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Does Continuous Assessment Using Rubrics Help To Uncover Unexpected Gaps in Student Understanding?
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Poster presentation at the NAIRTL National Academy 2nd Annual Conference, 13-14 November, 2008, Waterford Institute of Technology, Ireland

Conference Theme: Teaching and Learning in Higher Education: Challenging Assumptions

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Abstract
“Continuous Assessment – Rubrics and Uncovering Student Misconceptions”

Module EE4011, “Radio Frequency Integrated Circuit Design”, an optional final-year module in the B.E. (Electrical) programme at UCC, incorporates a computer-based assignment which accounts for 20% of the final marks. In 2007/8, a detailed marking scheme in the form of a rubric was given to the students with the assignment to allow them to clearly see where effort should be expended in the assignment itself and in the written report on which the marks would be based.

The final grades for the continuous assessments were determined by systematically evaluating how closely each student had met the standards of performance as specified in the rubric. By concentrating on the rubric for the purposes of evaluation, the assessor was not as distracted by small errors or misconceptions in the student reports as could possibly occur when grading the reports without the help of the detailed rubric. In fact, by concentrating on the rubric for grading purposes, the assessor felt a certain leeway to reevaluate the reports from a student learning perspective in order to gain insights into minor misconceptions which occasionally appeared. These minor misconceptions could subsequently be clarified in a follow-up tutorial.

Thus, the rubric-based approach, while primarily targeted in this instance at determining a grade, created clarity at grading time and allowed a separation between the task of grading and the search for misconceptions which could hinder student learning, with the latter being an unexpected but welcome bonus.
Introduction
Module EE4011, “Radio Frequency Integrated Circuit Design”, is an optional final-year module in the B.E. (Electrical) programme at UCC and incorporates a computer-based assignment which accounts for 20% of the final module marks. In the academic year 2007/8, the specification and grading of this assignment was guided by an increased awareness of the Teaching for Understanding framework [Hetland, 1988] and by the use of assessment rubrics [McCarthy, 2007] encountered as part of the Post-Graduate Certificate in Teaching and Learning in Higher Education undertaken by the author. This paper reports on the increased insights into student learning achieved through a combination of these factors.

Table 1: Extract from the Assessment Rubric

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<tr>
<th>Criterion \ Grade</th>
<th>Excellent (&gt; 70%)</th>
<th>Very Good (60% - 69%)</th>
<th>Good (50% - 59%)</th>
<th>Satisfactory (40% - 49%)</th>
<th>Unsatisfactory (&lt; 40%)</th>
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<tr>
<td>Circuit Simulations and Knowledge of Simulator (Contributing 30% of the final report marks)</td>
<td>An extensive range of simulations extending beyond the core requirements indicating a deep working knowledge of the simulator and familiarity with a range of circuits.</td>
<td>All of the required and some additional simulations have been performed demonstrating deeper knowledge of the simulator and the assignment.</td>
<td>Most of the required simulations have been performed and discussed indicating a good working knowledge of the software.</td>
<td>Most of the required simulations have not been performed or presented in graphical form indicating a weak working knowledge of the software.</td>
<td></td>
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Assignment Results
Figure 1 shows the breakdown of results, illustrating that 80% of the reports met either the “very good” or “excellent” criteria, indicating that most students closely followed the rubric provided.

Remaining Uncertainties
By concentrating on the rubric for the purposes of evaluation, the lecturer was not distracted by small errors or misconceptions occasionally encountered in the reports which would usually have impacted on the assessment methodology. In fact, these small errors were now looked upon as a way of gaining insight into student understanding. Figure 2 shows the typical errors or misconceptions that appeared and their frequency of occurrence. These represent typical areas of confusion concerning the design of radio frequency amplifiers including the role of the RF choke, the importance of the dynamic load line, the definition of reflection coefficient (Gamma) and others. Having identified these confusing points, it was possible to devote time in a subsequent lecture to clear up the associated misunderstandings.

Conclusion
The rubric-based approach, while primarily targeted in the EE4011 assignment at determining a grade, created clarity at grading time and allowed a separation between the task of grading and the search for remaining gaps in student understanding. This allowed these remaining gaps to be dealt with in class before the students faced into their final examinations.

References