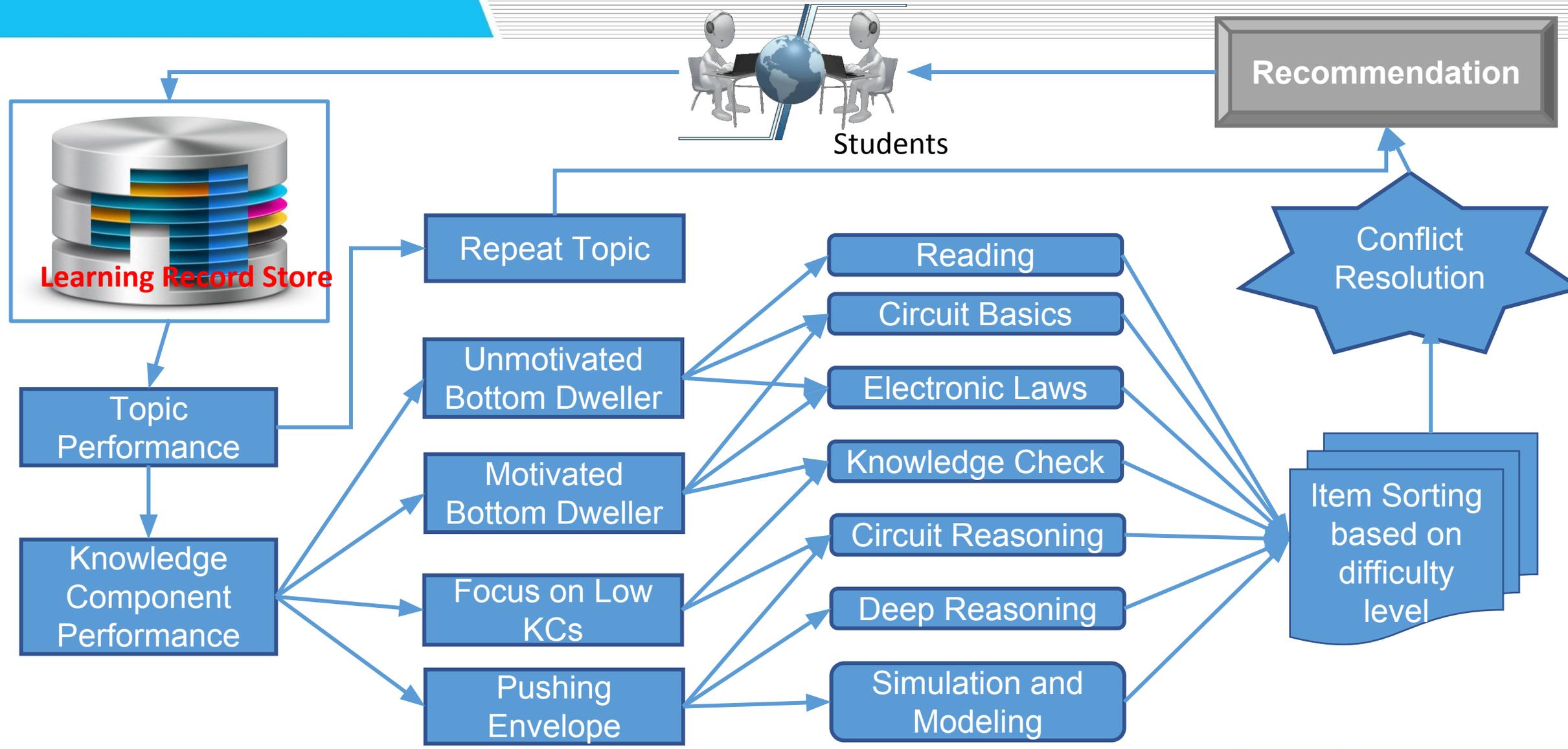


Standard Learning Management System (MOODLE)



Recommender Systems

Learning Record Store



Potential to Migrate ElectronixTutor to GIFT

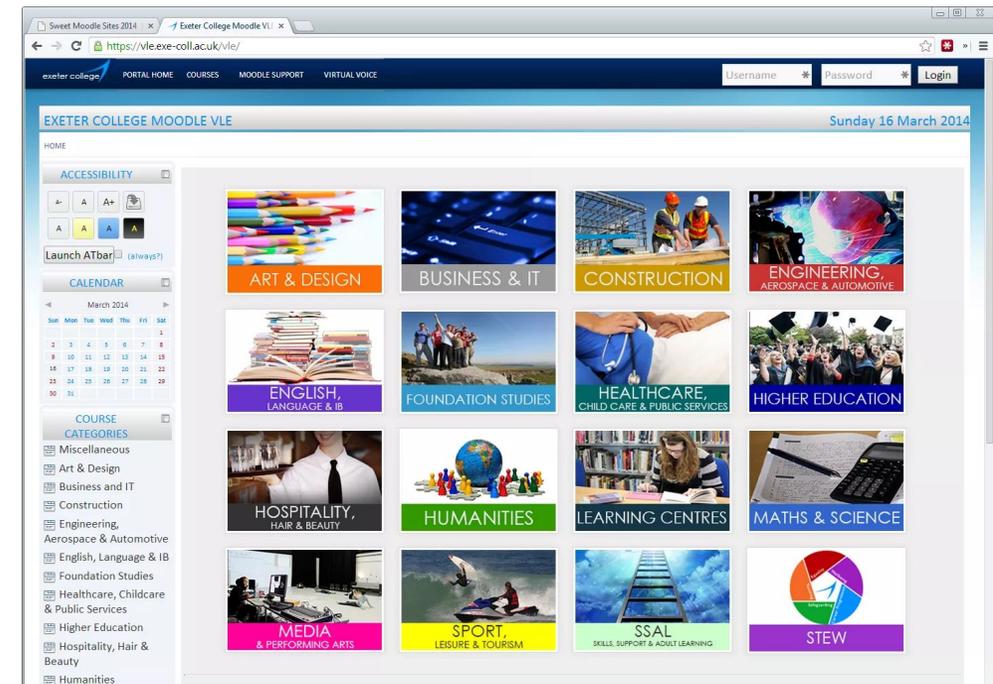
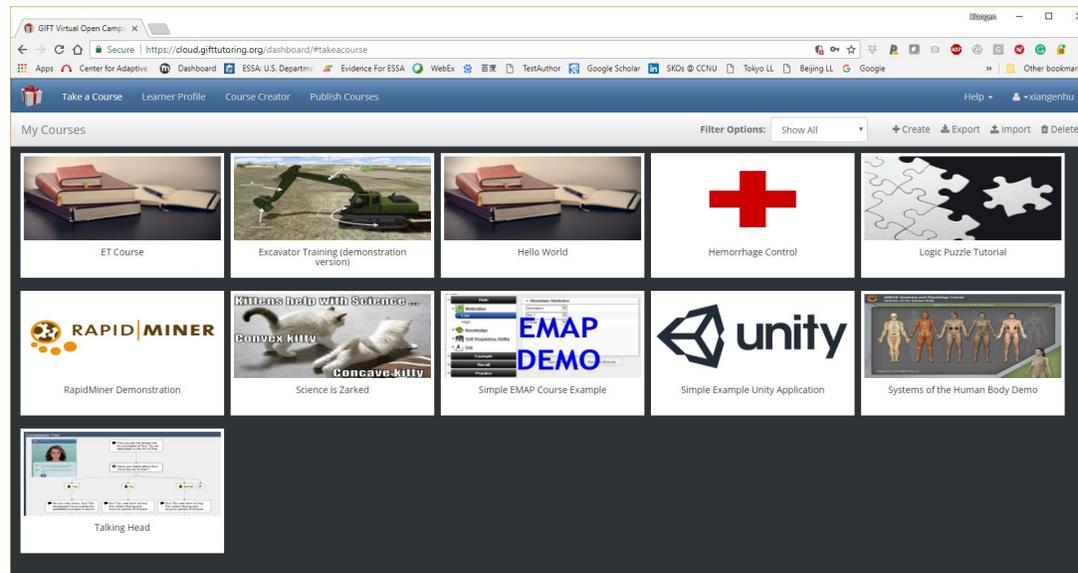
- Moodle vs GIFT
 - Open Source
 - General Purpose LMS



Similar Features

Potential to Migrate ElectronixTutor to GIFT

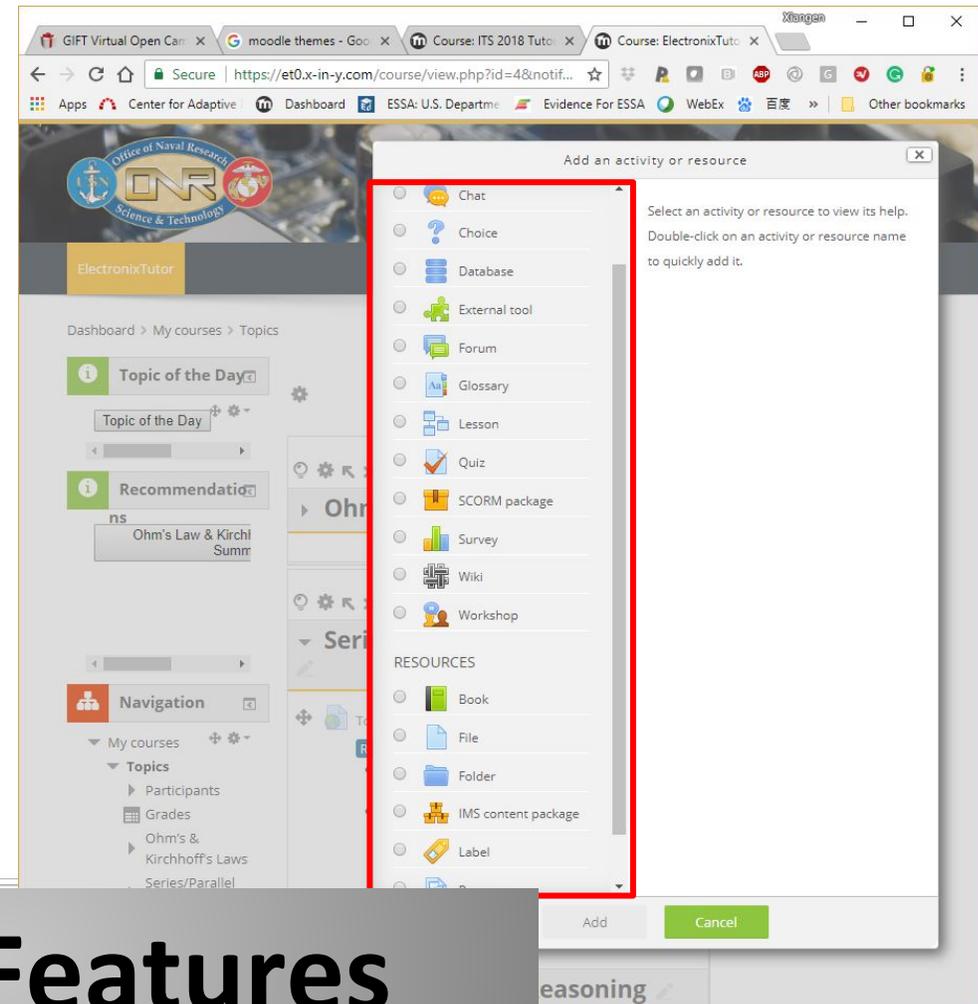
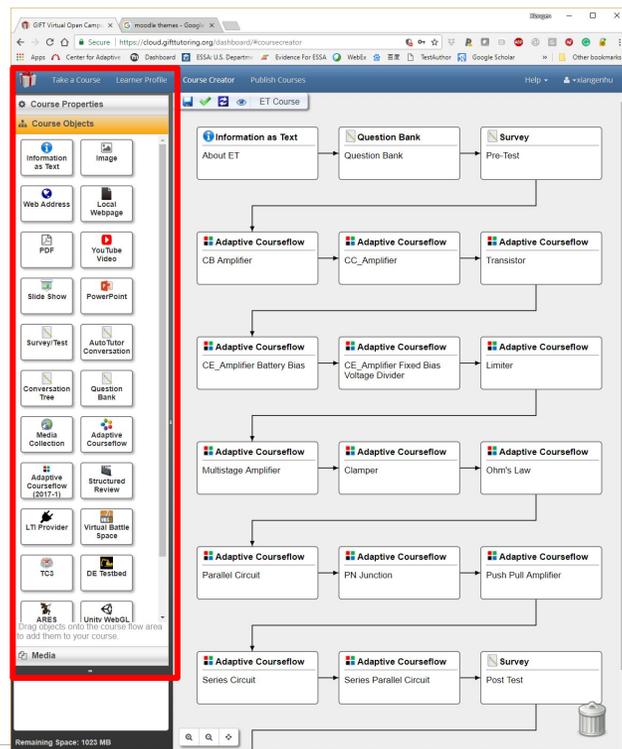
- Moodle vs GIFT



Similar Features

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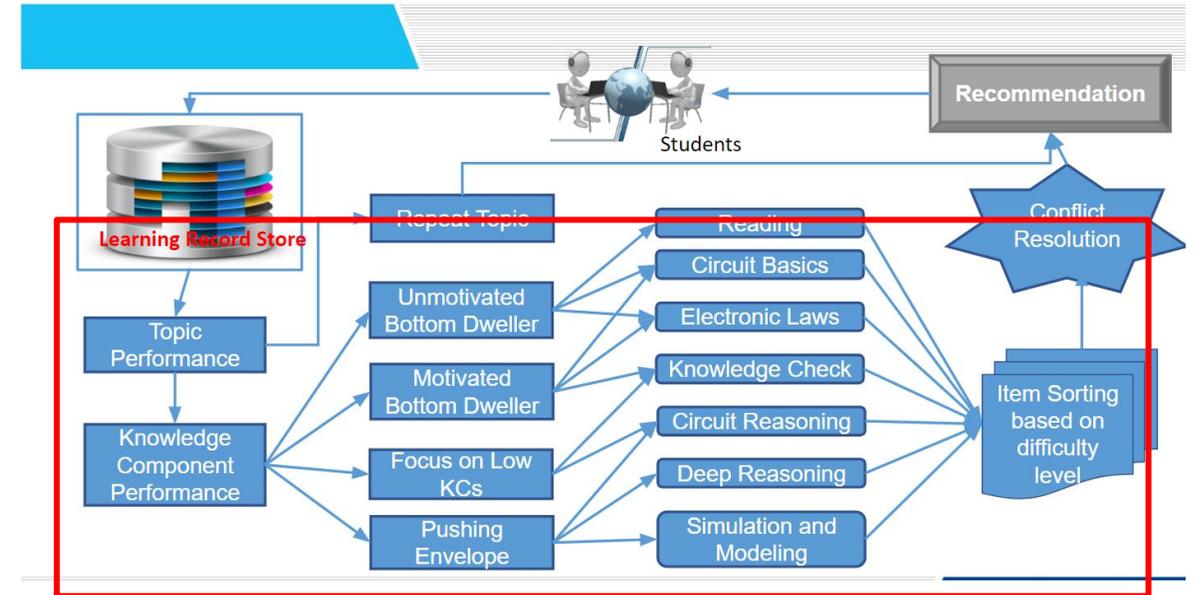
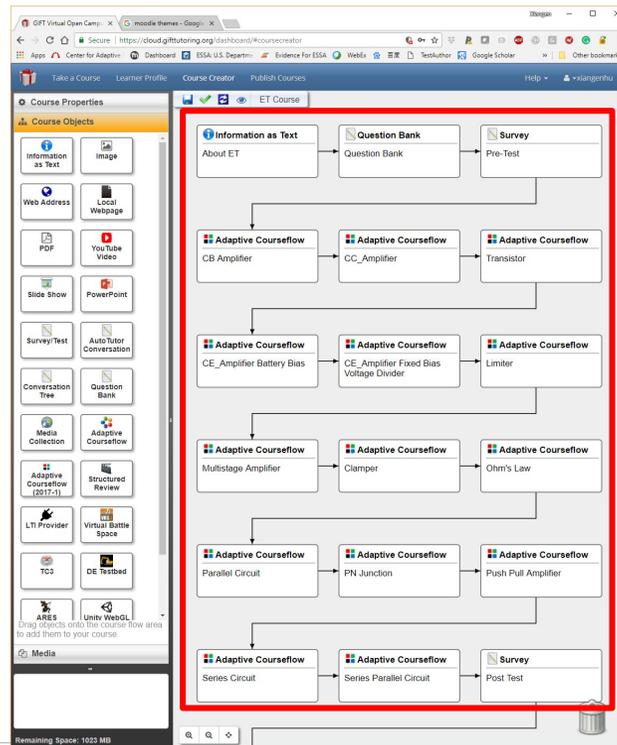
- Moodle vs GIFT



Similar Features

Potential to Migrate ElectronixTutor to GIFT

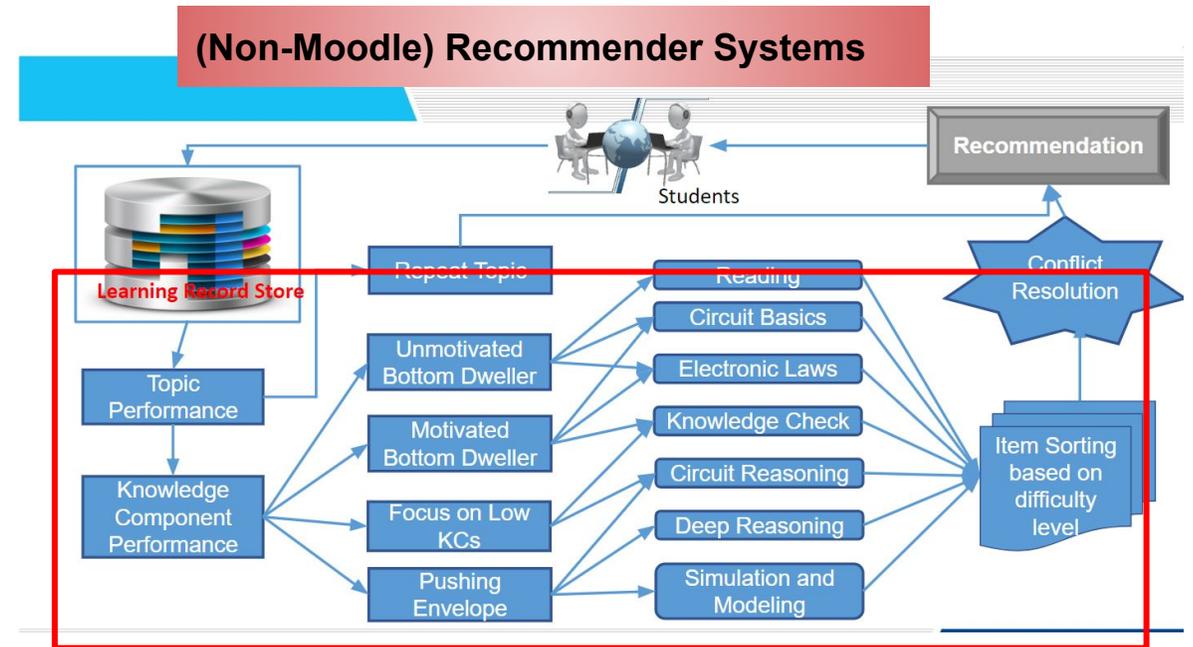
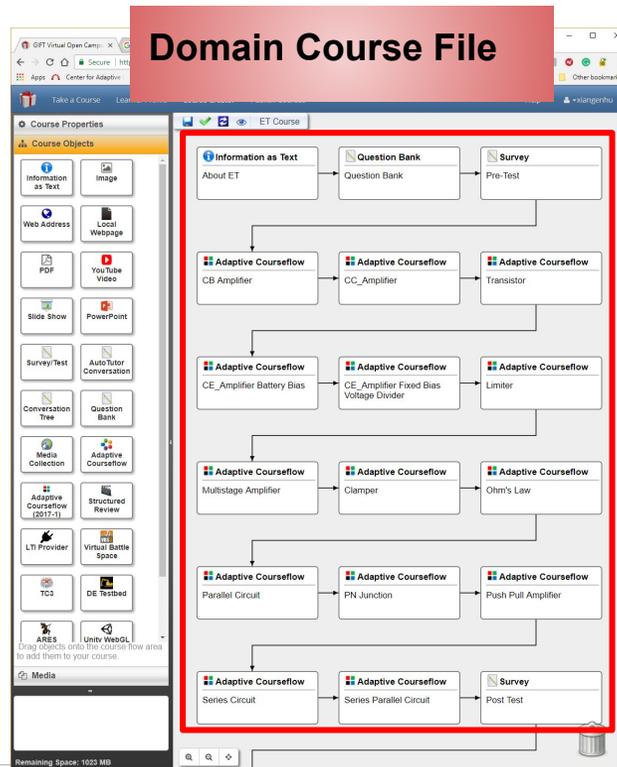
- Moodle vs GIFT



Similar Features

Potential to Migrate ElectronixTutor to GIFT

- Moodle vs GIFT



Similar Features

Potential to Migrate ElectronixTutor to GIFT

- ElectronixTutor vs GIFT
 - ElectronixTutor integrates other Learning Resources at the Modular-level

The screenshot displays the ElectronixTutor interface. On the left, there's a navigation menu with icons for 'Home', 'My Progress', 'My Assignments', and 'My Reports'. The main content area shows a 'Transistor Analysis' problem. The problem text reads: "The β of the transistor in the circuit below is 100. What is I_C ?" Below the text is a circuit diagram of a common-emitter transistor amplifier. The circuit includes a +15V DC supply, a 220k Ω base resistor, a 0.7V base-emitter junction, a 1k Ω collector resistor, and a load resistor. The collector current I_C is indicated. Below the circuit are four multiple-choice options: A. 0.318mA, B. 6.5mA, C. 6.82mA, and D. 7.14mA. To the right of the problem is a 'Comments' section with a table for tracking student progress. The table has columns for 'Answered', 'Correct', and 'Wrong'. Below the table is a 'Submit Answer' button and a 'Show hint 2 of 2' button. The interface also shows a 'Problem ID: PRA696C' and a 'Created on 24/8/2015' timestamp.

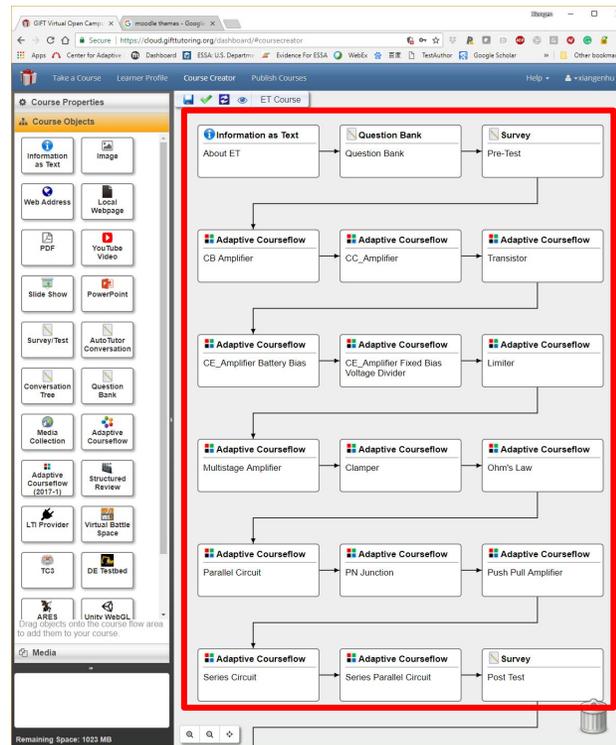
The screenshot displays the Learning Locker interface. It features a dashboard with several widgets. At the top, there are two large orange boxes showing the number of users: '256' and '393'. Below these are several smaller widgets, including a grid of user progress, a bar chart, and a list of users. The interface is clean and modern, with a white background and orange accents. At the bottom right, the Learning Locker logo is visible, featuring a stylized orange bird icon and the text 'Learning Locker OPENSOURCE'.

recommender

Differences

Potential to Migrate ElectronixTutor to GIFT

- ElectronixTutor vs. GIFT



Adaptive Course Flow and Sequencing through the Engine for Management of Adaptive Pedagogy (EMAP)

Benjamin Goldberg¹ and Michael Hoffman²

Differences

Potential to Migrate ElectronixTutor to GIFT

- ElectronixTutor vs GIFT
 - ElectronixTutor only track learning activities at KC level

The image displays two screenshots of the ElectronixTutor interface. The top screenshot shows a 'Statements' page with a list of entries, each labeled 'Austin Smith SaveKCScore StatementRef' and dated '8 days ago'. The bottom screenshot shows a detailed view of a statement within the 'Learning Locker' application. The interface includes a sidebar with navigation options like 'IIS', 'Data', 'Dashboards', 'Visualise', 'Source', 'Statement Forwarding', 'People', and 'Settings'. The main content area shows a query editor with fields for 'Who' and 'Additional Data', and a list of filters including 'Did', 'What', 'Where', 'Result', 'When', and 'Store'. The detailed view shows a JSON response with fields for 'actor', 'timestamp', 'version', 'id', 'result', and 'response'.

```
{
  "actor": {
    "objectType": "Agent",
    "name": "Austin Smith",
    "mbox": "mailto:wforrest@memphis.edu"
  },
  "timestamp": "2018-04-30T19:23:28.055Z",
  "version": "1.0.0",
  "id": "0e053b04-fc42-4d87-946e-902ab3f16a2d",
  "result": {
    "score": {
      "scaled": 1,
      "min": 0,
      "max": 1,
      "raw": 1
    }
  },
  "response": "resistor_series_behavior"
}
```

Differences

Potential to Migrate ElectronixTutor to GIFT

- ElectronixTutor vs GIFT
 - GIFT track and manage learning activities using Domain Knowledge File

```
1. <assessment>
2.   <tasks>
3.     <task name="Patrol Compound Perimeter" nodeId="1">
4.       <startTriggers>
5.         <learnerLocation>
6.           <coordinate>
7.             <GCC>
8.               <x>3767066.8535533906</x>
9.               <y>-3163453.0857864376</y>
10.              <z>4046285.810660172</z>
11.             </GCC>
12.           </coordinate>
13.         </learnerLocation>
14.       </startTriggers>
15.     <endTriggers>
16.       <learnerLocation>
17.         <coordinate>
18.           <GCC>
19.             <x>3767086.7305224794</x>
20.             <y>-3163449.4280285537</y>
21.             <z>4046269.7597387605</z>
22.           </GCC>
23.         </coordinate>
24.       </learnerLocation>
25.     </endTriggers>
```

```
181.   <scoring>
182.     <count name="violation count" units="count">
183.       <evaluators>
184.         <evaluator assessment="AboveExpectation" value="0" operator="Equals"/>
185.         <evaluator assessment="AtExpectation" value="2" operator="LessThanEquals" />
186.         <evaluator assessment="BelowExpectation" value="2" operator="GreaterThan" />
187.       </evaluators>
188.     </count>
189.     <violation_time name="violation time" units="hh:mm:ss">
190.       <evaluators>
191.         <evaluator assessment="AboveExpectation" value="00:00:00" operator="Equals"/>
192.         <evaluator assessment="AtExpectation" value="00:00:30" operator="LessThanEquals" />
193.         <evaluator assessment="BelowExpectation" value="00:00:30" operator="GreaterThan" />
194.       </evaluators>
195.     </violation_time>
196.   </scoring>
```

Differences

Potential to Migrate ElectronixTutor to GIFT

- ElectronixTutor vs GIFT
 - ElectronixTutor Integrated resources have their own “DKF”

The screenshot shows the ElectronixTutor web interface. At the top, there are tabs for 'Script Information', 'Information Delivery', 'Tutoring', 'Multiple Choice', 'Matching', 'Fill-in-Blank', 'Group Interaction', and 'Auto Tutor (ASAT)'. Below these are sub-tabs for 'Page', 'Agents', 'SpeechActs', 'RigidPacks', 'TutoringPacks', and 'Rules'. The main content area shows a question 'Q1' with a dropdown menu for 'Q1 E # 1' and buttons for 'Add' and 'Delete'. Below this, there are sections for 'Misc', 'Answers', 'Hints', and 'Prompts'. The 'Prompts' section is currently active, showing a table of prompts:

name	Name	Keys	Agent	Type	Threshold
Prompt1A1	Prompt1A2	buneq(?luip)w*b	ComputerTutor	Bad	0.8
Prompt1A2					
Prompt1A3					
Prompt1A4					

```
<AutoTutorScript>
  <Agents>
  <SpeechActs childrenURL="ace.autotutor.org/AutoTutorTemplates/ETDialog/ETDialogNoStudentMQHint.xml">
  <ASATPageConfiguration name="MyPageConfig">
  <RigidPacks>
  <Rules childrenURL="ace.autotutor.org/AutoTutorTemplates/ETDialog/ETDialogNoStudentMQHintNoPage.xml">
  <TutoringPacks>
    <TutoringPack name="Q1">
      <Questions>
        <Question id="1" agent="ComputerTutor" text="What is the mathematical relationship between the total
      </Questions>
      <Expectations>
        <Expectation id="1" text="I is equal to the sum of the three currents." kc="Kirchhoffs_Current_Law">
          <Answers>
          <Hints>
            <Hint id="1" agent="ComputerTutor" text="In the given circuit, three currents I1, I2 and I3 are t
              <Answers>
                <Answer name="Hint1A1" agent="ComputerTutor" type="Good" text="By adding up all the three cur
                <Answer name="Hint1A2" agent="ComputerTutor" type="Good" text="The sum of the three currents
                <Answer name="Hint1A3" agent="ComputerTutor" type="Bad" text="One third of the summation of t
                <Answer name="Hint1A4" agent="ComputerTutor" type="Bad" text="Multiplying by 3 to any of the
                <Answer name="Hint1A5" agent="ComputerTutor" type="Bad" text="Dividing by 3 to any of the bra
              </Answers>
            </Hint>
          </Hints>
          <Prompts>
          </Expectation>
        </Expectations>
        <Misconceptions/>
      </TutoringPack>
    </TutoringPacks>
  </AutoTutorScript>
```

Differences

Potential to Migrate ElectronixTutor to GIFT

- Unified Domain Modeling:
 - Domain Course File to consider Domain Standardization
- Question:
 - How flexible is DKF that can cover variety of ITS implementations

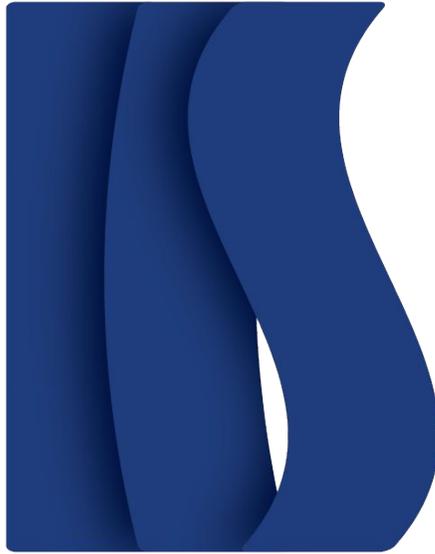
Potentials (Solutions)

Conclusions & Recommendations

- Moodle version of ElectronixTutor and GIFT are similar
 - Content Organization
 - “Domain Course File”
- Moodle version of ElectronixTutor and GIFT are different
 - Method of integrating learning resources
 - GIFT needs to have “native” resources

Conclusions & Recommendations

- Migration is possible:
 - Standardization of domain modeling
 - Develop DKF for other ITS



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