Peer Evaluation System for MOOCs

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Outline

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4. PEAS Evaluation System
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What is MOOC?
Evaluation Strategies in MOOCs

[1]

1. Peer Evaluation
   - + Saves instructors time, faster feedback
   - - Reviewers are also our competitors

2. Expert Evaluation
   - + Correct Evaluation Of grades
   - - Infeasible in MOOCs

3. Auto Grader
   - + Fast, efficient
   - - Unsuitable for subjective answers

4. Self Evaluation
   - + Motivates student to learn
   - - Grade Inflation
Open response assessment allows for multiple grader types to be used in a single problem. [2]

The different grading mechanism that ORA supports are:

- Grading using Machine Learning Algorithms
- Instructor and course staff grading
- Peer grading
- Self grading
- None
- Basic Check
Peer Evaluation System for MOOCs

PEAS Evaluation System

PEAS is a web based stand alone application for evaluation.

The basic modules of our PEAS system are:

- Peer grading
- Self grading
- Auto grading
- Expert grading
Peer Grading

- Opportunity to students to learn by playing the role of both student and teacher.[3]
Calibration

- Employed in the beginning to divide the students into groups, so that each paper is evaluated by a number of reviewers of different reviewing abilities. [4]
- The abilities of the reviewers to evaluate correctly is corresponding to the incentive they receive. [5]
- The incentive is a number from 0 to 1.
Peer Evaluation System for MOOCs

PEAS Evaluation System

Peer Grading

Figure: Calibration Flow Diagram
Normalization

Necessary for fair assessment.

Handles four main cases:[6]

- Normal Case
- Over Generous Case
- Creative Accounting Case
- Penalised Case
Figure: Flow Diagram for Normalization
Figure: Formulae for Normalization

- $I_{ER} = \sum M_i$
- $A_{ER} = \frac{I_{ER}}{i}$
- $I_{WF} = \frac{I_{ER}}{A_{ER}}$
- $BIAS\ \text{FACTOR} = \frac{RATING\ \text{GIVEN\ TO\ OTHERS}}{A_{ER}}$
- $NORMALISATION\ \text{FACTOR} = \frac{1}{BIAS\ \text{FACTOR}}$
### Normalization

#### Case 2. The Over-generous Case

<table>
<thead>
<tr>
<th>Task</th>
<th>Peter</th>
<th>John</th>
<th>Mary</th>
<th>Janet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
<tr>
<td>Peter</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>John</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mary</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Janet</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**Average effort rating**
- Peter: 60
- John: 50
- Mary: 46
- Janet: 49

**Bias factor**
- Peter: 1.17
- John: 0.98
- Mary: 0.90
- Janet: 0.96

**Normalization factor**
- Peter: 0.85
- John: 1.03
- Mary: 1.11
- Janet: 1.05

**Normalized scores**
- Peter: 4.10, 4.10, 4.10, 4.10
- John: 4.46, 3.34, 5.57, 4.46
- Mary: 3.14, 4.18, 3.14, 4.18
- Janet: 5.23, 5.23, 4.18, 4.18

**Average effort rating**
- Peter: 1.00
- John: 1.00
- Mary: 1.00
- Janet: 1.00

**Bias factor**
- Peter: 1.00
- John: 1.00
- Mary: 1.00
- Janet: 1.00

**Figure**: Normalization—The Over Generous Case
Peer: edX ORA vs PEAS

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>EDX ORA</th>
<th>PEAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALLIBRATION</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>COMPULSORY CALIBRATION</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>NORMALISATION</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>INCENTIVE</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>OPTIMAL DISTRIBUTION</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>PEER REVIEW</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Figure: edX ORA vs PEAS
Self Assessment

- Self assessment is employed by the instructor when the main purpose of the course is learning. [7]
- Students are asked to evaluate their own assignments. [8]

Figure: PEAS Self Assessment
Expert Evaluation

The instructor has the option to review the papers himself. This is a useful option when there are less number of students enrolled in a course. [9]

Figure: Expert: edX ORA vs PEAS [2]
Auto Grader

[10]

- For checking program codes, essays and multiple choice questions (MCQs).
- Automatic evaluation with existing online softwares.
Self+Peer Evaluation

The instructor can adopt a combination of any of the above mentioned methods for evaluation for every assignment that he uploads. He has to provide the weightage for scores from each type of evaluation to be accounted in the final assignment score.
Peer Evaluation System for MOOCs
PEAS Evaluation System
Hybrid: Self+Peer

Self+Peer: edX ORA vs PEAS

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>edX ORA</th>
<th>PEAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF EVALUATION FOR MOTIVATION</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>SELF EVALUATION FOR GRADING</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>NORMALIZATION</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>INCENTIVE</td>
<td>✗</td>
<td>✔</td>
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<tr>
<td>PROMPT</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>RUBRICS</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

[2]
Progress of the Project

- Study of Research Papers
- Prototype (workflow) in Joget
- Study of edX ORA
- Django stand alone web application
Future Scope

- Release of an open source API for PEAS
- Integration of PEAS as a grading module for the edX MOOC along with edX ORA.
It is a simple mathematical application which calculates the perimeter and area of geometric figures, like square, triangle and circle.
It is a mathematical educational application which is a quiz on matrices.
Welcome to PEAS

Peer Expert Autograde Self Evaluation System

PEAS offers full control over courses, assignments, deadlines and marking scheme to the instructor. The instructor also acts as a supervisor and can make necessary changes in the schema when he deems fit.

The assignments for the course are to be provided on the PEAS online application. Students will take up an assignment, and submit solutions. These solutions will then be evaluated by other students/instructor or himself and scores are given.
Screenshots of PEAS Evaluation System

**ADD ASSIGNMENT**

Describe your views on Education System.
Constraints: About 100 words

Question:

Check the answer on basis of:
- a) Length of the content
- b) Grammar
- c) Language
- d) Writing Style

Rubrics:

Grading Strategy: EXPERT

Add Assignment:
ANSWER ASSIGNMENT

Question: write an essay on education system.

Write your answer:

Indian education system has a wide structure and the educational institutions can introduce the education or learning pattern as below:Va years in pre-preschool schools. In the primary schools up to V Class or so. Education is further upgraded up to 10th class where the examinations are conducted by the Board at 10 and 12. Thereafter, students are free to choose the courses of their own at any stage, i.e. primary, secondary, senior secondary level.

Schools are of different levels. Local Boards run the schools up to primary, V standard, both in mother tongue and English medium. Thereafter the schools may upgrade themselves up to X known as Secondary schools. They can also be upgradedfunctioning. As such schools are pre-primary, pre-preschool, then primary.
PEAS

Question:
write an essay on education system.

Grade the answer:
Indian education system has a wide structure and the educational institutions can introduce the education or learning pattern as below VA years in pre-nursery schools, in the primary schools up to V class or so. Education is further upgraded upto 10+2 system where the examinations are conducted by the Board at 10 and 12. Thereafter, students are free to choose the courses of their own at any stage, i.e., primary, secondary, senior secondary level. Schools are of different levels. Local Boards run the schools up to Primary, V standard, both in mother tongue and English medium. Thereafter the schools may upgrade themselves up to X known as Secondary schools. They can also be upgraded up to 12, called Senior Secondary schools. The education is a co-current (state level) subject and the Central Government cannot interfere in their functioning. As such schools are pre-primary, pre-nursery, then primary, secondary and senior secondary run both by the private bodies as well as by Government.

Grade in accordance with this Rubrics:

grammar

Grading scale:
References


