Moodle Plugin for Game Based Learning

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MTP Stage II Presentation
Motivation

• Growth of Internet brings positive as well as negative effect on education
• It gives an opportunity for distance based education and provides support for classroom teaching
• Since online teaching is different from classroom teaching, classical way to evaluate students is not that effective
• Need to find some alternative way to teach and evaluate
Solution to the Problem

Teaching strategies:

- Socratic
- Scaffolding
- Guided discovery
- Game based learning

Selected CMS

- Moodle
Presentation Outline

• Introduction
• Related work
• Moodle internals
• Proposed games
• Future work
• Conclusion
Earlier Attempt

- Web application
- Implements four teaching strategies
- Components: Teacher and Student
- Based on question and answer strategy
- Review and Evaluation
Moodle Games

- Hangman
- Crossword
- Cryptex
- Millionaire
- Sudoku
- The hidden picture
- Snakes and ladder
Useful Features of Moodle

• Users: We can manage users through this option.
• Course: All course related settings can be done from here.
• Plugins: All installed plugins can be seen by clicking on this link.
• Debugging: We can set debugger mode on by clicking on this link.
• XMLDB Editor: All the database related task can be done from here.
Moodle Plugins

- Quiz: supports various types of questions like multiple choice, true false, short answer, matching etc.
- Glossary: used for storing concept and corresponding definition
- Creating new plugin
Proposed Games

- Tic-Tac-Toe
- Guess in Time
- The Weakest Link
- Anagram
What is Tic-Tac-Toe

- Two player game where opponent is computer
- Based on classical Tic-Tac-Toe where both play alternatively
- Aim is to form a consecutive sequence of tiles to get a point
- On selecting a tile some question will be asked
- Right answer will mark that tile otherwise computer will play it’s turn
- Game continues till the all tiles are marked
Teacher role

Figure: Creation of tic-tac-toe
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Figure: Home page of tic-tac-toe
Rules to play the game

1. Select any tile by clicking on that. Corresponding question will be appear on the right side of the board.
2. If want to attempt the question, click on submit button, otherwise select other tile.
3. If you get the correct answer 'X' mark will appear on that tile and tile will be disabled and your turn is over and computer will make a 'O' mark on it's choice of tile.
4. Try to mark consecutive tiles in row or column or diagonal in order to get a point.
5. Play until all tiles are marked.
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Figure: Question corresponding to tile clicked
Student role

Figure: Summary page of tic-tac-toe
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Functions

- `addInstance(formData)` : stores the form parameter into database
- `updateInstance(formData)` : modifies the form parameter into database
- `deleteInstance(formData)` : delete the game instance
- `initGame()` : setting user attempt and questions
- `playGame()` : loads javascript class and shows initial board
- `update()` : updates the game state
- `draw()` : draws the game board
- `check answer()` : sends user response to question class for answer checking
- `reset()` : resets the game state
- `updateScore()` : updates score
- `aiMove()` : calculates AI move
- `getQuestion(tile)` : returns question for corresponding tile
- `checkAnswer()` : checks answer and store it into database for summary
What is Guess in Time

- For a different type a question
- Answer the question before the time-limit
- Summary will be displayed with total right answers and not attempted answers
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Teacher role

Figure: Teacher interface for guess in time game
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**Figure:** Intermediate state in guess in time game
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**Figure:** Summary of guess in time game
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Figure: Data flow diagram of student playing guess in time
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**Figure:** Data flow diagram of student playing guess in time
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Figure: ER Diagram of Guess in time
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- addInstance(formData) : stores the form parameter into database
- updateInstance(formData) : modifies the form parameter into database
- deleteInstance(formData) : delete the game instance
- initGame() : setting user attempt and questions
- playGame() : loads javascript class and shows initial board
- buildQuiz() : getting question and answer from the database
- startquiz() : starts the game and showing time remaining
- stopquiz() : stops the quiz and shows guessed and missed words
What is The weakest link

- A new way to grade students
- A series of questions will be displayed on the screen
- Goal is to maximize your winnings by forming longest chain of correct answers
- In case of wrong answer your winning total becomes zero
- To avoid that you can bank your current winnings and start from initial state
Teacher role

Figure: Teacher interface for the weakest link
Figure: Intermediate state in the weakest link
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Figure: Summary of the weakest link
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Figure: Data flow diagram of student playing the weakest link
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Figure: ER Diagram of Guess in time
Functions

- `addInstance(formData)`: stores the form parameter into database
- `updateInstance(formData)`: modifies the form parameter into database
- `deleteInstance(formData)`: delete the game instance
- `initGame()`: setting user attempt and questions
- `playGame()`: loads javascript class and shows initial board
- `fetchCurrentState(twl)`: fetches current state
- `checkAnswer(qid, ans)`: takes question id and user answer and returns the correctness
- `endGame()`: calls the summary after no question is left
- `fetchAllQuestions(twl)`: getting all questions
- `bank()`: add current amount to banktotal
What is Anagram

- Questions and answers are already there on the board
- Aim is to reshuffle themselves such that for every question correct answer should be besides that question
- At the end of game summary with correct and wrong attempts will be displayed
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Figure: Teacher interface for anagrams
Rules to play the game

1. Click on plugin icon
2. See the corresponding question or answer written as a text
3. Click on the box you want to swap. Scroll up or down with holding left click of mouse. Box can be seen as moving up or down. Drop the box on another box.
4. Student can see the two boxes are swapped.
5. Repeat the process until arrangement is not proper
6. Click on submit to see the summary page
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**Figure:** Intermediate state in anagram
Student role

Summary
Correct: 4
Wrong: 2

<table>
<thead>
<tr>
<th>Question text</th>
<th>Right Answer</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many layers are there in OSI model?</td>
<td>7</td>
<td>Wrong</td>
</tr>
<tr>
<td>TCP stands for.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTP is which layer protocol?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A device used in a network to strengthen a signal as it is passed along the network cable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A formal description of a set of rules and conventions that govern how devices on a network exchange information.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A security device which inspects traffic entering and leaving a network, and allows or disallows the traffic, depending on rules describing acceptable use of the network, by filtering out unwanted packets.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure: Summary of anagram
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Figure: Data flow diagram of student playing anagram
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Figure: Data flow diagram of student playing anagram
Database design

Figure: ER Diagram of anagram
• addInstance(formData) : stores the form parameter into database
• updateInstance(formData) : modifies the form parameter into database
• deleteInstance(formData) : delete the game instance
• initGame() : setting user attempt and questions
• playGame() : loads javascript class and shows initial board
• summaryGame() : summarises student’s attempt in form of correct and wrong attempts for each question
Future Work

• Tic-Tac-Toe Versions
• Network Games: multiplayer support
• Experimental setup
Conclusion

- Game based learning can be a nice way to involve students into education activity
- I developed four such games as a plugin for moodle
- A lot of research should be done to conceptualize these games based on individual subjects
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Thank You