Automatic Grading on Paper

The course MEC2025F has approximately 200 students. It is a course on Solid Mechanics taught to second year Mechanical Engineering students. In previous years, tutors would grade tests which are written three times during the semester. The grading level is not uniform with some tutors giving a different grade to nominally the same answer with the same working. A tutor's times can better be spent helping students than marking a large number of tests. A second problem is that the students often do not know what their understanding of the work is between tests which can lead to poor test performance.

A third problem experienced in the course is inadequate attendance at tutorials. According to a questionnaire to students 59% of them feel that doing tutorials is the most effective method of them learning. An attendance register is distributed to try and control attendance but students sign for each other which undermines this process.

To address these problems weekly multiple choice tests are given. These tests are generated with open source software. The software generates a pages with both questions and answer blocks which the student fills in. The conditions for the test taking were often not ideal as the venues were packed to capacity with students sitting right next to each other. The questions are not necessarily in the same sequence on each copy of the question paper and answer options in each question are also rearranged. This acts as a deterrent to students copying which mitigates the cramped conditions in which they write.

The test can be created directly through the software but using manipulating the Latex code on which it is based allows better control of the software parameters and greater customization. Students were identified through their PeopleSoft number which 7 digit identifier unique to each student. The tests given were conceptual with a few questions at the end of the test which required some working.

The student's grade (or lack thereof) will be used as an indication of whether the student has attended the tutorial (or not). This obviates the need for an attendance register.

Another method of implementing multiple choice is using an online system. Each student would need a computer and it's difficult to get a computer lab for 200 students to do it in one session. Another option of letting students do it in their own time is not conducive to plagiarism free work. The actual problem of poor attendance during tutorials is not addressed using an online system.

In a questionnaire given to students 77% of them felt that the tutorial tests should continue. When asked how well tutorial tests helped them learn 72% felt it was average, good or excellent. The final mark of the student improved in the year that tutorial tests were instituted to the previous year where there were no tutorial tests. The average went from 61% to 65%. The exams which comprises 70% of the final mark were moderated by the same examiner and accepted to be of the same standard.

In conclusion tutorial tests can implemented relatively easily and can have a significant effect on student performance in test taking.