

## MEASURING THE EFFECTIVENESS OF ACCOUNTING EDUCATION FOR AGRICULTURAL STUDENTS: A COMPARISON BEFORE AND DURING COVID

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### ABSTRACT

In the context of online learning, online exams have become increasingly popular as an efficient assessment method since long-distance learners can easily administer exams. However, the use of online exams has not become common in Hungary until the mandatory online education during the first waves of the corona virus epidemic. The following research aims to look at testing of accounting knowledge in agricultural education. Bachelor level students at Neumann University in three different agricultural majors were taking end of semester tests in two accounting courses. Test results in spring of 2019 (before pandemic) and spring of 2021 (during pandemic) were compared with the purpose of analyzing students' performances in online tests and comparing the results with respect to student performances in paper-based tests.

**Keywords:** online learning, agricultural education, testing, COVID

### INTRODUCTION

In the context of online learning, online exams have become increasingly popular as an efficient assessment method since long-distance learners can easily administer exams. Additionally, students can do self-practice by utilizing online exams provided through learning management systems (LMS).

Thanks to the advantages of online exams, universities worldwide have been using online exams for online, hybrid, and face-to-face type courses. Other institutions worldwide also prefer to employ online exams in various contexts. For instance, driving license exams, foreign language exams, certificate exams, as well as recruitment exams can be conducted via online means. However, the use of online exams has not become common in Hungary until the mandatory online education during the first waves of the corona virus epidemic.

Therefore, this study has the purpose of analyzing students' performances in online tests and comparing the results with respect to student performances in paper-based tests.

In the context of this study, students' performances were considered in accounting courses between 2019 spring (pre-epidemic) and 2021 spring (on-line mode) semesters. These were all bachelor level students studying at an agricultural faculty of a public university in Hungary.

The remainder of the paper is structured as follows. The next section is allocated to literature review, followed by methodology, and the fourth section is dedicated to results with discussion presented at the end.

Hungary was hit by the Corona-virus epidemic in March 2020, and on March 11th the government declared a state of emergency. After March 23rd, 2020 classes took place in an emergency work schedule, using distance learning methods. The traditional 20th century education system suddenly switched to the 21st century version (LAZÁNYI ET AL., 2021). This paradigm shift has actually transformed teacher-centered education into learner-

centered education. Most universities and colleges already had some routine in distance learning, as correspondence and blended methods of training has already existed. E-learning systems for sharing materials online and taking online exams (such as Coospace and Moodle) were introduced in most institutions as early as the 2000s. Nevertheless, according to the statistics of the Education Office, before the autumn of 2019 only a quarter of the students took part in non-regular, mainly correspondence-based learning (VERECKEI, 2021).

There are several studies conducted dealing with student perception and experiences related to online tests however there are fewer studies specifically focusing on comparison of students' performances between online-based and paper-based tests (BRALLIER ET AL., 2015, AL-QDAH & ABABNEH 2017, ILGAZ & ADANIR, 2019). There are even fewer prior studies done comparing Hungarian students' online test performances with respect to their paper-based test performances. PÁL & KÓRIS (2021) examined the use of summative assessment forms in an online context among professional language educators. Summative assessment could be provided by online written or oral exams, which can be proctored or non-proctored exams. The latter is essentially an open book exam as it is not remotely controllable.

In their research among students of five Hungarian universities, VIKTOR & KÁRPÁTI-DARÓCZI (2020), has found that 98% of the respondents rated the acquisition of the curriculum as good or excellent. 87% of respondents were satisfied with the form and difficulty of the exams, while 73% said they had enough time to complete the tests. In contrast, 58% of the achieved scores were only sufficient.

Another study examined the difference between the results of off-line and on-line examinations (BARANYAI & DEBRENTHI, 2020) among mathematics students from the different faculties of Babes-Bolyai University (BBTE), the University of Debrecen and the Partium Christian University (PKE). Although the exam average for the online semester was lower, the deterioration was not significant. It is important to note that during the exam, all students were monitored by two cameras.

## MATERIALS AND METHODS

### Research questions

The aim of this study was to investigate students' performance in online-based and paper-based tests in accounting courses before and during Covid lockdown. Accordingly, there are two research questions set up:

1. Is there any effect of demographics on students' performance in paper-based or online-based tests? Demographics are defined as: gender, area of study (major) and type of study (correspondence and regular students).
2. Is there any difference in students' performance between online-based and paper based tests?

### Research design and participants

Data was considered from the spring semester of 2019 (before Covid) and the spring semester of 2021 (during Covid). The spring semester of 2020 was not considered since this was a mixed semester as half of the semester was conducted under normal circumstances. Quantitative data covers students' percentage scores achieved in paper-based and on-line tests. Participants of this study were bachelor level students at a public university in the Faculty of Horticulture and Rural Development who took accounting courses between the years 2019 and 2021. General accounting courses are taught for 2nd

year students as a fundamental course. In 2019 teaching was carried out in a class-room setting for all students, but correspondence students were already taking their semester-end exams in an on-line setting. In 2021, due to the compulsory shutdown, all classes were conducted on-line (Ms Teams) and all students have filled out their end of semester tests on-line. In both cases, on-line tests were unmonitored. Because of the small sample size, the study is not representative.

**Table 1.** Demographic Profile of Students

|               | Category          | Frequency | Percentage (%) |
|---------------|-------------------|-----------|----------------|
| Gender        | Male              | 47        | 47.5%          |
|               | Female            | 52        | 52.5%          |
| Major         | Horticulture      | 32        | 32.3%          |
|               | Agriculture       | 39        | 39.4%          |
|               | Rural development | 28        | 28.3%          |
| Type of study | Correspondent     | 47        | 47.5%          |
|               | Regular           | 52        | 52.5%          |
| Semesters     | 2019 spring       | 51        | 51.5%          |
|               | 2021 spring       | 48        | 48.5%          |

## RESULTS

### Research question 1: impact of demographic data on students' test performance

This question analyzed the relationship between students' performance in the two different types of tests and students' demographics (i.e. gender, major, and type of study). Accordingly, the variables in the analysis are gender (independent variables: male, female), major (independent variable with values representing different majors), type of study (independent variables: correspondent, regular), and performance (dependent and continuous variable, which is measured with students' test score percentages). Before the analysis, the standard assumptions (i.e. normality and homogeneity of variance) were verified and no violations were found. Independent-samples T-tests and One-way Analysis of Variance (ANOVA) test were applied to analyze the impact of demographics on students' test performance. All analyses were conducted with a 95% confidence interval. The corresponding results are presented in *Table 2*.

**Table 2.** Results of Statistical Tests on Students' Performance by Demographics

| Online-based test |    |                 |        |
|-------------------|----|-----------------|--------|
|                   | df | Test statistics | Sig    |
| Gender            | 46 | -1.43           | 0.161  |
| Major             | 46 | 5.386           | 0.007* |
| Type of study     | 46 | 3.72            | <.001* |

  

| Paper-based test |    |                 |        |
|------------------|----|-----------------|--------|
|                  | df | Test statistics | Sig    |
| Gender           | 29 | -2.55           | 0.016* |
| Major            | 29 |                 | 0.841  |

\* The mean difference is significant at the 0.05 level

As can be seen from *Table 2*, there is significant statistical difference in performance according to the gender of students for paper based test ( $p = .016$ ). That is, female students acquired higher scores ( $M = 48.87, SD=4.93$ ) than males ( $M = 28.5, SD=4.95$ ). However, for on-line testing even though female students still have higher scores ( $M = 64.25, SD=4.26$ ) than males ( $M = 53, SD=3.78$ ) this difference is not significant ( $p = .161$ ).

Since correspondence students filled out on-line tests already in 2019, the type of study is not appearing for paper based test, only for on-line test. Corresponding students significantly outperformed regular students ( $p < .001$ ) in the on-line environment ( $M = 70.17, SD=3.01$  vs.  $M = 50.88, SD=3.43$ ).

For paper based tests, although Rural development students achieved higher scores ( $M = 48.76, SD = 3.76$ ), than Horticultural students ( $M = 39.39, SD = 7.13$ ) the difference was not significant. For the effect of major on on-line test scores ANOVA test was conducted, followed by post hoc test of Tukey-Kramer Test with unequal sample size, results of which can be seen in *Table 3*. Highest scores were achieved by students studying Rural development ( $M = 72.46, SD = 1.69$ ), while the lowest score belongs to students of Horticulture ( $M = 50, SD = 2.44$ ) with agricultural students in the middle ( $M = 60.78, SD = 5.68$ ).

**Table 3.** Tukey-Kramer Test with unequal sample size

| Online | KE    | MG    | VF       |
|--------|-------|-------|----------|
| KE     |       | 0.247 | 0.004325 |
| MG     | 2.294 |       | 0.1953   |
| VF     | 4.781 | 2.487 |          |

**Research question 2: difference in students’ test performance between paper based and online-based tests**

In this question it was examined whether students’ final exam scores change according to the type of test. Independent-samples T-test was used to analyze the impact of the type of test on students’ performance. The results are presented in *Table 4*. As results showed, there is a statistically significant difference in students’ grades according to test type ( $t(77) = -4.32, p < .001$ ). Students who took the online-based test ( $M = 60.13, SD = 4.11$ ) have better grades than students who took paper-based tests ( $M = 38.36, SD = 5.85$ ).

**Table 4.** Results of the Independent T-Test on Students’ Performance According to Type of Test

| df | Test statistic | sig.       |
|----|----------------|------------|
| 77 | -4.32          | $p < .001$ |

**DISCUSSION**

The study involved the spring terms of 2019 and 2021. The participants of the study are studying at the Faculty of Horticulture and Rural Development at a state university in Hungary. The participants enrolled in the accounting course as a second-year requirement course of their faculty. This study aimed to analyze undergraduate students’ performances in online and paper-based tests. The effect of demographics on student performances was investigated within the first research question. As the first result of the study, I found that gender had no effect on student performance on online tests, but it did on paper-based

tests. Previous researchers have found that female and male students did not differ significantly in their performance on different test types (BRALLIER ET AL., 2015).

The second result has shown that corresponding students significantly outperformed regular students in the on-line environment, perhaps because they have had previous experience with this type of testing.

The third result of the study demonstrated that performance differs according to the students' major. That is, students in the Rural development program generally performed better in both test types when compared to the ones in the Horticultural or Agricultural program.

The second research question was meant to find out whether there is significant difference in students' performance between online-based and paper based tests. The study demonstrated that students had better performance in online tests with respect to paper-based tests. This result is similar to the finding of ILGAZ & ADANIR (2019).

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