

Testing Security under Remote Teaching

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Can one give objective examinations online in remote teaching?

The question as to whether online testing is possible arises in the context of a credit-by-examination program under consideration for students whose hardships caused them to miss many online sessions. Some may object to online testing, feeling that it would be too easy for students to cheat. One way to test the security of online testing is to compare results for students who took online tests in the classroom under teacher supervision to the same tests given in a remote learning environment. If online testing is too prone to cheating to be relied upon, then comparative results would show it.

Results support the reliability of online testing under the conditions present for this study. There was no statistical difference that would indicate increased cheating under remote testing.

The Assessments

I teach out of the same LMS for in-building and remote teaching. Students take all of their tests online at InnovationAssessments.com. For this study, I examined multiple-choice tests. There were two *types* of multiple-choice tests given: (A) those that count little in the grade and for which students may study the exact questions in advance (so 100 is expected for students); (B) those that count more in the GPA and for which students may have access to some but not all questions in advance.

The data was normalized in the following ways:

- The data set only includes students who earned a score, so students with zero scores were removed.
- The students in special modified curriculum classes were not included because they do not take the same assessments.
- The students who left the district were not included because they did not take all the assessments.
- Cases where the score could have come from different optional assessments were excluded.

Other considerations regarding the data set:

- The time period covered for was 13 Jan to 29 May.
 - grade 8: six assessments before remote learning, three after

- grade 9: three assessments before remote learning, six after
- grade 10: no type A assessments were included because they always get 100 on these (this is expected)
- All three grades had interim exams each ten weeks

The Results

Mr. Cutting is a teacher in the Schroon Lake Central School math department. He ran a test of significance to determine whether any difference in scores in-building and on-remote was attributable to random chance or the actual different testing situations. Mr. Cutting ran a two tailed test.

Assessment Type	Grade	t =	p =
A	8	-0.94	0.36
B	8	-0.17	=.86
A	9	1.15	0.25
B	9	-1.1	0.26
B	10	-1.1	0.26

To be statistically different, the p value would have to reach at least 0.10 but in most cases 0.05. The closest is .25

So, our conclusion for each set would be:

1. The results are NOT Statistically Significant
2. The differences are due to random chance.
3. We would fail to reject the Null Hypothesis (basically for statistical purposes the means are equal)

Accepting the variable of interest is of no or "null" effect on the results.

Mr. Cutting also simulates what the difference would be with 95% confidence if the experiment were to run an infinite number of times. He ran a 95% confidence interval for grade 9 type A assessments, the closest to being significant. It came out -2 to 8. That means the difference, which was "3" between the averages (89 to 92), could be as high as 8 for the higher score and the

-2 means the lower score could actually be higher by 2 points if we ran this trial an infinite number of times.

Security Settings

The following security settings are available for the multiple-choice assessments at this website:

- Tests can be scheduled to only open for students during a certain time period or to single-use unlock keycodes.
- Tests can be timed, thus limiting lookup opportunities in book or paper form.
- Student screens can be monitored during testing using third party service like *GoGuardian*
- The test window locks up if students browse away.
- Test detects full screen mode so that side-by-side answers not possible without teacher knowing
- Students need not see test questions in advance.
- A right click for context menu (some plugins could give the answers sometimes like Grammarly) deletes the question for no credit on that question
- Test detects screen resizing.