



# Using Interactive Learning Activities to Predict Learning Outcomes in Medical Education

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## INTRODUCTION

The cardio-pulmonary-renal (CPR) course at MU-COM includes, sixteen case-based, interactive learning activities (ILAs) and five examinations (Fig.1). Students' engagement in the ILA is measured by the pre-ILA and post-ILA assessments with a goal of promoting test-enhanced learning. The ILA scores contribute to 5% of the course grade.

The study aims to determine how well student performance in the interactive learning activities (ILAs) correlates with their performance in the course. Another objective is to identify which ILAs have stronger or weaker correlations with the relevant examination grades.

The hypothesis is that the students' level of preparation and their ILA assessment scores positively correlate with their learning outcomes in the CPR course.

## METHOD

The IRB of Marian University exempt approved the study. The study included de-identified grades of 156 DO students enrolled in CPR in 2022. A correlational research design was used to investigate relationships between students' performance in the ILAs and their course examination scores.

A linear regression analysis between the average grades of ILAs and examinations was performed. A detailed correlation of the individual examination grades and their relevant ILA grades was also analyzed.

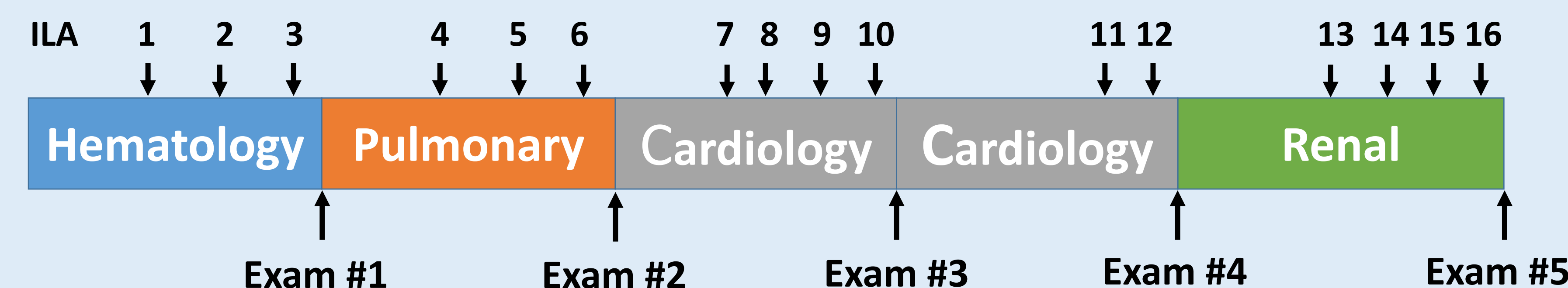


Figure 1: Distribution of ILAs in relationship to Course Content and Exams.

## RESULTS

> Both ILAs assessment score and course examination weighted score are close to normal distribution (Fig 2).

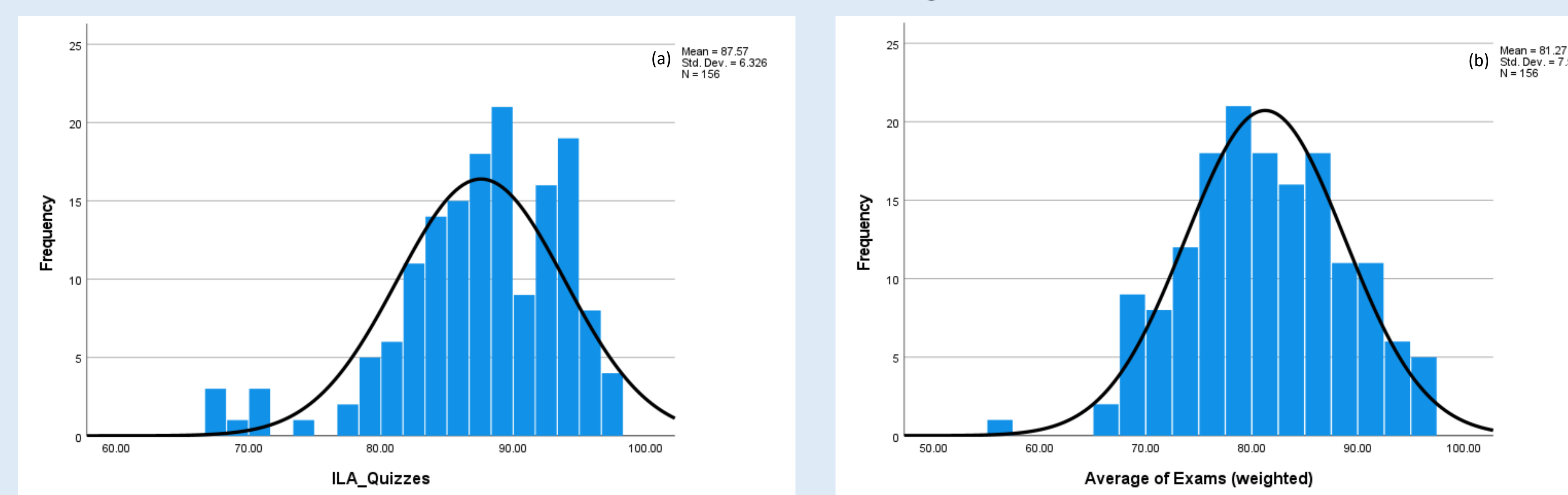


Figure 2: (a) Histogram of ILAs grade distribution. (b) Histogram of weighted total exam grades. Both figures demonstrated that both the independent and dependent variables are close to normal distribution.

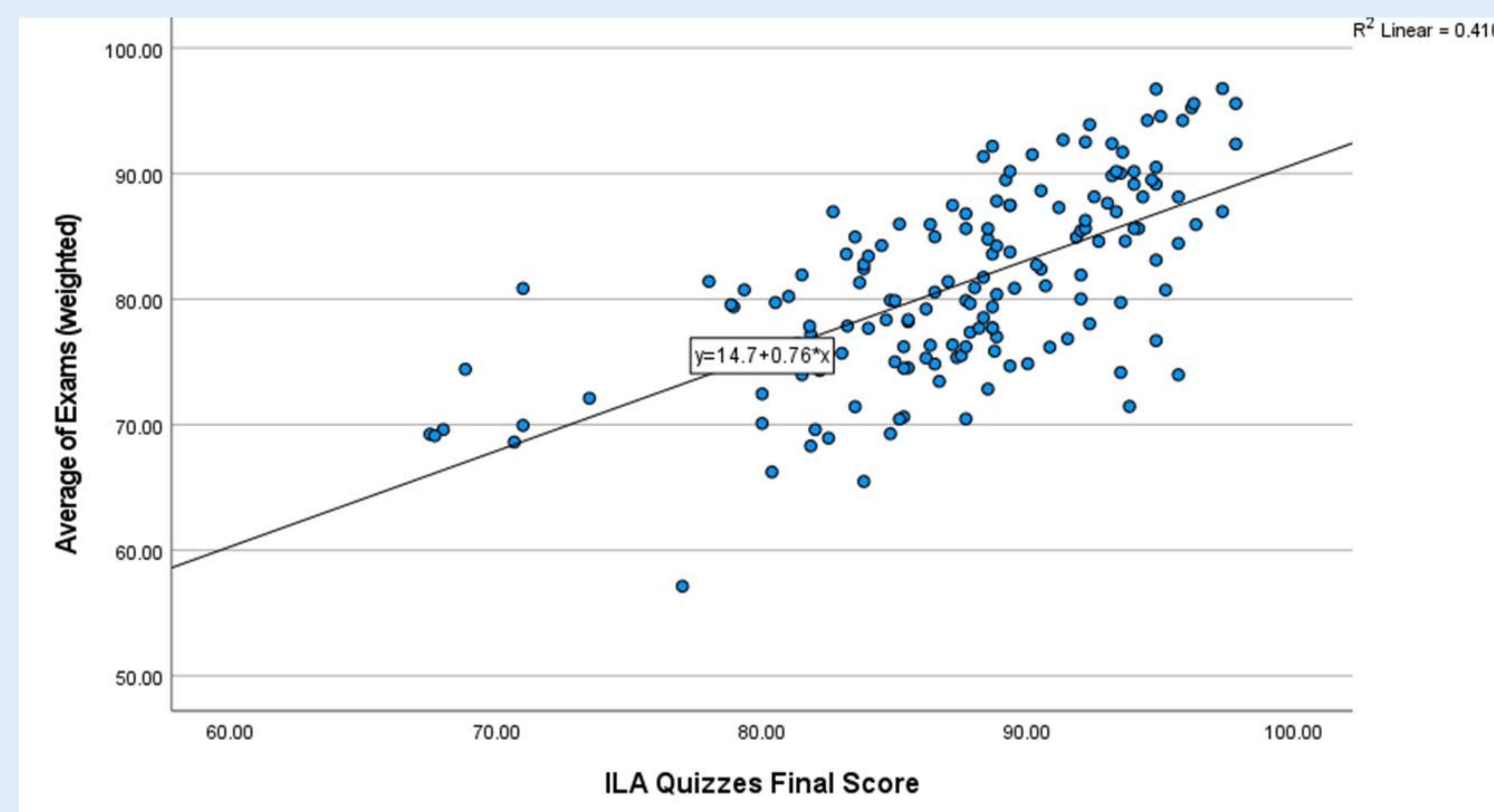


Figure 3: Scatter plot between ILAs and weighted exam grades. Linear regression analysis was used to analyze the correlation.

- A strong positive correlation was observed between the ILA scores and weighted examination scores ( $R = 0.641$ ) (Fig. 3).
- The least square regression equation for prediction is  $y = 14.7 + 0.76 * X$  (Fig. 3).
- Regression analysis of individual examination scores and their related ILA scores revealed variable correlation (Tab. 1).
- Individual ILAs performance correlates the scores of corresponding exam (Tab. 1)

Table 1. Correlation among ILAs and Individual Exam

|             | Exam 1 | Exam 2 | Exam 3 | Exam 4 | Exam 5 |
|-------------|--------|--------|--------|--------|--------|
| Correlation | 0.488  | 0.682  | 0.427  | 0.418  | 0.666  |
| ILA#        | 1-3    | 4-6    | 7-10   | 11-12  | 13-16  |

## DISCUSSION

The study provides evidence on the importance of students' participation and performance in interactive activities.

Results of this study are important given the emphasis placed on interactive classroom activities in the medical curriculum.

A future goal is to provide data-driven feedback to faculty who facilitate the ILAs to facilitate modifications to the instructional and assessment materials.

