# Identifying Academic Dishonesty in Online Quizzes

Christopher Collins
Aug 11, 2016

## Purpose

Determine the level of academic dishonesty taking place during online quiz taking.

## Summary

It has been suspected among the JATC-669 Testing Staff that apprentices have been 'gaming' the online quiz-taking functionality to raise their overall averages so that they are eligible to take final exams. While looking through hundreds of apprentice quiz records each week, staff have become aware of suspicious patterns in the way many apprentices complete quizzes. While staff have been aware of this behavior for some time, a method for measuring the number of potential offences was not available until now.

This report seeks to:

1. Define the dishonest behavior, how apprentices are able to commit the offence, and why it occurs
2. Quantify the level at which it is being perpetrated
3. Illustrate how that quantification was performed
4. Suggest changes to the program that would prevent the behavior from occurring in the future

DATA:

**Report Data:**
https://docs.google.com/spreadsheets/d/1xsqFx7fhViO0QXGuv56aGggcnYU9agYLvBUd89z5MHo/edit?usp=sharing

**Identification Tool:**
On the O: Drive at /JATC/Systems/stafftools/ad-checker/index.html

## Findings

- 49% of apprentices fail a static quiz on their first attempt
- 49% fail a shuffled quiz on their first attempt
- 42% of static quiz retakes result in a 100% grade after a failed first attempt
- 7% of shuffled quiz retakes result in a 100% grade after a failed first attempt
- Shuffled courses had a 35% fewer questionable retakes
- The highest first attempt failure rates were found in SPF03 (68%) and SPF11 (65%)
- The lowest first attempt failure rates were found in SPF02 (29%) and SPF05(34%). NOTE: All lessons are not being graded in SPF02 and skew the data towards higher scores
- The highest levels of questionable retakes were found in SPF11 (59%) and SPF18 (57%)
- The lowest levels of questionable retakes were found in the shuffled courses (SPF03,02,10 all under 10%) with SPF01 (25%) and SPF06 (30%) having the lowest levels in the static courses

## Definition of the Behavior

This report defines Academic Dishonesty as:

> *Any type of cheating that occurs in relation to a formal academic exercise. This includes behaviors or actions that take advantage of systems or functionality present in the academic program.*

The findings found in this report focuses on one specific type of academic dishonesty present in the apprenticeship program, the recording of the correct or incorrect status of answers during a static online quiz with the intent to improve scores without the effort of additional scholarly work on second attempts of the same quiz.

The offence may occur in this way:

1. An apprentice goes to the testing site to take a quiz
2. They open the quiz and answer all the questions, or in certain cases, do not even answer the questions
3. Upon completing the quiz, Moodle displays their answers alongside the correct answer
4. The apprentice records the correct answers
5. After the 24 hour retake time limit, they re-attempt the quiz using the recorded answers to achieve a higher grade

As mentioned above, support staff have been aware of this behavior for some time. It is not uncommon to see the course record of a student have multiple low-scoring first attempts followed by a perfect score on their reattempts. Apprentices have even confirmed this behavior to staff, noting that they simply wanted to have a submission recorded or get their average high enough to request a final. **Many apprentices repeat this behavior throughout their entire participation in the program.**

## Quantification of the Behavior

In the program's 16 static courses (SPF 1, 5-6, 8-9, & 11-18), this behavior is believed to be occurring at rates of 35% to 67% for all retake attempts. Specific data for all non hand-graded courses is as follows:

| COURSE | QUIZ ATTEMPTS | HAD REATTEMPTS | QUESTIONABLE REATTEMPTS |
|---|---|---|---|
| SPF01 | 1000 | 45% | 25% |
| SPF02 | 1458 | 29% | 7% |
| SPF03 | 2682 | 68% | 3% |
| SPF05 | 907 | 34% | 35% |

| | | | |
|---|---|---|---|
| SPF06 | 908 | 53% | 30% |
| SPF08 | 868 | 57% | 42% |
| SPF09 | 722 | 47% | 47% |
| SPF10 | 1338 | 50% | 10% |
| SPF11 | 1212 | 65% | 59% |
| SPF12 | 614 | 49% | 39% |
| SPF13 | 494 | 50% | 45% |
| SPF14 | 436 | 41% | 41% |
| SPF15 | 436 | 55% | 38% |
| SPF16 | 325 | 49% | 39% |
| SPF17 | 315 | 38% | 46% |
| SPF18 | 752 | 49% | 57% |

## Method of Quantification

Moodle and Banner do not have the capability to generate reports that could illustrate when this behavior could be occurring. Moodle does however have the ability to export XHTML documents that are essentially web pages with tabulated records of all attempts on a quiz.

Using JavaScript, we were able to write a program that parses the tabulated data, identify potential offenders and display the data in a digestible format.

Three reports were generated from either the “A” or “D” (if applicable) versions each of the non hand-graded courses, one from the beginning, middle and end of the course. These reports were then compiled in the newly created tool where they were processed.

**The methodology for determining whether an attempt should be flagged is as follows:**

1. If there were one or more attempts on a quiz *and*...
2. the first attempt was below 60% *and*...
3. the retake score was 100% *then*
4. the attempt is flagged as questionable

The JATC rules allow reattempts. To factor in apprentices that are genuinely trying to raise their score, the threshold was lowered below a failing grade. For the same reason, only reattempts that scored perfect were flagged with the reasoning that someone recording the correct answers will enter in all correct responses in their second attempt.

It should also be noted that, while this report does not provide specific data on the amount of time apprentices took on their first attempt compared to their retake, in many cases the duration of the first and second attempts varied widely. For example, the duration of a first attempt might be ~30s while the second attempt is ~3m potentially indicating that the apprentice merely clicked random answers and then spent more time entering the correct ones on their second attempt. Others show a longer first attempt and a significantly shorter time spent on the retake. While reason would suggest that an apprentice seeing a quiz for the second time should be able to move through the question faster, retake durations of under a minute that result in perfect scores may suggest the recording of correct answers in the first attempt.

## Analysis

While these findings are not definitive, the author believes that the results of this study strongly indicate that many apprentices may be committing academic dishonesty. Below are some insights into the data:

1. Considering that the shuffled course quizzes are more difficult to record correct answers due to their question pools, as well as the fact that static quizzes have a 35% avg higher questionable attempt rate, it is very probable that there is a high level of academic dishonesty occurring in static courses.

2. This study found that 21% of apprentices are potentially committing academic dishonesty on their static quizzes compared to 3% on shuffled courses. Of course there must be some level of apprentices that achieve 100% scores on their second attempts without cheating, but we do not have a way to determine the level at this time.

3. Courses that occur later in the program (SPF14-18) have a dramatically lower failure rate on final exams, despite having slightly above average first attempt failure rates and questionable retake occurrences. Failure rates for these courses are on average 6% lower that the program's average. The final exam score averages are also 6% higher than the overall program average.

4. SPF02 is an anomaly due to the essay questions being marked correct regardless of what is entered in the fields on lessons 4 and 5. This has a diminishing impact on the data quality and this report's findings.

5. There seems to be an unexpected correlation between the amount of retakes and the course failure rate (more retakes = more course failures), however this is not definitive. For example, SPF05 has the lowest retake rate (34%) but an average course failure rate (8.6%). On the other side of the spectrum, SPF15 has a high retake rate (57%) but one of the lowest course failure

rates (2.7%). One would think that if an apprentice fails a quiz, studies and then retakes their exams, they should do better on the final exam but this is not the case.

There is also data that suggests that courses with a higher questionable retake rake have a higher course failure rate and lower final exam averages.

## Recommendations

Below are some recommendations for reducing the amount of academic dishonesty cited above. We are currently implementing some of these but a roll-out to current and future courses is recommended.

### Remove the ability for apprentices to retake quizzes

The ability for apprentices to retake quizzes is potentially resulting in poor scores, academic dishonesty and less-educated students. Apprentices do not have ‘skin in the game’ if they are allowed to submit lessons over and over until they stumble over the passing threshold. Currently, we are telling apprentices that their course work does not matter outside of getting a 60% average to take the final.

To change this attitude, the program could blend the grades of the course work and the final exam to determine the apprentice's final grade rather than a pass/fail based on the final exam score.

This would require a major change to the way the program is set-up and administered as well as agreement from stakeholders at all levels.

### Discontinue displaying correct answers when an apprentice completes a quiz

Currently for many courses, Moodle displays the correct answers after an apprentice completes a quiz. This is the point in time when the suspected academic dishonesty is being committed. If the ability to retake quizzes was removed, it might be acceptable to leave this functionality in as the correct answers would not be relevant on a different version of the course.

By removing correct answers we would be able to eliminate the vast majority of the academic dishonesty described in this report and hopefully encourage the apprentice to fully engage with the learning content.

This could be implemented immediately by the support staff.

## Create question pools for all courses

As illustrated in this report, courses with question pool quizzes have have a 35% reduction in questionable quiz retakes. This is most likely due to the shuffling of questions during attempts making it more difficult to record correct answers.

This would require significant effort from subject matter experts, support staff and administration.

## Shuffle answers during online quiz attempts

Moodle also allows the ability to shuffle the order of answers when displayed in a quiz attempt. By turning on this functionality we could reduce the ability for an apprentice to write down, for example: “The answer to Question 10 is ‘A’.” and enter that on their second attempt.

This could be implemented immediately by the support staff.