Measuring the Educational Impact of Overtly Coding Lecture Slides to Learning Objectives: A Continued Analysis Regarding Student-Reported Use

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INTRODUCTION

The Liaison Committee on Medical Education (LCME) standard 6.1 instructs medical schools to ensure that the learning objectives for each required learning experience are made known to all students1. In this study, we assessed the value of exceeding this standard by visually aligning learning objectives with lecture slides to establish a closer association with course material.

This study builds upon two previous satisfaction-focused studies, conducted at the University of Western Australia and WMed, both of which found strong student support for this novel method. In contrast to previous research, our objective was to determine whether this enhanced model correlates with improved outcomes for students who self-reported utilization of learning objectives while preparing for the Foundations of Biomedical Science II (FBSII) exam

METHODS

- Investigators modified 7 lectures in the FBSII course before they were delivered to the class of 2028 (GC2028).
- Changes included the addition of pertinent learning objectives to the bottom left corner of each slide and a summary slide following the lecture which linked learning objectives to their respective slides.
- Students in GC2028 were made aware that learning objectives could be found in the bottom corner of the slide, but not that this was a novel or experimental approach.

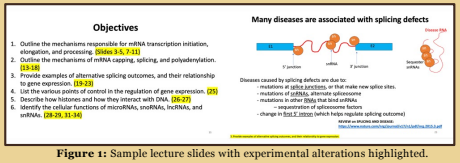

Figure 1: Sample lecture slides with experimental alterations highlighted.

- In a prospective cohort study, post-initiative exam scores for the GC2028 were gathered. 11 test items tagged to altered lectures were analyzed.
- An optional survey with one binary question and four Likert-scale questions and a free-response section was administered via convenience sampling using a REDCap online survey.
- Students who responded to the survey (n = 40) were grouped into two groups "Utilized LOs" and "Did Not Utilize LOs" based on their response to the binary question of the survey.
- Two 2-sample t-tests compared the difficulty between the treatment (Utilized LOs) and control (Did Not Utilize LOs) groups.
- Data was formatted and analyzed using SAS Proprietary Software version 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

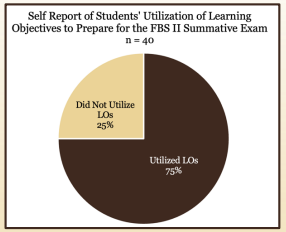

Figure 2: Chart demonstrating student responses to the first question of the optional survey, which inquired whether students used learning objectives to prepare for the FBSII summative exam.

Question	Utilized LOs	Did Not Utilize LOs	P-Value
Q34	26 86.67%	10 100.00%	0.5558
Q39	30 100.00%	10 100.00%	1.0000
Q50	30 100.00%	10 100.00%	1.0000
Q51	16 53.33%	5 50.00%	1.0000
Q56	28 93.33%	9 90.00%	1.0000
Q59	22 73.33%	8 80.00%	1.0000
Q60	28 93.33%	10 100.00%	1.0000
Q61	27 90.00%	8 80.00%	0.5835
Q64	16 53.33%	5 50.00%	1.0000
Q82	21 70.00%	8 80.00%	0.6962
Q84	30 100.00%	10 100.00%	1.0000
Total Correct (Mean, Range)	9.13 (6-11)	9.30 (7-11)	0.9363

Figure 3: Quantitative analysis of test questions tagged to altered slides.

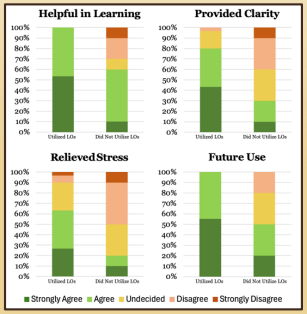

Figure 4: Qualitative analysis of student perception of the novel method.

- T-tests yielded no p-values < 0.05, indicating no statistical difference in test item scores between the groups.
- The survey demonstrated strong student support for the new method, particularly among the cohort of students who reported utilization during this block. Positive responses were noted regarding its helpfulness, clarity of test expectations, and stress reduction.
- Notably, 50% of students who did not utilize LOs to prepare for the FBSII summative exam responded favorably to this method being used in future courses.

STUDENT REFLECTIONS

All reflections included, edited only for clarity.

- "I think this **helps a lot with writing out the learning objectives**"
- "**The learning objectives really help when they are specific and detailed**. When they are too broad and unspecific, they make us more confused on what is important and what isn't."
- "This is **one of the most effective lecture techniques used at WMed**. Every professor should be doing this!"
- "This was honestly one of the most useful things on the slides, **I noticed it every time a lecture did not have this**."
- "In addition to including the LOs, I think it would be helpful to have direct answers to the LOs to clarify not only the topic area to understand, but the big key takeaways."
- "It wasn't in this course but in our current Heme/Onc course, Dr. Larson is writing small summaries that go along with the LOs which are more helpful."
- "If the learning objectives were more specific and granular they would be more beneficial. Vague learning objectives put more stress because we cannot be sure if we are learning what the lecturer intended."
- "I personally have never once looked at the learning objectives. There are often an overwhelming amount to look at, and I've found it isn't worth my time, since why would we be given information that isn't important."

CONCLUSION

While quantitative analysis of student performance lacked statistical significance, both compelling student satisfaction and non-inferiority of the approach suggest the value of further exploration and utilization of this method.

ACKNOWLEDGEMENT

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REFERENCES

1.Association of American Medical Colleges, Liaison Committee on Medical Education. Functions and structure of a medical school: standards for accreditation of medical education programs leading to the MD degree. Liaison Committee on Medical Education; November 2023. https://lcme.org/wp-content/uploads/2023/11/2024-25-Functions-and-Structure_2023-11-15.docx
2.Boyatzis, Amber E., et al. "Enhancing early tertiary students' education: A novel lecture learning objectives strategy." *Medical Science Educator*, vol. 32, no. 1, 9 Jan. 2022, pp. 21–25, https://doi.org/10.1007/s40670-021-01488-4.