



2023

Student Preferences for Active Learning and Their Beliefs, Experiences, and Knowledge

Tammy Shilling

Andrews University, tammys@andrews.edu

Jerome Thayer


Andrews University, thayerj@andrews.edu

Anneris Coria-Navia

Andrews University, anneris@andrews.edu

See next page for additional authors

Follow this and additional works at: <https://ir.library.illinoisstate.edu/tlcsd>

 Part of the [Curriculum and Instruction Commons](#), [Educational Methods Commons](#), [Higher Education Administration Commons](#), [Higher Education and Teaching Commons](#), [Nursing Commons](#), [Scholarship of Teaching and Learning Commons](#), and the [Speech Pathology and Audiology Commons](#)

Recommended Citation

Shilling, Tammy; Thayer, Jerome; Coria-Navia, Anneris; and Ferguson, Heather (2023) "Student Preferences for Active Learning and Their Beliefs, Experiences, and Knowledge," *Teaching and Learning in Communication Sciences & Disorders*: Vol. 7: Iss. 2, Article 10.

Available at: <https://ir.library.illinoisstate.edu/tlcsd/vol7/iss2/10>

This Scholarship of Teaching and Learning Research is brought to you for free and open access by ISU ReD: Research and eData. It has been accepted for inclusion in Teaching and Learning in Communication Sciences & Disorders by an authorized editor of ISU ReD: Research and eData. For more information, please contact ISUREd@ilstu.edu.

Student Preferences for Active Learning and Their Beliefs, Experiences, and Knowledge

Abstract

Active teaching methods are believed to facilitate higher-order thinking skills and prepare allied health students for independent clinical decision-making. This quantitative, correlational study aimed to explain the relationships between student preferences for active over traditional methods and their beliefs, the frequency and positiveness of their experiences, and the extent of knowledge they have received regarding active and traditional teaching methods. Two hundred and thirty students completed a 53-item online survey. Students were enrolled in a Doctor of Physical Therapy, Masters in Speech-language Pathology, or Bachelor of Science Nursing program in one of seventeen participating institutions across a ten-state Midwest region. A combination of student knowledge, student beliefs, and positive student experiences with active over traditional methods predicted 72.5% ($R^2 = .725$, $p = <.001$) of the variance of student preferences for active methods. When students have clarity about the expectations of active learning methods, how they benefit their learning, believe they are responsible for learning and take the initiative, and perceive a positive experience, they prefer active methods over traditional methods. The results inform health professional education programs with recommendations that influence pedagogical change to support faculty and prepare students for clinical practice, higher-order thinking skills, and workforce expectations.

Keywords

Active learning, Learning Preferences, Health Professions Education, Student experiences

Cover Page Footnote

Tammy Shilling, Ph.D., CCC-SLP Associate Clinical Professor ORCID # 0000-0001-8775-7724 4195 Administration Drive, Bell Hall Suite 114 Berrien Springs, Michigan 49104 tammys@andrews.edu Affiliations: School of Communication Sciences and Disorders, Andrews University, Berrien Springs, Michigan Financial Support: There was no external funding for this research. Conflict of Interest: none Co-Authors Jerome Thayer, Ph.D. Position: Director, Center for Statistical Services ORCID # 0000-0002-0272-5529 thayerj@andrews.edu Affiliations: Andrews University Financial Support: None Conflict of Interest: None Anneris Coria-Navia, Ed.D. Position: Professor of Curriculum and Instruction, Director of the Center for Teaching and Learning ORCID # 0000-0002-2258-9712 anneris@andrews.edu Affiliations: Andrews University Financial Support: none Conflict of Interest: none Heather Ferguson, Ph.D. CCC-SLP Position: Associate Professor of Speech-Language Pathology/Chair of School of Communication Sciences and Disorders ORCID # 0000-0003-2056-2695 hferguson@andrews.edu Affiliations: Andrews University Financial Support: None Conflict of Interest: None

Authors

Tammy Shilling, Jerome Thayer, Anneris Coria-Navia, and Heather Ferguson

Introduction

Health professional education aligns with current higher education trends, as lecture-based methods occur more frequently than active methods (Rao, 201). However, current teaching methods are lacking to support learners in practicing and applying knowledge. Considerable evidence demonstrates that students and new graduates from health professional programs have difficulty making decisions that are consistent with their didactic knowledge (Kahlke et al., 2019). Health professions educators must prepare students with adequate clinical reasoning skills using appropriate teaching methods that facilitate and develop higher-order skills (Foord-May, 2006). Health professional education programs are encouraged by national organizations and accrediting bodies to use more student-centered, interactive teaching models to enhance the learning process, prepare students to apply knowledge to clinical practice, and promote higher achievement of learning outcomes and academic performance (Bolden et al., 2019; Hoke & Robbins, 2005; Powers, 2020; Tyo & McCurry, 2019). Student-centered active learning methods are believed to facilitate higher-order thinking skills and prepare students for independent clinical decision-making (Christensen & Nordstrom, 2013; Debisette et al., 2010; General Medical Council, 2002; Ginsberg et al., 2017; Liaison Committee on Medical Education, 2014; National Research Council, 2001; National Science Board, 2003, 2012, 2016; World Health Organization, 2010).

The Constructivist Model of Learning provides a foundational theoretical framework for student-centered, active learning pedagogy (Baeten et al., 2010). Students are active class participants, discovering and building knowledge for themselves (Saltmarsh, 2010). Students with active learning experiences are focused on the higher levels of Bloom's taxonomy (synthesize, evaluate, create) (Harris & Bacon, 2019), enabling them to develop application and clinical reasoning (Yen & Hallili, 2015). Fink's taxonomy (Fink, 2013) includes six dimensions of significant learning: foundational knowledge, application, integration, human dimension, caring, and learning how to learn. Each of the six dimensions includes specific types of learning and provides specific value for the learner. While the first three dimensions could be considered analogous to Bloom's hierarchy, the last three dimensions further expound on the roles and responsibilities of students in health professional programs and the need for active learning experiences. Students develop a sense of caring, integrate knowledge into their everyday lives, and value self-directed learning as they become lifelong learners in their profession (Burwash et al. 2016).

Several quantitative studies have found that students improved their use of higher-order skills, such as evaluation and application of theories and knowledge to clinical practice when they are engaged in active learning methods (Anderson & Krathwohl, 2001; Baker, 2011; Gunn et al., 2012; Kalain & Kasim, 2017; Lennon et al., 2019; Rapillard et al., 2019; Sniffen et al., 2019; Thompson & Opalack, 2019; Yoo & Park, 2015). Of note are Theobald et al. (2020) found that "active learning benefits all students but offers disproportionate benefits for individuals from underrepresented groups. Widespread implementation of high-quality active learning can help reduce or eliminate achievement gaps in STEM courses and promote equity in higher education" (p.6476).

While the shift to active learning methods appears to be an obvious solution, the change is multifaceted and complex. Student feedback and preferences for traditional or active learning methods vary (Bencsik, 2017; Deslauriers et al., 2019). Gaining student support and acceptance of new

pedagogical practices requires new ways of thinking; many perceived barriers exist (Grunspan et al., 2018; Michael, 2007; Saltmarsh, 2010). Several student barriers are reported, including (a) student beliefs confirming their role as a passive learner, (b) negative experiences working when engaging in active learning course activities, (c) an educational experience rooted in traditional lecture-based methods, and (d) lack of knowledge of how active methods benefit learning (Ginsberg, 2008; Grunspan et al., 2018; Seidel & Tanner, 2013; Tharayil et al., 2018).

According to Grunspan and colleagues (2018), the college experience for undergraduate students has been primarily lecture-based. Students have long-established beliefs which determine their role as passive learners and that lecture-based methods are necessary for high academic achievement in this environment (Grunspan et al., 2018). Deslauriers et al. (2019) found that college students preferred lecture-based methods even though their performance on examinations was higher in courses using primarily active learning methods. The authors concluded that college students believe they are learning more when a professor is lecturing, and active learning strategies require students to use higher-order thinking skills, and they are unaware of the learning taking place.

Students' prior classroom experiences are a primary origin of resistance to active methods. Seidel and Tanner (2013) and Tharayil and colleagues (2018) found that students value, participate, and engage in active learning methods according to their negative and positive experiences with peers. Classroom experience also included faculty organization and the ability to effectively communicate and execute active methods. Findings from Nguyen and colleagues (2016) confirm that students who reported more positive experiences with prior active methods showed higher levels of participation and responded more favorably in course evaluations.

Conversely, in health professions programs, students reported more confidence in learning content knowledge, mastering clinical skills, and achieving learning outcomes when the professor taught the information as compared to constructing their knowledge or learning from and with peers (Henning et al., 2008; House et al., 2016; Moore et al., 2016). The lecture-based approach is more traditional in higher education and is supported by the objectivist learning model (Schiro, 2013). It is an efficient and effective way to deliver content to college students (Bolden et al., 2019). According to Grunspan and colleagues (2018), the college experience for undergraduate students has been primarily lecture-based, and they have developed effective learning strategies and are comfortable with this teaching method. Given students' discomfort with active learning, students benefit from knowledge and training prior to implementation to understand the changes in expectations and the positive effects on learning from an active learning classroom. Tharayil and colleagues (2018) supported the findings that students value and participate in active methods when they receive clear and thorough explanations of their role, expectations for the activities, and information about how the methods benefit learning.

The purpose of this quantitative, non-experimental study was to gather self-reported data describing relationships between health professional student preferences for active learning or traditional instructional methods and (a) their beliefs regarding roles and responsibilities in education, (b) the positiveness of their prior classroom experiences with active learning and traditional instruction, (c) the frequency of their prior experiences with active learning and

traditional instruction, and (d) their knowledge and training related to active and traditional methods. The study sought to answer the following research questions:

Methods

Participants. The participants included in this study were graduate students enrolled in an accredited Doctorate of Physical Therapy (DPT) or Communication Sciences and Disorders (CSD) program, and undergraduate juniors and seniors in a Bachelor of Science in Nursing (BSN) program. Initial data were collected from 243 students across seventeen institutions that offered all three accredited programs. The region includes ten Midwestern states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, North Dakota, Ohio, and Wisconsin.

The criteria for choosing these programs were: (a) all were considered terminal degree programs for clinical practice, (b) the majority of the coursework was clinical content and preparation for clinical practice, (c) programs were accredited, (d) students were placed into a cohort, and (e) the majority of courses within the program were taught on campus with face-to-face delivery methods.

Instrumentation. Students completed a survey constructed for online administration using Class Climate V8.2. The 52-item questionnaire included instructions and definition of terms, demographic questions including program type, year in the program, and type of courses primarily taken in the program, and items related to (a) their preferences for active or traditional methods, (b) their beliefs toward active and traditional methods, (c) their prior positive experiences with active and traditional methods, (d) the frequency of their experiences with active and traditional methods, and (e) their knowledge with active and traditional methods. See Table 1.

Table 1

Student Survey Categories

Category of Items	# of Items
Demographic Information	6
Student preferences for active learning	18
Student beliefs in higher education for active learning or traditional methods	13
Positiveness of prior student experience with active learning or traditional methods	3
Frequency of prior student experience with active learning or traditional methods	3
Student knowledge and training in active learning or traditional methods	9
Total Items	52

The researcher developed easily understood, mutually exclusive, and single-topic statements to reduce the likelihood of participants providing socially desirable or acceptable responses. A small sample of students at the researcher's institution reviewed the recruitment materials and survey to (a) identify any errors, (b) determine the appropriateness and effectiveness of the questions and statements, (c) clarify and improve instructions to participants, and (d) suggest revisions (Babbie, 1973; Hulley et al., 1988; Irwin et al., 2020). Fifteen students (five from DPT, seven from CSD, and three from BSN programs) participated in the review and provided feedback. The researcher gathered written feedback to open-ended questions and conducted small group and individual interviews to ensure their input and suggestions were clear. In response to the feedback, the researcher modified the wording and the order of the statements and provided additional instructions throughout the survey. The number of statements, general ideas, and concepts remained the same for the survey. The students who provided feedback did not participate in the revised online survey. See the Appendix for the final questionnaire.

Data Collection and Analyses. After consent was received from the Institutional Review Board (IRB) of each institution, the researcher forwarded a recruitment email explaining the purpose of the study and an online survey link to the appropriate chairs and program directors of the DPT, graduate CSD, and BSN programs. They were asked to forward the emails to their students enrolled in their programs. Twenty-three student respondents answering fewer than 85% of the statements were eliminated from the dataset, leaving 230 responses. See Table 2.

Table 2

Student Demographic Data

Program Type	n	Percentage
DPT	86	37.4%
BSN	79	34.3%
CSD	65	28.3%

The researcher followed a data reduction process and created scales for each variable. Several combined items on the questionnaire measured each variable. Mean scores for active learning statements and traditional methods statements were added together, and the difference was then taken between the mean scores for active learning and traditional methods. Four independent variable subscales arose: (a) beliefs toward active over traditional methods, (b) positive experiences with active over traditional methods, (c) more frequent experiences with active over traditional methods, and (d) knowledge and training in active and traditional methods and student preferences for active over traditional methods. Table 3 provides a detailed summary of the survey items and how they are attributed to each new variable subscale. Each subscale measured preferences toward active or traditional methods with a continuum of negative to positive mean values. A positive mean response (> 0) indicated preferences toward active methods, a negative mean response (< 0) revealed preferences toward traditional methods, and a mean response close to 0 indicated a relatively equal preference toward active and traditional methods. See Table 3.

Table 3*Survey Items and Variable Subscales*

Variable	Original Items	Data Reduction Technique	Range of values
Student beliefs and ideas toward active over traditional methods	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11-3.13	Mean scores for active learning items (3.2, 3.3,3.4, 3.6, 3.7, 3.10, 3.12, 3.13) were added together; Mean scores for traditional items (3.1, 3.5, 3.8, and 3.11) were added together and the difference taken.	-4.00 to 4.00 ^a
Positive student experiences with active over traditional methods	5.1-5.3	x.2 and x.3 scores were added, the mean computed, and x.1 subtracted.	-3.00 to 3.00 ^b
Frequency of experiences with faculty with active vs. traditional methods	4.1-4.3	x.2 and x.3 scores were added, the mean computed, and x.1 subtracted.	-3.00 to 3.00 ^b
Student knowledge of active vs. traditional methods	6.1-6.3, 7.1-7.3, 8.1-8.3	x.2 and x.3 scores were added, the mean computed, and x.1 subtracted. Responses were combined into one scale	-3.80 to 3.80 ^a
Student preferences for active vs. traditional methods	9.1-9.3, 10.1-10.3, 11.1-11.3, 12.1-12.3, 13.1-13.3, 14.1-14.3	x.2 and x.3 scores were added, the mean computed, and x.1 subtracted; Six values were combined into one scale.	-4.00 to 4.00 ^a

Note: ^aBased on 5-point scale. A midpoint of zero indicates an equal preference for active (positive) and traditional (negative) methods.

^bBased on a 4-point scale. A midpoint of zero indicates an equal preference for active (positive) and traditional (negative) methods.

The analysis was completed using Statistical Package for Social Sciences (SPSS) version 24. All variables were considered acceptable for normality with skewness between -1 and +1 (Bryne, 2010; Hair et al., 2010). Pearson *r* values were computed between the four independent variable subscales and student preferences for active over traditional methods. Subsequently, the independent variables were combined to examine their relationship with the dependent variable

using multiple regression analysis. Finally, forward and backward regression analyses were used to determine whether an adequate smaller combination of independent variables predicted the dependent variable.

Results

Descriptive findings for each of the variables are found in Table 4. Students reported a slightly higher preference for active over traditional methods ($M = 0.51$, $SD = 1.01$). Students responded favorably to belief statements preferring active learning with a positive mean response ($M = 0.77$, $SD = 0.74$). Overall, students reported slightly more positive experiences with active learning methods ($M = 0.52$, $SD = 0.94$) but more frequent experiences with traditional methods ($M = -0.66$, $SD = 1.15$). Students had slightly more knowledge regarding the course expectations with active learning ($M = 0.19$, $SD = 0.88$).

Table 4

Descriptive Statistics for Student Preferences and Four Independent Variables

Variables	<i>M</i>	<i>SD</i>	Minimum	Maximum
Dependent Variable				
Student preferences for active over traditional methods	.51	1.01	-2.25	2.83
Independent Variables				
Student beliefs toward active over traditional methods	.77	.74	-.94	3.06
Positive student experiences with active over traditional methods	.52	.94	-2.00	2.50
More frequent student experiences with active over traditional methods	-.66	1.15	-3.00	3.00
Student knowledge of active over traditional methods	.19	.88	-1.89	2.34

Correlational analyses were conducted between the dependent variable and the four independent variables (see Table 5 for results). The results indicate a strong, positive, and significant relationship between student preferences for active over traditional methods and three of the independent variables: (a) student beliefs toward active over traditional methods, (b) positive student experiences with active over traditional, and (c) student knowledge of active over traditional methods. No relationship was found between student preferences for active over traditional methods and more frequent student experiences with active over traditional methods.

This supports the finding that students report their professors use traditional methods more frequently than active ones.

Table 5

Pearson r Correlations of Student Preferences for Active Over Traditional Methods and Independent Variables

Independent Variables	Student preferences for active over traditional methods		
	<i>r</i>	<i>p</i>	<i>N</i>
Student beliefs toward active over traditional methods	.62	.001	204
Positive student experiences with active over traditional methods	.63	<.001	203
More frequent student experiences with active over traditional methods	-.01	.887	210
Student knowledge of active over traditional methods	.77	<.001	197

Note: df = (2, 228)

Through forward and backward stepwise regression analyses, results yielded the same three-variable model that predicts 72.5% ($R^2 = .725$, $F(3,180) = 158.19$, $p < .001$) of the variance in student preferences for active over traditional teaching methods. The researcher concludes that a three-variable model predicts student preferences for active over traditional methods (see Table 6). The independent variable, more frequent student experiences with active over traditional methods, is not a significant variable that relates to or predicts student preferences for active over traditional methods.

Discussion

This study described significant positive relationships between student preferences for active learning methods and their beliefs, positiveness of experiences, and knowledge with active learning methods. First, we found a positive and significant relationship between student preferences for active learning and their beliefs. The findings revealed that students prefer active learning methods over traditional lectures when they:

- a) believe active methods prepare them for the course and national examinations
- b) believe active methods facilitate higher-order thinking skills
- c) believe both teachers and students play an active role in classroom learning
- d) believe that active learning methods are effective and valuable ways to learn.

Table 6**Forward Stepwise Regression Analysis for the Relationships Between Student Preferences for Active Methods and Knowledge, Positive Experiences, and Beliefs**

Variable	<i>b</i>	β	<i>t</i>	<i>p</i>	Part <i>r</i>
Constant	-.047				
Student knowledge of active over traditional methods	.613	.519	10.22	<.001	.400
Student beliefs toward active over traditional methods	.443	.312	6.86	<.001	.268
Positive student experiences with active over traditional methods	.218	.192	3.88	<.001	.152

Note: $R^2 = .725$, $F(3,180) = 158.19$, $p < .001$

This finding corroborates past literature. For example, Nguyen and colleagues (2016) found that students have initial beliefs regarding traditional and active methods and resist active learning when their past experiences and beliefs align with passive learning in a traditional lecture-based classroom. Deslauriers and colleagues (2019) hypothesized that students do not see the benefit of or prefer active methods unless they (a) believe active methods develop higher-order thinking skills needed for clinical practice and (b) believe that active methods prepare them better academically.

Secondly, there was a significant positive relationship between student preferences for active learning and the positiveness of their previous experiences with active learning. This finding is supported by the previous work of Seidel and Tanner (2013) and Tharayil and colleagues (2018). The primary origin of student resistance to active methods is previous experience. Students resist active methods when they experience poor interactions with peers during learning activities or when faculty do not organize and facilitate learning and assessment activities in a meaningful manner (Seidel & Tanner, 2013; Tharayil et al., 2018).

Thirdly, a significant positive relationship was found between student preferences for active learning and their knowledge and training. Findings from the larger body of literature align with the firm, positive relationship between student knowledge of active over traditional methods and their preferences for active over traditional methods. When students know more about the expectations of active learning methods and how they benefit their learning, they prefer active methods over traditional ones (Tharayil et al., 2018). Seidel and Tanner (2013) state that students resist active learning methods if they lack training, participation, or experience. They need to (a) know how much time a learning method will take outside of class, (b) know the expectations about reading and homework to prepare for class, and (c) understand the learning advantages of new methods. Lake (2001) indicated that when physical therapy students are given a rationale including

the learning benefits of active learning methods, they rate faculty and course effectiveness higher than groups who do not receive the information.

The current study revealed no relationship between more frequent experiences with active methods and student preferences for active over traditional methods. This may be related to the observation that students report that their professors use traditional methods more frequently than active ones. Similarly, Brigati (2018) compared students who had previous experience with active learning methods to those who experienced only traditional lecture-based methods in their biology and science courses, and the amount of experience did not influence student attitudes toward active learning methods. Contrarily, Nguyen and colleagues (2016) found that the frequency with which students learned through active methods was a significant and robust predictor of how students responded to active methods.

Regression analysis revealed a three-variable model predicting whether students' preferred active over traditional methods. Student knowledge and training is the most critical contributor to the variance compared to student beliefs and positive student experiences. This finding supports the work of Tharayil and colleagues (2018) and Seidel and Tanner (2013). Tharayil and colleagues (2018) found that the most important predictor for student preferences for active methods is student knowledge. Students value, participate, and provide positive feedback with active methods on course evaluations when they receive sufficient knowledge, including (a) the purpose of the active methods and learning activities, (b) the expectations regarding time outside of class, and (c) evidence about the effectiveness and benefits to learning.

Limitations and future research

One limitation with self-reported measures, such as the survey, is the potential pressures of social desirability. It may be beneficial to include other health professional programs while expanding the geographical region to allow for a more representative cross-section of the United States. A larger sample size could provide stronger correlations between variables. Additional factors which were not examined and may have influenced student preferences for active over traditional methods include (a) the perceived effort of learning (Deslauriers et al., 2019), (b) whether the institution they attend is research-focused or teaching-focused (Grunspan et al., 2018), (c) age, (d) gender, and (e) Non-traditional students including English as a first or second language and those from an ethnic background with cultural differences related to education (Ali et al., 2018).

Conclusions

There is evidence that facilitating higher-order thinking skills through active learning pedagogy is the future of health professions education as faculty pursue excellence in preparing students for future employment and clinical decision-making (Christensen & Nordstrom, 2013; Debisette et al., 2010). By understanding the complexity and interaction of factors influencing preferences for teaching methods, institutions and faculty are better informed to mitigate barriers and the origins of student resistance. The literature elucidates student resistance as a primary factor in the adoption and implementation of active learning methods (Deslauriers et al., 2019; Douna et al., 2015; Michael, 2007; Nguyen et al., 2016; Seidel & Tanner, 2013; Tharayil et al., 2018). There is consistency among the three variables with strong positive relationships showing that the

significant predictors of student preferences for active over traditional methods are (a) student beliefs, (b) positive student experiences, and (c) student knowledge and training.

Based on the findings, student resistance to active learning methods is related to student knowledge, beliefs, and experiences. It is essential for faculty to provide knowledge to students frequently regarding the purpose, benefits, and expectations of active methods, course learning activities, and alternate assessment strategies. Resources should be developed to assist faculty as they teach students how active learning methods benefit learning, prepare them for national examinations, and prepare them for clinical practice. Evidence supports that the successful provision of knowledge to students about the purposes, learning benefits, expectations regarding time outside of class, and strategies to complete learning activities will mitigate student resistance and provide a positive course experience.

Disclosures

Tammy Shilling receives a salary from Andrews University. There are no non-financial disclosures.

Anneris Coria-Navia receives a salary from Andrews University.

Heather Ferguson receives a salary from Andrews University. There are no non-financial disclosures.

Jerome Thayer has no disclosures to report.

References

- Ali, N. Ahmed, L., & Rose, S. (2018). Identifying predictors of students' perception of and engagement with assessment feedback. *Active Learning in Higher Education*, 19(3), 239-251. <https://doi.org/10.1177/1469787417735609>
- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Pearson Longman.
- Babbie, E.R. (1973). *Survey research methods*. Belmont, CA: Wadsworth.
- Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centered learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review*, 5(3), 243-260. <https://doi.org/10.1016/j.edurev.2010.06.001>
- Baker, K. F. (2011). Active learning: Relevancy matters. *Perspectives on Issues in Higher Education*, 14(2), 64-69. <https://doi.org/10.1044/ihe14.2.64>
- Bolden, E. C., Oestreich, T. M., Kenney, M. J., & Yuhnke Jr, B. T. (2019). Location, location, location: A comparison of student experience in a lecture hall to a small classroom using similar techniques. *Active Learning in Higher Education*, 20(2), 139-152. <https://doi.org/10.1177%2F1469787417742018>
- Brigati, J. (2018). Student attitudes toward active learning vs. lecture in cell biology instruction. *The American Biology Teacher*, 80(8), 584-591. <https://doi.org/10.1525/abt.2018.80.8.584>
- Bryne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Philadelphia, PA: Routledge.
- Burwash, S. C., Snover, R., and Krueger, R. (2016) Up Bloom's pyramid with slices of fink's pie: Mapping an occupational therapy curriculum. *The Open Journal of Occupational Therapy*, 4(4). <http://dx.doi.org/10.15453/2168-6408.1235>
- Christensen, N., & Nordstrom, T. (2013). Facilitating the teaching and learning of clinical reasoning. In G. M. Jenson & E. Mostrom (Ed.). *Handbook of teaching and learning for physical therapists* (3rd ed., pp. 183-199). New York, NY: Elsevier.
- Debisette, A., Weiss, J., Burns, H. K., Cavanaugh, E. E., Cox, K., Drayton-Brooks, S., & Ellipsis Gonzalez, C. M. (2010). Addressing new challenges facing nursing education, solutions for a transforming health care environment. *The National Advisory Council on Nurse Education and Practice*, 1-34.
- Deslauriers, L., McCarty, L. S., Miller, K., Callaghan, K., & Kestin, G. (2019). Measuring actual learning versus the feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences of the United States of America*, 106(39), 19251-19257. <http://www.pnas.org/cgi/doi/10.1073/pnas.1821936116>
- Douna, P., Kyridis, A., Zagkos, C., Ziontaki, Z., & Pandis, P. (2015). The ideal university teacher, according to views of Greek students. *International Journal of Higher Education*, 4(2), 145-158. <https://files.eric.ed.gov/fulltext/EJ1060558.pdf>
- Fink, L. D. (2013). *Creating significant learning experiences: An integrated approach to designing college courses*. San Francisco, CA: Jossey-Bass.
- Foord-May, L. (2006). A faculty's experience in changing instructional methods in a professional physical therapist education program. *Physical Therapy*, 86(2), 223-235. <https://doi.org/10.1093/ptj/86.2.223>
- General Medical Council. (2002). *Tomorrow's doctors*. <https://www.educacionmedica.net>

- Ginsberg, S. M. (2008). Student anticipation and reactions to hybrid format education. *Perspectives on Issues in Higher Education*, 11(2), 76-82. <https://doi.org/10.1044/ihe11.2.76>
- Ginsberg, S. M., Friberg, J., Visconti, C. F., DeRuiter, M., & Hoepner, J. K. (2017). On the culture of scholarship of teaching and learning. *Teaching and Learning in Communication Sciences & Disorders*, 1(1), 1. <https://doi.org/10.30707/TLCSD1.1>
- Grunspan, D. Z., Kline, M. A. & Brownell, S. E. (2018). The lecture machine: A cultural evolutionary model of pedagogy in higher education. *Life Sciences Education*, 17(3), 1-11. <https://doi.org/10.1187/cbe.17-12-0287>
- Gunn, H., Hunger, H., & Haas, B. (2012). Problem-based learning in physiotherapy education: A practice perspective. *Physiotherapy*, 98(4), 330-335. <https://doi.org/10.1016/j.physio.2011.05.005>
- Hair, J., Black, W. C., Babin, B.J. & Anderson, R.E. (2010). *Multivariate data analysis* (7th ed.). New York, NY: Pearson.
- Harris, N., & Bacon, C. E. W. (2019). Developing cognitive skills through active learning: A systematic review of health care professions. *Journal of Athletic Training Education*, 14(2), 135-148. <https://doi.org/10.4085/1402135>
- Henning, J. M., Weidner, T. G., & Marty, M. C. (2008). Peer-assisted learning in clinical education: Literature review. *Athletic Training Education Journal*, 3(3), 84-90. <https://doi.org/10.4085/1947-380X-3.3.84>
- Hoke, M. M., & Robbins, L. K. (2005). The impact of active learning on nursing students' clinical success. *Journal of Holistic Nursing*, 23(3), 348-355. <https://doi.org/10.1177/0898010105277648>
- House, J. B., Choe, C. H., Wourman, H. L., Berg, K. M., Fischer, J. P., & Santen, S. A. (2016). Efficient and effective use of peer teaching for medical student simulation. *Western Journal of Emergency Medicine*, 18(1), 137-141. <https://dx.doi.org/10.5811/westjem.2016.11.32753>
- Hulley, S.P. & Cummings, S.R. (Eds.). (1988). *Designing clinical research*. Baltimore, MD; Williams & Wilkins.
- Irwin, D., Lass, N.J., Pannbacker, M., Tekieli Koay, M.E., & Whited, J.S. (2020). *Clinical research methods in speech-language pathology and audiology* (3rd ed.). San Diego, CA: Plural Publishing.
- Kahlke, R. M., McConnell, M. M., Wisener, K. M., & Evan, K. W. (2019). The disconnect between knowing and doing in health professions education and practice. *Advances in Health Sciences Education*, 25(1), 227-240. <https://doi.org/10.1007/s10459-019-09886-5>
- Kalaian, S. A., & Kasim, R. M. (2017). Effectiveness of various innovative learning methods in health sciences classrooms: A metaanalysis. *Advances in Health Sciences Education*, 22(5), 1151-1167. <https://doi.org/10.1007/s10459-017-9753-6>
- Lake, D. (2001). Student performance and perceptions of a lecture-based course compared with the same course utilizing group discussion. *Physical Therapy*, 81(3), 896-902. <https://doi.org/10.1093/ptj/81.3.896>
- Lennon, O., Phelan, D., Wallace, D., King, J., & Barrett, T. (2019). The more you did it, the more it made sense: Problem-based learning to improve evidence-based practice in an undergraduate physiotherapy professional programme. *Physiotherapy Research International*, 24(3), 1-9. <https://doi.org/10.1002/pri.1774>

- Liaison Committee on Medical Education (LCME). (2014). *Accreditation Standards, 2014*. www.lcme.org
- Michael, J. (2007) Faculty perceptions about barriers to active learning. *College Teaching*, 55(2), 42-47. <https://doi.org/10.3200/CTCH.55.2.42-47>
- Moore, C., Westwater-Wood, S., & Kerry, R. (2016). Academic performance and perception of learning following a peer coaching teaching and assessment strategy. *Advances in Health Sciences Education*, 2, 121-130. <https://doi.org/10.1007/s10459-015-9618-9>
- National Research Council. (2001). *Educating teachers of science, mathematics, and technology: New practices for the new millennium*. The National Academies Press. <https://doi.org/10.17226/9832>.
- National Science Board (2003). *The science and engineering workforce realizing America's potential*, NSB 03-09. <http://www.nsf.gov/nsb/documents/2003/nsb0369/nsb0369.pdf>
- National Science Board (2012). *Science and engineering indicators*. National Science Foundation. <http://www.nsf.gov/statistics/seind12/pdf/seind12.pdf>
- National Science Board (2016). *Science and engineering indicators*. National Science Foundation. <https://www.nsf.gov/statistics/2016/nsb20161/uploads/1/nsb20161.pdf>
- Nguyen, K. A., Shekhar, P., Husman, J., Borrego, M., Prince, M., Finelli, C., Waters, C., DeMonbrun, R. M., Henderson, C. (2016). *Extended abstract-students' expectations and responses to active learning in undergraduate engineering courses*. Paper presented at 2016 Mid Years Engineering Education Conference at College Station, Texas. https://www.researchgate.net/profile/Kevin-Nguyen-40/publication/318573045_Extended_Abstract-Students'_Expectations_and_Responses_to_Active_Learning_in_Undergraduate_Engineering_Courses/links/5980088faca272d56819fb96/Extended-Abstract-Students-Expectations-and-Responses-to-Active-Learning-in-Undergraduate-Engineering-Courses.pdf
- Powers, K. (2020). Bringing simulation to the classroom using an unfolding video patient scenario: A quasi-experimental study to examine student satisfaction, self-confidence, and perceptions of simulation design. *Nurse Today*, 86, 1-6 (104324). <https://doi.org/10.1016/j.nedt.2019.104324>
- Rao, B. J., (2019). Innovative teaching pedagogy in nursing education. *International Journal of Nursing Education*, 11(4). 176-181. <https://doi.org/10.5958/0974-9357.2019.00114.4>
- Rapillard, S., Plexico, L. W., & Plumb, A. M. (2019). Influence of graduate speech-language pathology student's learning style and coping strategies on training and development. *Teaching and Learning in Communication Sciences & Disorders*, 3(1), 1-23. <https://ir.library.illinoisstate.edu/tlcsd/vol3/iss1/2>
- Saltmarsh, J. (2010). Changing Pedagogies, in Fitzgerald, H.E., Burack, C., & Seifer, S. (Eds.) *Handbook of Engaged Scholarship: Contemporary Landscapes, Future Directions. Vol. 1: Institutional Change*. Michigan State University.
- Schiro, M. S. (2013). *Curriculum theory: Conflicting visions and enduring concerns*. (2nd ed.). Newbury Park, CA: Sage.
- Seidel, S. B. & Tanner, K. D. (2013). What if student's revolt? Considering student resistance: Origins, options, and opportunities for investigation. *CBE-Life Sciences Education*, 12(4), 586-595. <https://doi.org/10.1187/cbe-13-09-0190>

- Sniffen, K., Briggs, E., Hinyard, L., & Breitbach, A. P. (2019). Interprofessional role clarity, case-based learning, and perceptions of group effectiveness among athletic training and physical therapy students in a shared professional course. *Internet Journal of Health Professions Sciences and Practices*, 17(4), 1-10. <https://nsuworks.nova.edu/ijahsp/vol17/iss4/6/>
- Tharayil, S., Borrego, M., Prince, M., Nguyen, K.A., Shekhar, P., ... & Waters, C. (2018). Strategies to mitigate student resistance to active learning. *International Journal of Science, Technology, Engineering, and Mathematics Education*, 5(7), 1-16. <https://doi.org/10.1186/s40594-018-0102-y>
- Theobald, E.J., Hill, M.J., Tran, E., Agrawal, S., Arroyo, E.N., ... & Freeman, S. (2020, March 9). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Psychological and Cognitive Sciences*, 117(12), 6476-6483. <https://doi.org/10.1073/pnas.1916903117>.
- Thompson, C. C., & Opalack, K. (2019). How a student-led health professions club modeled teamwork and critical thinking for prospective health practitioners. *Journal of Allied Health*, 48(3), 69E-72E.
- Tyo, M. B. & McCurry, M. K. (2019). An integrative review of clinical reasoning strategies and outcome evaluation in nursing education. *Nursing Education Perspectives*, 40(1), 11-17. <https://doi.org/10.1097/01.NEP.0000000000000375>
- World Health Organization (2010). *Framework for action on interprofessional education and collaborative practice*. Geneva: Offices of the World Health Organization. http://www.who.int/hrh/resources/framework_action/en/
- Yen, T. S. and Halili, S. H. (2015). Effective teaching of higher-order thinking in education. *The Online Journal of Distance Education and e-Learning*, 3(2), 41-47. <http://www.tojdel.net/journals/tojdel/articles/v03i02/v03i02-04.pdf>
- Yoo, M. S., & Park, H. R. (2015). Effects of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students. *Nursing & Health Sciences*, 17(2), 166–172. <https://doi.org/10.1111/nhs.12151>

Appendix

Student Survey

Instructions:

Thank you for your willingness to participate in this survey.

This survey should not require more than 15 minutes of your time to complete. Read the definitions carefully. Next, rate the series of statements related to your beliefs, your experiences, your training, and your knowledge as they relate to teaching methods in your academic courses (this does not include skills lab or lab sessions).

Feel free to use tabs at the top or "previous" and "next" buttons to navigate freely through the survey before submitting responses.

Demographic Questions

2.1 Which institution do you represent?

2.2 I represent the following program

- a) Doctor of Physical Therapy
- b) Communication Sciences and Disorders
- c) Bachelor of Nursing Program

2.3 Out of all the Academic courses I have taken in the program, how many are introductory courses (*typically taken in the first two semesters teaching fundamentals, foundations, and principles*)?

- a) Very few (0-25%)
- b) Less than half (25-49%)
- c) More than half (50-74%)
- d) Almost all (75-100%)

2.4 Out of all the Academic courses I have taken in the program, how many are advanced courses (*typically taken in the middle to later stages of the program using foundations and principles for application to assessment and treatment of specific disorders*)?

- a) Very few (0-25%)
- b) Less than half (25-49%)
- c) More than half (50-74%)
- d) Almost all (75-100%)

2.5 Due to COVID-19, my courses changed from primarily in-person to remote learning during the 2020-2021 school year.

- a) Very few (0-25%)
- b) Less than half (25-49%)
- c) More than half (50-74%)
- d) Almost all (75-100%)

2.6 Due to COVID-19, the teaching methods (use of lectures, classroom activities) in my courses changed during the 2020-2021 school year.

- a) Very few (0-25%)
- b) Less than half (25-49%)
- c) More than half (50-74%)
- d) Almost all (75-100%)

Rate the following statements based on your beliefs about higher education.

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree

- 3.1 I want a professor who is a "Storehouse of knowledge" teaching me facts, principles, and concepts that I need to learn.
 - 3.2 When I actively engage with the content, my peers, and with the professor, I perform better on course examinations.
 - 3.3 Course activities should be designed to encourage me to take initiative and responsibility for my learning.
 - 3.4 As a student in this program, I am primarily responsible to learn the content in my courses.
 - 3.5 Lectures covering content from readings and textbooks are the best way to prepare me for course and national examinations.
 - 3.6 I want a professor who is a "coach" who facilitates my learning through active learning experiences.
 - 3.7 Developing my ability to learn independently is a better way to prepare me to do well on course and national examinations.
 - 3.8 Memorization and comprehension of facts, concepts, and theories are the best way to prepare me for clinical practice.
 - 3.9 Teaching me how to think rather than what to think is a better way to prepare me for course and national examinations.
 - 3.10 Creating active learning experiences, projects, and assessments are the best way to help me develop decision-making skills and prepare me for clinical practice.
 - 3.11 I believe Traditional teaching methods help me develop higher-order skills.
 - 3.12 I believe Moderately Active learning methods help me develop higher-order skills.
 - 3.13 I believe Highly Active learning methods help me develop higher-order skills.
-

Definitions of Terminology:

Teaching Methods:

Traditional Teaching Methods: The instructor teaches content through lectures and PowerPoints with minimal student engagement or activity.

Moderately Active Learning Methods: The instructor teaches content through mini-lectures with PowerPoints and frequent opportunities for the student to actively engage throughout the class session. The activities may include response systems such as clickers, think-pair-share activities, and written reflections such as the muddiest point or 1-minute response papers.

Highly Active Learning Techniques: The use of multiple instruction methods where the instructor fulfills a coaching role. The student takes a more independent role in learning by actively engaging with the content and peers. The types of activities may include flipped classrooms, problem-based learning, simulations, case studies, etc.

Level of Course Objectives:

Lower-order: Examples include knowledge of facts, definitions, and methods; comprehending knowledge through paraphrasing, classifying and comparing, and contrasting; and applying knowledge and skills to various situations.

Higher-order: Examples include critical thinking in the analysis of fact versus opinion; synthesis of ideas through formulating clinical questions using evidence-based methods; and evaluation and reflection using feedback to inform clinical practice.

Types of Courses:

Introductory Courses: Courses that are typically taken in the first two semesters of a program that teach foundations, fundamentals, basic principles, or theories.

Advanced Courses: Courses that are typically taken in the middle or later stages of the program that build on foundations or principles and require an application to assess and treat specific disorders.

Rate the following statements based on your experience

1=Very few (0-25%), 2=Less than half (26-49%), 3=More than half (50-75%), 4= Almost all (76-100%),

- 4.1 In my college experience, my instructors have utilized Traditional teaching methods.
- 4.2 In my college experience, my instructors have utilized Moderately Active learning methods.
- 4.3 In my college experience, my instructors have utilized Highly Active learning methods.

Rate the following statements based on your experience

1=Not a positive experience at all, 2= Somewhat positive, 3=Positive, 4= Very positive experience

- 5.1 My overall college experience with Traditional teaching methods is.
- 5.2 My overall college experience with Moderately Active learning methods is.
- 5.3 My overall college experience with Highly Active learning methods is.

Rate the following statements based on your beliefs

1=No value or effectiveness, 2=Somewhat valuable and effective, 3=Valuable and effective, 4= Highly valuable and effective

- 6.1 I believe Traditional teaching methods are valuable and effective in meeting course learning objectives.
- 6.2 I believe Moderately Active learning methods are valuable and effective in meeting course learning objectives.
- 6.3 I believe Highly Active learning methods are valuable and effective in meeting course learning objectives.

Rate the following statements based on your knowledge and your preference

1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree

- 7.1 I always know what is expected of me as a student with Traditional teaching methods.
- 7.2 I always know what is expected of me as a student with Moderately Active learning methods.
- 7.3 I always know what is expected of me as a student with Highly Active learning methods.

- 8.1 I know how Traditional teaching methods benefit my learning.
- 8.2 I know how Moderately Active learning methods benefit my learning.

8.3 I know how Highly Active learning methods benefit my learning.

9.1 I prefer Traditional teaching methods because they are effective ways for me to learn.

9.2 I prefer Moderately Active learning methods because they are effective ways for me to learn.

9.3 I prefer Highly Active learning methods because they are effective ways for me to learn.

10.1 In preparation for clinical decision making, I prefer Traditional teaching methods.

10.2 In preparation for clinical decision making, I prefer Moderately Active learning methods.

10.3 In preparation for clinical decision making, I prefer Highly Active learning methods.

11.1 I prefer Traditional teaching methods when taking an introductory course in my program.

11.2 I prefer Moderately Active learning methods when taking an introductory course in my program.

11.3 I prefer Highly Active learning methods when taking an introductory course in my program.

12.1 I prefer Traditional teaching methods when taking an advanced course in my program.

12.2 I prefer Moderately Active learning methods when taking an advanced course in my program.

12.3 I prefer Highly Active learning methods when taking an advanced course in my program.

13.1 When my course has lower-order learning objectives I prefer Traditional teaching methods.

13.2 When my course has lower-order learning objectives I prefer Moderately Active learning methods.

13.3 When my course has lower-order learning objectives I prefer Highly Active learning methods.

14.1 When my course has higher-order learning objectives, I prefer Traditional teaching methods.

14.2 When my course has higher-order learning objectives, I prefer Moderately Active learning methods.

14.3 When my course has higher-order learning objectives, I prefer Highly Active learning methods.

15.1 I believe Traditional teaching methods help me develop higher-order skills.

15.2 I believe Moderately Active learning methods help me develop higher-order skills.

15.3 I believe Highly Active learning methods help me develop higher-order skills.