Pre-class Online Quizzes on Reading Assignments: Student Behavior and Relation with Achievement

Michel A. Wattiaux† (wattiaux@wisc.edu), Wei-Zhong Wang‡, and P. Crump§

†Department of Dairy Science, ‡Department of Information Technology, and §Department of Computing and Biometry

NACTA (2018); Abstract 160.

Background

- The combination of face-to-face and technology enhanced learning at the core of the “flipped classroom” offers the potential for “better” learning environments in which students can be more engaged, active, and responsible for their learning (Hutchings and Quinney, 2015).
- In a flipped classroom, students are expected to engage with course materials prior to class such that class time can be dedicated to activities of higher order of learning (e.g., analytical and critical thinking). However, it is challenging to create incentives for students to be prepared (i.e., to study) before materials are “covered” in class.
- Not all learning activities are equally effective (Dunlosky et al., 2013). For example, summarization and highlighting have been ranked as “low utility” learning activities, but practice testing (self-testing or taking tests over to-be-learned material) and distributed practice (implementing a schedule of practice that spreads out study activities over time) have been given a high utility ranking.
- Little is known about the effectiveness of pre-class assignments in helping students learn.

Materials and Methods (cont’d)

<table>
<thead>
<tr>
<th>Quiz Schedule</th>
<th>#</th>
<th>Class</th>
<th>Date</th>
<th>Topic</th>
<th>Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>08/09</td>
<td>Ruminant vs non-ruminant</td>
<td>Q01</td>
<td></td>
<td></td>
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<td>02</td>
<td>08/09</td>
<td>Strategies of digestion</td>
<td>Q02</td>
<td>Q03</td>
<td></td>
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<tr>
<td>03</td>
<td>08/10</td>
<td>Variation in feed composition</td>
<td>Q04</td>
<td>Q05</td>
<td></td>
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<td>04</td>
<td>08/16</td>
<td>Dry matter intake</td>
<td>Q06</td>
<td></td>
<td></td>
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<tr>
<td>05</td>
<td>08/17</td>
<td>Energy system: Part 1: NER supply</td>
<td>Q07</td>
<td></td>
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<td>06</td>
<td>08/22</td>
<td>Energy system: Part 2: NER requirements</td>
<td>Q08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>08/24</td>
<td>Protein system: Part 1: MP supply</td>
<td>Q09</td>
<td></td>
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<tr>
<td>08</td>
<td>09/08</td>
<td>Protein system: Part 2: MP requirements</td>
<td>Q10</td>
<td></td>
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<td>09</td>
<td>09/13</td>
<td>New hose calf</td>
<td>Q11 Q12</td>
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<td>10</td>
<td>09/15</td>
<td>MID TERM</td>
<td></td>
<td></td>
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<td>11</td>
<td>10/10</td>
<td>Troublesome E. Biological test</td>
<td>Q13</td>
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<td>12</td>
<td>10/12</td>
<td>Troublesome E. Far-off &amp; close-up rations</td>
<td>Q14 Q15</td>
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<td>10/19</td>
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<td>Q16</td>
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<td></td>
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<tr>
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<td>Q17</td>
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<td>12/08</td>
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<td>17</td>
<td>12/08</td>
<td>FINAL</td>
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Quiz Set Up

- For each quiz (Qz), a database of 12 to 18 multiple choice items were created focusing on the content of the reading.
- Each on-line quiz was composed of 10 multiple choice items randomly selected from the database.
- Students were given two attempts with resampling of items for attempt 2.
- Quiz scores would be given for attempt 1 frequency (n) = 0.02

Results (cont’d)

Figure 1. Time spent taking the quiz.

- Attempt 1 frequency (%) = 0.22

Figure 2. Time of submission relative to 9:30 am deadline.

- Attempt 1 frequency (%) = 0.22

Figure 3. Changes during the semester.

- Quiz Score 1
- Time Spent 1 (min.)
- Time to Deadline 1 (hr)

Figure 4. Correlations: Quiz, midterm and final exam scores.

- Average score
- Average score
- Midterm exam score
- Final exam score

Conclusions - Implication - Conjecture

- Question 1: Does the amount of time spent taking an online quiz and time a quiz is taken before the deadline influence quiz score? In general, students who took the quiz earlier spent more time on it and obtained a better score compared to students who took the quiz closer to the deadline.
- Question 2: Is there a correlation between quiz scores and midterm or final exam scores? In general, students who obtained a better score on the quiz also obtained better scores on the midterm and final exams.
- Additionally we found that as the semester progressed, quiz scores did not change, nor did the time spent to take a quiz, but students started to work on their assignment closer to the deadline.
- Implication: Students should be advised to start early.

- Conjecture: The reason students who started early performed better on the quiz might be related to spending more time reading the material carefully and thoughtfully.

References


Materials and Methods

Ruminant Nutrition (414) Course Syllabus

- Two-credit junior and senior level course
- Meet twice a week: Tuesday and Thursday from 9:45 to 10:45 am
- Complete syllabus is at https://kb.wisc.edu/dairynutrient/414RN/

Course objectives are:

- To understand nutritional concepts / implications in balancing rations
- To gain analytical & critical thinking skills / practical aspects of feeding
- To gain “hands-on” experience in evaluating feed ingredients and rations in the "real world."

Expectations (what I am supposed to do as a student?):

- Before class: Read paper(s) posted on the course website and take an online quiz to test your knowledge of the paper’s content.
- During class: Summarize main points / Discuss mini-essays with classmates / Complete problem set, etc.
- After class: Complete a minute paper / Review material / Prepare for next class.

On-line quiz as a “study guide”

- Students were told that the quizzes should be considered as “study guides” meant to reward them for doing the “right” thing: read the material thoughtfully.
- Students get feedback after each submission:
  - Correct / incorrect items with explanation referencing reading materials only;
  - Score (percentage of correct items).
- The quizzes further than 9:30 am deadline spent more time and obtained better scores.
- Quiz grade is 15% of the overall grade for the class.