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Kathleen Klein
Stockton University

Jennifer Calabrese
Stockton University

Adam Aguiar
Stockton University

Sunny Mathew
Stockton University

Kimoni Ajani
Stockton University
Stockton University additional works at: <https://digitalcommons.usu.edu/jete>

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Evaluating Active Lecture and Traditional Lecture in Higher Education

Authors

Kathleen Klein, Jennifer Calabrese, Adam Aguiar, Sunny Mathew, Kimoni Ajani, Rania Almajid, and Jennifer Aarons

EVALUATING ACTIVE LECTURE AND TRADITIONAL LECTURE IN HIGHER EDUCATION

Kathleen Klein; Jennifer Calabrese, OTD; Adam Aguiar, Ph.D.; Sunny Mathew, Ph.D.; Kimoni Ajani, Ph.D.; Rania Almajid, Ph.D.; and Jennifer Aarons, Ed.D.

Abstract

The purpose of this study was to evaluate the effectiveness of traditional and active lecture methods in higher-education courses. A multiple group convergent parallel mixed method design was used, with measurement of learning, attention, and student preference for active or traditional lecture methods. Six faculty at a public university in the northeast region of the United States engaged 178 undergraduate and graduate students in a traditional lecture session and an active lecture session during the Spring 2022 semester. Results indicated effectiveness of active and traditional lecture approaches ($p < .05$). Analysis of qualitative and quantitative data in the study provides additional information regarding student preference for active lecture based on perceptions of increased learning benefits, interaction/engagement, attention, activities, discussion, and the use of multimedia. In implementing both traditional and active lecture sessions this study employed pre-lecture and post-lecture quizzes that students found to be very beneficial to learning.

Keywords: active lecture, traditional lecture, active learning, student engagement

Introduction

Lecture, as a teaching method, remains one of the most common and enduring course delivery methods in higher education (Deslauriers et al., 2011; Henderson & Dancy, 2007; Sadeghi et al., 2014; Schmidt et al., 2015; Stains et al., 2018). Active lecture is a teaching method based on a student-centered approach that encourages student engagement, interaction, and participation during lectures. Traditional lecture is a passive approach where students listen without active engagement or significant participation. In higher education, the use of active lecture has numerous benefits compared to traditional lecture (Freeman et al., 2014; Kay et al., 2019; McCullough & Munro, 2018; Murphy et al., 2021).

One major advantage of active lecture is increased student engagement and participation (Bradford et al., 2016; Bidadi et al., 2016). With active involvement in the learning process, students are more likely to experience increased understanding and retention of course content. Active lectures encourage students to think critically, ask questions, and participate in discussions in a manner that more fully engages students with the subject matter (Chi & Wylie, 2014; Connell et al., 2016; Freeman et al., 2014; Silva et al., 2022; Yarmohammadi et al., 2023). Active lecture also promotes the development of important skills such as teamwork, communication, and problem-solving (Farashahi & Tajeddin, 2018; Knight & Wood, 2005). Group activities and discussions may be incorporated into active lectures, providing students the opportunity to work together and develop communication skills. Another benefit of active lecture is the reduction of the achievement gap between students as active lecture provides equity opportunities, encouraging all students to participate and engage in the learning process, regardless of background or prior knowledge (Clark, 2023; Haak et al., 2011; Theobald et al., 2020).

In contrast, traditional lectures draw criticism for focusing on the instructor instead of the student. It may be difficult for students to stay engaged and focused during a long lecture, resulting in a struggle to retain information (Alaagib et al., 2019; Sudarmika et al., 2020; Zeng et al., 2020). Traditional lecture relies heavily on memorization rather than critical thinking and problem-solving skills (Schmidt et al., 2015). In a meta-analysis study conducted by Freeman et al. (2014), it was observed that students in traditional lecture courses were more likely to fail compared to students in active lecture courses. Traditional lectures remain a convenient method for delivering vast amounts of information and may be well received when presented by an engaging lecturer in a systematic and organized manner (Kay et al., 2019).

While traditional lecture is a common approach to teaching in higher education, active lecture is shown to be more effective in promoting student engagement, participation, and learning (Deslauriers et al., 2011; Freeman et al., 2014; Kay et al., 2019; Murphy et al., 2021). By incorporating active lectures, educators help students master course content, develop important skills, promote equity in the classroom, and improve overall learning outcomes.

This study was designed to apply and evaluate the existing literature findings. The faculty researchers were curious about assessing the impact of active lectures compared to traditional lectures with graduate and undergraduate students in their classrooms. The systematic evaluation of active and traditional lecture methods serves several purposes, all of which contribute to understanding the influence of lecture teaching methods on learning outcomes.

The specific objectives of this mixed-methods research study include:

- Determining if active and traditional lecture methods contribute to improved learning outcomes, as measured by knowledge retention quizzes and student perceptions.
- Investigating whether active lectures increase student attention and participation compared to traditional lectures, indicating heightened student engagement and motivation.
- Assessing students' preference for active and traditional lecture methods.

In addition to these study objectives, the faculty researchers were eager to evaluate the effectiveness of their personal classroom lecture approaches and to acquire skills related to the scholarship of teaching and learning. Faculty were interested in determining the generalizability of research literature findings to different subject areas and student demographics. This study served as part of a continuous improvement process, highlighting best practices and areas for enhancement. The investigation of these two lecture methods allowed faculty to consider aligning their teaching strategies with specific student learning outcomes based on analysis of the impact of the lecture method in the classroom.

Method

Participants

Participants were 178 undergraduate and graduate students attending a public university in the northeast region of the United States. As indicated in Table 1, two courses were graduate courses, representing 58 of the 178 students in the study. The other four courses were undergraduate courses, with 120 undergraduate students participating in the study. Student participation in the study was voluntary. Students were enrolled in at least one of six participating courses in Spring 2022, as indicated in Table 1.

Table 1. Student Participants

Course Subject	Number of Students	Level
Afrikan Studies	35	undergraduate
Biology	22	undergraduate
Hospitality	12	undergraduate
Occupational Therapy	28	graduate
Physical Therapy	30	graduate
Social Work	51	undergraduate

All participants provided consent and were clearly informed that participation in this research study had no impact on the course grade. In accordance with ethical guidelines, this study received approval from the University's Institutional Review Board (IRB) under protocol number 2022-025.

Research Design

A multiple group convergent parallel mixed method design was used to compare traditional and active lecture approaches. In this approach, quantitative and qualitative data are analyzed with analysis merged into a singular interpretation. This design permits enhanced understanding of quantitative data based on qualitative findings (Creswell & Plano Clark, 2011).

The research questions addressed for this study are (1) To what extent does active lecturing impact student learning compared to traditional lecturing? and (2) Does active lecturing increase student engagement as measured by students' self-reported perceptions?

Students enrolled in one of six courses taught by six different faculty members were provided with a class session that involved traditional lecture and a separate class session that involved active lecture as defined in a protocol developed for the study and submitted as part of the IRB process. The protocol provided specific information for faculty to employ active and traditional lectures in the classroom. Prior to implementing the lectures, the faculty involved in this study were grouped into pairs. Each pair reviewed their planned active and traditional lectures prior to lecture delivery to ensure fidelity to the definition of active and traditional lecturing.

For this study, a traditional lecture is course content delivered via instructor's spoken word and didactic feedback restricted to answering student questions only. An active lecture for this research study is defined by Kay et al. (2019) as a "...student-centered approach where instructors and students collaborate, engage and interact with course content" (p. 449). Specifically, Freeman et al. (2014) described active lecture as an experience that "engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work" (p. 8413-14). Faculty members in this study determined an appropriate class session in their Spring 2022 course for each lecture approach with consideration of making the content challenge level equivalent between the two course sessions.

Both traditional and active lectures presented students with clear learning objectives/outcomes and reviews to ensure that students had sufficient knowledge or skills necessary to succeed in mastering the course content. The active lectures presented students with materials/activities designed to promote active learning, suitable technology to facilitate continual engagement and interaction, and/or supplementary materials for student-focused active learning (Freeman et al., 2014; Pickering & Roberts, 2018; Kay et al., 2019).

In this study, each faculty selected active learning activities best suited to the specific class session. Active learning activities included small group work, think-pair-share activities, polling, worksheets, case studies, jigsaw, YouTube video activities, and discussions. Faculty engaged with student groups/pairs during the activities to facilitate student learning and utilized questioning/polling and other interactive methods to assess student understanding of concepts and provide real-time feedback to correct any errors when learning course content.

Participating faculty formed partner groups allowing a faculty partner to review planned lectures, course content, and quizzes to determine whether lecture, course activities, and pre-lecture and post-lecture quizzes met study criteria before delivering the active or traditional lecture session. This process helped to determine that course content and quizzes used in the various courses and lecture methods were as equivalent as possible. If additional guidance on fidelity was desired, the faculty contacted the primary investigator for clarification. In three courses (50%), the traditional lecture session preceded the active lecture session during the semester. In the other three courses, the active lecture session preceded the traditional lecture session. Although complete control of confounding variables was not possible, careful matching of content within each course and appropriate statistical analysis was implemented to enhance the validity of the findings of this study.

Instruments

Quantitative and qualitative student data was collected after each active lecture and traditional lecture course session with a Qualtrics survey developed by the researchers. The survey was completed anonymously by students immediately following the session. The survey questions are listed below.

Qualtrics Survey Questions

1. IRB-approved text statement providing informed consent.
2. Did today's lecture help you to learn and understand the course content presented?
3. How did the lecture help you learn the content? What specifically was the strength of this lecture?
4. What specifically prevented you from learning content during this lecture?
5. Did the lecture maintain your attention during the class?
 - a. If YES, how did the lecture help?
 - b. If NO, why not?
6. I would prefer ___ percent (%) of our classes to use today's lecture method. 0=none of our classes; 100=all our classes
7. Please suggest activities that would increase your learning and participation in this class.
8. Please include any additional comments/suggestions regarding lectures like the one in today's class.

Student learning of course content was measured with an eight to eleven-question pre-lecture and post-lecture quiz developed and administered by each course faculty member. The quiz grades did not impact the student's grade in five of six courses. In one course, lecture quizzes were scored activities and the scoring did not change when the quiz was used for the study. Mean quiz scores were compared to measure student mastery of course content (learning).

Results

Learning Quizzes

Pre-lecture and post-lecture quizzes were used to assess student learning of course content. Any change in student quiz scores from before the lecture to after the lecture was used to measure student learning of course content. The quiz scores were assessed with paired t -tests. Statistical analysis indicates students' learning of course content increased in both active and traditional lectures.

A paired t -test was conducted to compare the mean quiz scores before ($M = 54.11$, $SD = 25.83$) and after ($M = 72.55$, $SD = 22.25$) active lecture classroom sessions. The results showed a statistically significant increase in quiz scores following the active lecture, $t = -11.27$, $p = .000$, $d = 0.51$, indicating a medium effect size. The standard deviation of the differences between paired observations was 21.38. Likewise, the paired t -test conducted to compare the mean quiz scores before ($M = 42.21$, $SD = 19.28$) and after ($M = 67.17$, $SD = 24.02$) traditional lecture classroom sessions showed a statistically significant increase in quiz scores following the traditional lecture, $t = -11.86$, $p = .000$, $d = 0.4$, indicating a small to medium effect size. The standard deviation of the differences between paired observations was 26.98.

The analysis of learning measured by pre-lecture and post-lecture quizzes indicates that student learning increased with both traditional and active lectures. However, the effect sizes suggest that the improvement was moderate for active lectures and smaller for traditional lectures. In the active lecture quizzes, the standard deviation of 21.38 suggests some variability in the improvement of students' quiz scores after the lecture. In the traditional lecture quizzes, the standard deviation of 26.98 indicates a slightly higher level of variability, suggesting that quiz score improvements varied more among students in traditional lecture sessions.

The researchers opted for a multiple-group convergent parallel mixed-method design, which facilitates the analysis of quantitative data in tandem with qualitative survey findings, as outlined by Creswell and Plano Clark (2011). This approach enables exploration of the student learning experience in active lecture classes compared to traditional lecture classes, going beyond the limits of relying solely on analysis of quiz scores.

Survey

Students anonymously completed a Qualtrics survey after active learning class sessions ($n=178$) and again after traditional lecture class sessions ($n=177$). The survey provided quantitative and qualitative data to be analyzed concurrently to assist the researchers with a unified interpretation of data regarding the student learning experience during active or traditional lectures.

Survey responses regarding students' perceptions of learning course content and maintaining attention are summarized in Table 2. A higher percentage of students reported learning more from active lectures (94%) compared to traditional lectures (85%). The 9% difference suggests that active lectures were perceived as slightly more effective in terms of content learning. When reporting on attention levels, which are associated with engagement and motivation (Gamo, 2022), a significantly higher percentage of students felt more attentive during active lectures (93%) compared to traditional lectures (69%). The 24% difference suggests that active lectures were more successful in maintaining student attention.

Table 2. Summary of Student Yes/No Responses to Survey Questions 2 & 5
Question 2 (Q2). Did today's lecture help you to learn and understand the course content presented?
Question 5 (Q5). Did the lecture maintain your attention during class?

Student Response	Q2 Number of respondents	Q2 Percentage of respondents	Q5 Number of respondents	Q5 Percentage of respondents
Active Lecture				
2 – Yes	167	94%	154	93%
1 – No	11	6%	11	7%
No Answer	0		13	
Total	178	100%	178	100%
Traditional Lecture				
2 – Yes	151	85%	105	69%
1 – No	26	15%	47	31%
No Answer	0		25	
Total	177	100%	177	100%

A chi-square test for independence was conducted to examine the relationship between student perception of effectiveness (learning course content and maintaining attention) and active lecture. The results revealed a significant association between effectiveness and active lecturing, $\chi^2(1, N = 178) = 16.87, p < 0.0001$. These results indicate a statistically significant association between student perception of the course's effectiveness in learning content and maintaining attention during active lecturing.

A chi-square test for independence was conducted to examine the relationship between student perception of effectiveness (learning subject material and maintaining attention) and traditional lecture. The results revealed a significant association between effectiveness and traditional lecturing, $\chi^2(1, N = 177) = 35.32, p < 0.0001$. The chi-square test found a significant association between students' perceptions of the effectiveness of traditional lectures in terms of learning subject material and maintaining attention.

The results of the chi-square analysis suggest that students perceive their learning as effective, irrespective of the lecture method. The choice of teaching method (active or traditional lecturing) may impact students' perceptions of the course's effectiveness, highlighting the importance of considering student feedback and preferences when selecting the most suitable lecture approach.

The quantitative comparison of quiz scores and analysis of student survey data presented so far offer support for active and traditional lectures, with students indicating higher levels of attention during active lectures and a slight perception of increased learning during active lectures. Additional interpretation of the quantitative data is aligned to the qualitative findings from student surveys. The researchers note that these findings are based on students' self-reported perceptions of their learning and attention and these perceptions may be influenced by various factors, including personal preferences and biases.

In evaluating how often students would prefer active versus traditional lecture sessions as a specific percentage of a course, students reported a preference for a larger portion of active lecture compared to traditional lecture, as indicated in Table 3. Student survey mean responses provided in Table 3 indicate a preference for a larger percentage of the class to incorporate an active lecture method (71%) compared to traditional lecture (51%).

Table 3. Summary of Student Responses to Survey Question 6

Question 6 (Q6). I would prefer_percent (%) of our classes to use today's lecture method 0=none of our classes; 100=all of our classes

Student Response	Q6 Mean	Q6 Range
Active Lecture	71	64-98
Traditional Lecture	51	12-77

The mean preference score for active lectures is higher than that for traditional lectures (71% vs. 51%). Many students indicate a preference for active lectures, which consist of interactive and engaged learning. The wide range of preferences indicated in Table 3 suggests that there is significant variability among students in terms of their preferences for instructional lecture methods. These findings, along with empirical evidence, suggest that incorporating active learning strategies aligns with student preferences. In doing so, faculty recognize that student preferences may be influenced by various factors, including their prior experiences, learning styles, and the content of a specific course.

Qualitative Data for Traditional Lectures.

In the analysis of qualitative data pertaining to traditional lectures, we aimed to complement the quantitative findings with a deeper understanding of student preferences. Among the 151 students (85%) who responded positively to the effectiveness of traditional lectures in aiding their learning of course content (as indicated in Table 2), we selectively examined survey questions three and four. These questions allowed students to elaborate on the strengths (question three) or weaknesses (question four) of the traditional lecture method. Of the respondents, 150 students representing all six courses provided additional comments, shedding light on the perceived strengths of traditional lectures.

One prominent theme identified was the value of quizzes in enhancing the learning experience. Many students expressed appreciation for the pre-lecture quiz, which provided a basic overview of what to expect and helped them focus on specific areas during the lecture. Furthermore, the process of taking both pre- and post-lecture quizzes was seen as effective in assessing knowledge and reinforcing learning. Reiteration of key points and clear definitions within the pre-lecture quizzes contributed to a better understanding of the content. Interestingly, some students even noted that the presence of quizzes, including knowledge of a post lecture quiz, helped maintain their attention during the lecture.

Another strength frequently highlighted was the structured learning aided by well-organized PowerPoint presentation slides. Students found these slides instrumental in systematically presenting lecture content. Visual aids, such as pictures, diagrams, and charts, were considered helpful for illustrating complex concepts and enhancing comprehension. Additionally, the incorporation of real-life examples, historical context, and statistical data within traditional lectures facilitated students in relating to and understanding the subject matter.

Furthermore, traditional lectures were praised for their clear, understandable, and detailed presentation style. Students appreciated lectures that were concise, well-organized, and focused on key points, as they found it easier to grasp information in such formats. Lectures that delved into topics with depth and provided comprehensive information were also valued for their thoroughness and detailed explanations. Some students found value in the passive learning style that traditional lectures offered, where they could receive information without excessive interaction.

However, it is important to acknowledge that not all students perceived traditional lectures as effective. In three out of the six courses examined, 25 students provided comments indicating that the traditional lecture format did not support their learning of the course content. These students reported difficulties related to engagement, maintaining attention, and information overload. Terms like “monotonous,” “boring/dry,” and “not engaging” were used to describe the lecture experience. A lack of variation in presentation style, faculty engagement, and student participation in discussions or

interactive activities contributed to students deeming traditional lectures as ineffective for their learning. Additionally, challenges with notetaking and maintaining attention hindered their understanding of lecture content. These qualitative insights provide a comprehensive view of the strengths and weaknesses associated with traditional lecture methods.

Qualitative Data for Active Lectures.

In the analysis of qualitative data related to active lectures, we aimed to gain a deeper insight into student preferences, aligning these qualitative findings with the quantitative results. As shown in Table 2, a significant majority of students (94%, or 167 students) reported that active lecturing positively contributed to their learning of course content. To further explore the reasons behind this perception, we selectively examined survey questions three and four, which allowed students to elaborate on the strengths (question three) or weaknesses (question four) of the active lecture method. Among the respondents, 87% (154 students) from all six courses provided comments to indicate the strengths and weaknesses of active lectures.

One prominent theme emerging from the analysis was the value of cooperative group learning and peer interaction during active lectures. Students expressed appreciation for the opportunities to collaborate with their peers and engage in discussions related to course content. Comments such as “I like to hear my peers’ point of view, or what they thought about the text that we were assigned. I like to compare “key takeaways” and find out if we focused on the same aspects” highlighted the perceived benefits of group learning. Peer interaction and the exchange of perspectives were seen as valuable aspects of active lectures, enhancing students’ learning, and benefiting from the insights of both faculty and peers.

Furthermore, many students emphasized the beneficial contributions of quizzes, both before and after the lecture. They found these quizzes valuable for maintaining focus and retaining the course content covered in the lecture. Comments such as “This lecture helped me learn because the pretest had me thinking about the material that I did not know then when we were lecturing I understood the correct answers to the questions on the pretest and the post-test reinforced my learning/knowledge” expressed student appreciation for the quizzes. It is noteworthy that almost 25% of student survey responses specifically noted the value of quiz administration in enhancing attention and knowledge retention, even though quizzing was not an inherent feature of active or traditional lectures.

Another important theme highlighted the significance of interactive elements within active lectures. Students reported that class activities and student participation were highly effective in maintaining attention, focus, and enhancing knowledge retention. Incorporating questions, polling, learning activities, in-class projects, and discussions during the active lecture encouraged active involvement in the learning process, which students believed increased their attention and overall learning.

The analysis also emphasized the effectiveness of a variety of active learning strategies employed in active lectures. These methods were commended for making lectures more engaging and memorable. Students expressed appreciation for well-designed active lectures, which included multimedia materials, personal stories, and engaging examples of course content. They found these elements helpful in breaking down complex information and aiding comprehension. Moreover, students praised the clear connection between course content and its real-world relevance in active lectures, which added depth to their learning and made the content more meaningful.

However, it is important to acknowledge that, in some cases, a few students did not find active lectures effective for their learning. In three of the six courses assessed, one student in each course indicated that the active lecture was not useful but did not provide specific comments. In one course, nine students (18%) reported that the active lecture was not useful, with seven students providing brief comments. Two of the comments identified perceived ineffectiveness of the active lecture in conveying information. One student stated a preference for traditional lectures. Other students expressed confusion about group work, finding it challenging to understand the work assigned.

The results section presents a thorough examination of the study's findings, employing quantitative and qualitative measures to evaluate active and traditional lecture methods. The analysis of quiz scores demonstrates that active and traditional methods led to increased student learning, with active lectures yielding a moderate improvement and traditional lectures a slightly smaller one. Student surveys reveal a preference for active lectures due to their engagement and ability to maintain attention, group interactions, and presentation interactive elements. It is noted that students found value in well-organized traditional lectures as familiar, organized, and presenting information systematically. Of special interest are student comments related to the benefits of pre-lecture and post-lecture quizzes that were related to the study and not representative of traditional or active lectures. The study underscores the importance of considering student feedback and preferences when selecting lecture methods and the need to further investigate aspects of lecture methods and knowledge assessment measured by quizzing.

Implications for Future Research

The results of this study should be considered in the context of several limitations, including the generalizability of students representing a diverse range of educational levels from a variety of academic fields of study at one public university. The higher-order creativity and skills required in graduate professional courses, as well as the understanding and comprehension expected in foundational courses, may have impacted the study outcomes (Venton et al., 2021).

Additional limitations include non-standardized researcher-generated surveys and quizzes. Future studies could incorporate more objective measures of learning. Limited student comments indicate that changing student expectations when instructors deviated from more familiar teaching methods may have influenced student responses when the instructors offered a traditional lecture and active lecture session for this study. Likewise, activities and approaches to traditional and active lectures were not standardized, although a protocol and peer review provided guidelines for the lecture methods.

This study suggests several avenues for further research within the context of lecture approaches in higher education. There is a need for ongoing longitudinal studies to assess the enduring effects of various lecture methods on student learning and engagement (Gamo, 2022). Such longitudinal studies could prove valuable in identifying shifts in student characteristics and evolving learning preferences over time. Also, future research may aim to evaluate the influence of instructor characteristics on the effective delivery of traditional and active lectures. Given that lecture methods have been a subject of scholarly investigation for many years, researchers may use this study's findings to advance our comprehension of lecture method effectiveness in higher education. Notably, this study reveals students' appreciation for pre-lecture and post-lecture quizzes as tools that enhance focus on lecture content and facilitate self-assessment of learning. This presents an intriguing potential area for future research exploration.

Conclusion

This study delved into the comparative effectiveness of active and traditional lecture approaches in higher education, shedding light on their impact on student learning and engagement. Active lecture, characterized by its student-centered approach and emphasis on engagement and interaction, was found to offer some advantages over traditional lecture methods. The significant benefits of active lectures described in the literature and confirmed by students in this study include increased attention and engagement, a stronger preference for active lectures compared to traditional lectures, and increased learning as measured by student report and the slightly larger effect size in pre-lecture and post-lecture

quizzes. Active lecture group activities, discussions, and other activities that promoted peer interaction were valued by students.

In contrast, traditional lectures, while convenient for delivering vast amounts of information, were critiqued by students for their potential to disengage students and faculty. Students reported struggling to maintain focus during traditional lectures, resulting in decreased information retention. Student comments indicate information overload and boredom during traditional lectures. In this study, student scores increased from pre-lecture to post-lecture quizzing. Chi-square analysis indicated effective learning (maintaining attention and learning subject material) irrespective of the lecture method. Empirical evidence indicates that students in traditional lecture courses are more likely to experience failure compared to their counterparts in active lecture courses.

This study indicates that students perceive traditional lectures to be valuable when presented systematically and engagingly by instructors. Clear organization, visual aids, and well-defined objectives contributed to making traditional lectures more effective. Nevertheless, the overall findings suggested that active lectures held an advantage in terms of promoting student engagement, attention, and learning gains measured by pre-lecture and post-lecture quizzes.

The study's objectives encompassed assessing the impact of lecture methods on learning outcomes, investigating student engagement and preferences, and contributing to faculty's ongoing improvement in teaching practices. It revealed that students tended to learn more effectively in active lecture settings and perceived higher levels of attention and engagement during these sessions. Furthermore, students expressed a preference for incorporating active lectures in a higher proportion of their courses.

The multiple group convergent parallel mixed method research design enabled a comprehensive exploration of both quantitative quiz score data and qualitative student survey responses. While the quiz scores confirmed the positive impact of both active and traditional lectures on student learning, the survey responses illuminated the nuances of student experiences and preferences.

However, this study does have limitations, including the non-standardized nature of the surveys and quizzes, the specificity of the university and its student demographics, and potential student bias due to deviations from familiar teaching methods. Future research in this area could benefit from more standardized measures, larger and more diverse participant pools, and a deeper exploration of the impact of instructor characteristics on lecture effectiveness.

In conclusion, this study describes the value of incorporating active lectures in higher education settings and offers insight on student perceived benefits of active and traditional lectures. It offers valuable insights regarding the influence of lecture methods on student learning and attention, highlighting the need for continued exploration in this area and the potential for enhancing teaching practices to align with student preferences and improve overall learning outcomes.

References

- Alaagib, N. A., Musa, O. A., & Saeed, A. M. (2019). Comparison of the effectiveness of lectures based on problems and traditional lectures in physiology teaching in Sudan. *BMC Medical Education*, *19*(1), 365. <https://doi.org/10.1186/s12909-019-1799-0>
- Bidadi, N.S, Isfahani, A. N., Rouhollahi, A., & Khalili, R. (2016). Effective teaching methods in higher education: Requirements and barriers. *Journal of Advances in Medical Education & Professionalism*, *4*(4), 170–178.
- Bradford, J., Mowder, D., & Bohte, J. (2016). You can lead students to water, but you can't make them think: An assessment of student engagement and learning through student-centered teaching. *Journal of the Scholarship of Teaching and Learning*, *16*(4). <https://doi.org/10.14434/josotl.v16i4.20106>
- Chi, M. T. H., & Wylie, R. (2014). The ICAP framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist*, *49*(4), 219–243. <https://doi.org/10.1080/00461520.2014.965823>

- Clark, T. M. (2023). Narrowing achievement gaps in general chemistry courses with and without in-class active learning. *Journal of Chemical Education*, 100(4), 1494–1504. <https://doi.org/10.1021/acs.jchemed.2c00973>
- Connell, G. L., Donovan, D. A., & Chambers, T. G. (2016). Increasing the use of student-centered pedagogies from moderate to high improves student learning and attitudes about biology. *CBE—Life Sciences Education*, 15(1), ar3. <https://doi.org/10.1187/cbe.15-03-0062>
- Cresswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. (Second ed.). SAGE Publications.
- Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class. *Science*, 332(6031), 862–864.
- Farashahi, M., & Tajeddin, M. (2018). Effectiveness of teaching methods in business education: A comparison study on the learning outcomes of lectures, case studies and simulations. *The International Journal of Management Education*, 16(1), 131-142. <https://doi.org/10.1016/j.ijme.2018.01.003>
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410–8415. <https://doi.org/10.1073/pnas.1319030111>
- Gamo, J. A. (2022). Anatomy education-paradigm shift from passive to active learning-effects on student engagement, comprehension and retention a review of literature from 2012 to 2022. *The FASEB Journal*, 36(S1). <https://doi.org/10.1096/fasebj.2022.36.S1.L7949>
- Haak, D. C., HilleRisLambers, J., Pitre, E., & Freeman, S. (2011). Increased structure and active learning reduce the achievement gap in introductory biology. *Science*, 332(6034), 1213–1216. <https://doi.org/10.1126/science.1204820>
- Henderson, C., & Dancy, M. H. (2007). Barriers to the use of research-based instructional strategies: The influence of both individual and situational characteristics. *Physical Review Special Topics – Physics Education Research*, 3(2), 020102. <https://doi.org/10.1103/PhysRevSTPER.3.020102>
- Kay, R., MacDonald, T., & DiGiuseppe, M. (2019). A comparison of lecture-based, active, and flipped classroom teaching approaches in higher education. *Journal of Computing in Higher Education*, 31(3), 449–471. <https://doi.org/10.1007/s12528-018-9197-x>
- Knight, J. K., & Wood, W. B. (2005). Teaching more by lecturing less. *Cell Biology Education*, 4(4), 298–310. <https://doi.org/10.1187/05-06-0082>
- McCullough, K., & Munro, N. (2018). Finance students' experiences of lecture-based active learning tasks. *Innovations in Education and Teaching International*, 55(1), 65–73. <https://doi.org/10.1080/14703297.2016.1189843>
- Murphy, L., Eduljee, N. B., & Croteau, K. (2021). Teacher-centered versus student-centered teaching: Preferences and differences across academic majors. *Journal of Effective Teaching in Higher Education*, 4(1). <https://doi.org/10.36021/jethe.v4i1.156>
- Pickering, J. D., & Roberts, D. J. H. (2018). Flipped classroom or an active lecture? *Clinical Anatomy*, 31(1), 118–121. <https://doi.org/10.1002/ca.22983>
- Sadeghi, R., Sedaghat, M. M., & Ahmadi, F.S. (2014). Comparison of the effect of lecture and blended teaching methods on students' learning and satisfaction. *Journal of Advances in Medical Education & Professionalism*, 2(4), 146–150.
- Schmidt, H. G., Wagener, S. L., Smeets, G. A. C. M., Keemink, L. M., & van der Molen, H. T. (2015). On the use and misuse of lectures in higher education. *Health Professions Education*, 1(1), 12–18. <https://doi.org/10.1016/j.hpe.2015.11.010>
- Silva, H., Lopes, J., Dominguez, C., & Morais, E. (2022). Lecture, cooperative learning and concept mapping: Any differences on critical and creative thinking development? *International Journal of Instruction*, 15(1), 765–780.
- Stains, M., Harshman, J., Barker, M. K., Chasteen, S. V., Cole, R., DeChenne-Peters, S. E., Eagan, M. K., Esson, J. M., Knight, J. K., Laski, F. A., Levis-Fitzgerald, M., Lee, C. J., Lo, S. M., McDonnell, L. M., McKay, T. A., Michelotti, N.,

- Musgrove, A., Palmer, M. S., Plank, K. M., ... Young, A. M. (2018). Anatomy of STEM teaching in North American universities. *Science*, 359(6383), 1468–1470. <https://doi.org/10.1126/science.aap8892>
- Sudarmika, P., Santyasa, I. W., & Divayana, D. G. H. (2020). Comparison between group discussion flipped classroom and lecture on student achievement and student characters. *International Journal of Instruction*, 13(3), 171–186.
- Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483. <https://doi.org/10.1073/pnas.1916903117>
- Venton, B. J., & Pompano, R. R. (2021). Strategies for enhancing remote student engagement through active learning. *Analytical and Bioanalytical Chemistry*, 413(6), 1507–1512. <https://doi.org/10.1007/s00216-021-03159-0>
- Yarmohammadi, A., Mostafazadeh, F., & Shahbazzadegan, S. (2023). Comparison lecture and concept map methods on the level of learning and satisfaction in puerperal sepsis education of midwifery students: A quasi-experimental study. *BMC Medical Education*, 23(1), 251. <https://doi.org/10.1186/s12909-023-04247-8>
- Zeng, H. L., Chen, D. X., Li, Q., & Wang, X. Y. (2020). Effects of seminar teaching method versus lecture-based learning in medical education: A meta-analysis of randomized controlled trials. *Medical Teacher*, 42(12), 1343–1349. <https://doi.org/10.1080/0142159X.2020.18051>