

# The initial impact of changing Step 1 grading to Pass/Fail on Medical Student Anxiety, Curiosity and Learning Behaviors



Virginia Tech Carilion  
School of Medicine

Renée J. LeClair, PhD<sup>1</sup>, Andrew P. Binks PhD<sup>1</sup>, Cecilia T. Gambala, MD, MSPH<sup>2</sup>, Judith M. Brenner, MD<sup>3</sup> and Joanne M. Willey PhD<sup>3</sup>

<sup>1</sup> Department of Basic Science Education, Virginia Tech Carilion School of Medicine, <sup>2</sup> Department of Obstetrics and Gynecology, Tulane University School of Medicine, <sup>3</sup> Department of Science Education at the Donald and Barbara Zucker School of Medicine.

## Introduction:

In 2020 the Federation of State Medical Boards (FSMB) and National Board of Medical Examiners (NBME) announced that US Medical Licensing Exam STEP-1 reporting would change from a **3-digit** score to **pass/fail** in 2022. The rationale for doing so was to:

- Reduce the emphasis of STEP-1 scores in residency screening.
- Reduce the impact of the ‘parallel curriculum’.
- Reduce the negative impact on student well-being and learning caused by anxiety surrounding a very high-stakes exam.

As anxiety promotes shallow learning approaches as a coping strategy with the short-term goal of passing assessments, our *hypotheses* were aligned with the intentions of the FSMB and NBME. The grade to pass/fail would:

- Reduce learner anxiety.
- Promote a learning, rather than grade-focused approach.
- Increase learner curiosity
- Promote use of deep learning approaches

## Methods:

Two cohorts of pre-clerkship medical students at 3 medical schools (VTC SOM, Tulane SOM and Zucker SOM) completed a questionnaire prior to taking the last **3-digit** scored Step 1 in 2021 or taking the first **pass/fail** scored Step 1 in 2022.

The questionnaire was comprised of four validated instruments:

- **Short Grit Scale**
- **State-Trait Anxiety Inventory (STA-I)**
- **Interest/Deprivation Type Epistemic Curiosity Scale (I-Curiosity and D-Curiosity)**
- **Revised two-factor Study Process R-SPQ2F).**

Analysis: The responses of the two cohorts (**3-digit** vs. **pass/fail** STEP-1 takers) were compared using non-parametric methods (Mann Whitney U).

To determine which of the measured variables most likely contributed to any observed impact on learning strategies, a multiple regression path analysis was performed.

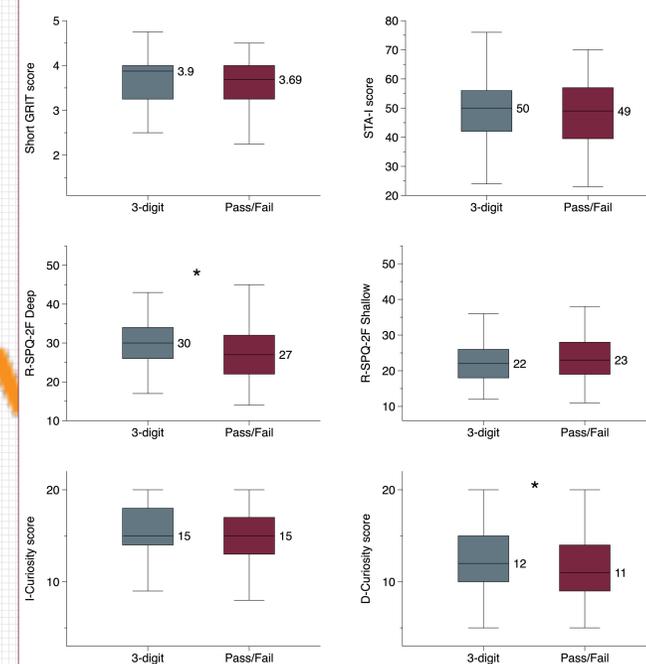
*The study was approved by VT IRB (protocol #21-241) and the approval was accepted by the IRB committees at the other schools.*

## Results:

The responses of the **3-digit** (n=86) and **pass/fail** exam takers (n=154) are shown in Figure 1. There was no difference in grit (p=0.22), anxiety (STA-I scores, p= 0.85), shallow learning strategies (R-SPQ-2F shallow, p = 0.84) or interest curiosity scores (I-Curiosity, p = 0.07).

However, pass/fail exam takers had lower deprivation curiosity scores (D-Curiosity, p = 0.03) and engaged in fewer deep learning strategies (R-SPQ-2F Deep, p = 0.0012).

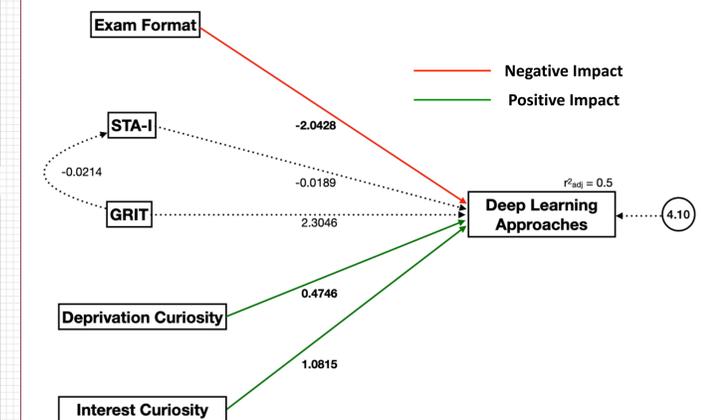
**Figure 1:** Survey responses to the Short Grit, STA-I, R-SPQ-2F and I-D Curiosity scales by medical students about to take 3-digit scored - or pass/fail Step 1 exam. Median values are shown and labelled with interquartile range (boxes) and ranges (whiskers). \* Significant difference (one-tailed, Mann Whitney U)



## Results cont.:

Multiple regression path analysis suggested the change in exam scoring to pass/fail was a major contributor to the decline in deep learning strategies (b = -2.0428, P < 0.05). There was no such relationship for shallow learning strategies.

**Figure 2:** Path diagram of the relationships ( $r^2_{adj} = 0.5$ ) between deep learning approaches and exam format (3-digit or pass/fail), anxiety (STA-I), grit, Deprivation and Interest-curiosity of M2 students (n=240). Significant paths and B coeff. in bold; nonsignificant paths are dashed.



## Summary/Conclusions:

Counter to our hypotheses and the intended outcomes, the initial impact of a Pass/Fail STEP-1 is:

- A decline in learner curiosity
- Reduced use of deep learning approaches
- No change in learner anxiety

We suggest learners may have reprioritizing activities and metrics to improve residency applications and sustained anxiety maybe related to unknown expectations of residency directors.