

# Effect of CR Lab Equipment on ARRT Image Acquisition and Evaluation Scores

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## Introduction

The adoption of digital imaging in medical radiography included the addition of new equipment, such as computed radiography (CR). To provide students with the best possible instruction, radiography programs implemented CR equipment into the laboratory settings to enhance the education students were receiving in the clinical setting. This study compared the scores on the imaging acquisition and evaluation portion of the American Registry of Radiologic Technologists (ARRT) national registry examination for two radiography programs in Texas before the implementation of CR equipment and after to determine if the addition of equipment had an impact on student scores.

## Methodology

Archival data of student scores on the imaging acquisition and evaluation portion of the ARRT national registry examination were obtained from a public two-year community college in north central Texas and a medium-size public university in northwest Texas for the years 2006 to 2014.

An independent-sample t test was performed to compare overall pre-equipment scores to overall post-equipment scores for both institutions combined. A second independent-sample t test was calculated to compare the national average of the imaging acquisition and evaluation portion of the exam in pre-equipment and post-equipment date ranges, excluding institution data. Finally, an ANOVA was performed to determine the effect of pre- and post-equipment date ranges on the imaging scores by school. The alpha level of .05 was used to determine statistical significance for all tests.

Subjects were undergraduate radiologic technology students who completed the ARRT national registry examination.

Two independent-sample t-tests were taken to compare the national average of the imaging acquisition and evaluation portion of the exam in pre-equipment and post equipment date ranges.

N= 646 student scores  
252 from the two-year community college  
395 from the university

ANOVA was used to determine the effect of pre-and post-equipment date ranges on the imaging scores by school



## Results

The first independent t-test comparing pre- and post-equipment overall imaging scores demonstrated the addition of CR equipment to the laboratory setting across both schools was a negative result, but was statistically significant ( $p = .000$ ).

The second independent t-test comparing pre- and post-equipment scores to the national average of imaging scores demonstrated an overall decrease of .05 after the addition of CR equipment; however, the decrease was not statistically significant ( $p = .516$ ).

The two-way ANOVA examined the effect of the addition of CR equipment on imaging scores by school. There was a statistically significant interaction between the effect of the addition of CR equipment on imaging scores,  $F(1, 643) = 23.45, p = .000$ , as well as a statistically significant interaction between the effect of the addition of CR equipment by school on imaging scores,  $F(1, 643) = 25.38, p = .000$ . However, there was no statistical significance between schools,  $F(1, 643) = 1.30, p = .254$ . The addition of CR equipment in the laboratory setting demonstrated an overall decline in scores of 0.28. The community college demonstrated a mean slightly higher than the university (.06). The community college also had a slight increase in scores of 0.01 after the addition of CR equipment, while the university had a noteworthy decrease of 0.57.

## Discussion

Possible reasons for a decline in scores include:

- Lack of faculty experience and familiarity with the equipment
- Increased difficulty of the national examination with the addition of digital imaging content
- The paradigm shift in the field was difficult for schools to teach effectively

The lack of decline at the community college might have been because of a difference in students, more knowledgeable faculty, or even better preparation for the registry examination because of smaller cohorts of students.

## Conclusions

The hypothesis was supported by a statistically significant difference in scores following the addition of CR equipment in the laboratory setting. The difference was not expected to be a negative one; however, this suggests a need for further research into the reasons why this occurred, as well as a need for a follow up analysis to see if the decline in scores has continued, or if after faculty members became more familiar and educated on digital imaging, the scores have begun to increase. Additional research comparing other schools' test results from this time period, 2006 -2014, could lead to other conclusions and offer more insight into the impact adding CR equipment had on a regional or national level.