WHAT STYLE OF LEARNING IS MOST BENEFICIAL TO STUDENTS?

by

LEXI JENNER

Human Health Biology

A FINAL HONORS PROJECT

submitted in accordance with the University Honors Program requirements

Division of Biology
College of Arts and Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

May 2024

Approved by:

Chelsi Medved

Abstract

In the summer of 2023, I was a student coordinator with the College of Health and Human Sciences' Health Professions Exploration Program at Kansas State University. This program hosted sessions over many health careers to introduce students to professions they may not know about or may be considering before college. I saw through each session, students retained more and were more driven to learn more about health professions that were presented in active and engaging ways. I was intrigued to research more about what learning style is most beneficial to students in general and in health programs. I took the Health Professions Exploration Program as a start to research active learning and how this style impacts students. I found that an active learning style is most beneficial for engaging students, retaining information, and increasing performance of students in future careers. During the summer camp, data was collected on what the students thought about each session. The data that was collected shows that the students enjoyed and wanted to learn more from the sessions that were presented in an active learning style. The students were more interested in areas of health that were presented in engaging formats. The following research paper uses the data from this health camp to show that students learn and benefit from active, engaged learning. I have also researched from other sources to support my claims and observations as well as included research pertaining to health programs.

During the Health Professions Exploration Program, I was able to observe that students learned more information from sessions that were interactive and gave an engaging look into health professions. Data that was collected shows that students learned more about health professions from the presenters who were active and engaging. An anonymous response from the first session of the Health Professions Exploration Program of summer 2023 said, "I would recommend this program to another student because of the growth I have received from this experience. Even the fields I am not interested in." The active engagement the students experienced gave them fun and interesting insights into career paths they may have not known much about. Information from Kansas State's College of Health and Human Sciences health summer camp, along with many studies and research performed by doctors and professors, proves that active and engaging learning is the most beneficial style for students to learn and perform in the future. Health care programs use simulation-based learning to prepare students for real-life application and better patient care. Active learning has been studied in all areas of learning and proved the same outcome: students perform and retain information better when they are engaged. Test scores, retention, and real-life skills are improved with active learning (Saleem & Khan, 2022) and (Reuell & Parsons, 2023).

The first year of the Health Professions Exploration Program was in the summer of 2022. The number of students that attended each session was 18-20 students. After each session, students submitted anonymous responses. While I was not a coordinator for this summer, I have reviewed the data, and the results are similar to the data collected from the students that I worked with in 2023. Various sessions were held throughout the week and most of the sessions were engaging and provided a real-life simulation of what that health profession did. I believe that through the active learning style of the sessions, students were more attentive and gained new

insights about each profession. A comment from a student during the gerontology session about working with elders said, “This was more interesting than I thought it would be and I am actually planning to get a secondary major in gerontology now.” Because this session engaged students and had activities that showed how professionals work with geriatric patients, students were interested in pursuing this field. There were many more comments made that are not quoted in responses from the data but from my experience getting to know these students. The summer of 2023 health sessions held two separate weeks with similar sessions in each.

The first session that we visited in both weeks was Communications Sciences and Disorders where the students learned about Speech Pathologists and Audiologists. This session was engaging with technology used in clinics to speak with patients who cannot speak, and the students were taught how to thicken liquids. After this session the students said that they did not even know about this profession but are now aware and interested in speech pathology. They were interested and asked many questions during this session. I could tell that most of the students enjoyed this session and gained more insight because of the activities that they were able to participate in.

The session of dietetics offered different health related tests that the students performed on each other. There was a food game played and the dieticians gave information in a way the students understood and enjoyed. The students learned that dieticians practiced in many different settings, and this was new to them. They viewed dietetics in a new light because of the way that many areas of the health field are impacted by it.

The Nursing session with Wichita State University Nursing Program was a student favorite because of the various nursing activities they performed on simulations. Out of 14 anonymous votes, 11 students submitted an overall rating of 5 on a 1 to 5 scale. That means that

78.5% of students that rated the nursing session were 100% satisfied with the active engagement and presentation. The students rotated through various aspects of nursing and nursing school activities. The students learned to draw blood on a simulation, listen to heartbeat and lung sounds on manikins, practiced casting on each other, and saw simulations on manikins. The students saw how the manikins can be manipulated to various health concerns so that nursing students can practice codes and handling situations to prepare them. I saw that students were excited about learning what nursing was like and they said that they learned and understood the job complications and experiences.

The students experienced Emergency Medicine in a session taught by Riley County EMS. This session was highly anticipated because another coordinator that I worked with was an EMT and shared his experiences with the students. The students were very interested in the stories and saving lives, so they went into the Emergency Medicine session with intrigue. After this session though many students were not as excited or energetic. Many seemed bored and commented on how they didn't see or learn much from the session. When further questioned, students relayed that they felt the presenters talked and didn't present in a way that made them interested. The presenters read off a slideshow and talked about the logistics and what Riley County EMS did in complex terms. The students sat during most of the session. This session was not active, and the students were not engaged or excited about the information given. Most information was about the length of shifts, how to become certified, and the levels of certification. This was all good information to present but the students wanted to know about more than just that information. They were not given a real-life, hands-on look into being an EMT. This shows that engagement is important when presenting complex information.

Studies have proved that simulation-based learning provides a better way of learning than passive learning alone (Saleem & Khan, 2022). One of the sessions that students in the Health Professions Exploration Program visited was at the Kansas State Physician Assistant Program. The students were given fake skin and learned to suture. This practice would not have been learned had the students viewed a video or lecture alone. Complex skills like this are learned and retained better when they are taught with hands-on simulation. No patient wants to be the first actual practice model for health care workers. Simulation gives health care workers an ability to practice and learn techniques before working with patients (Saleem & Khan, 2022). This improves patient care.

Because of the learning and responses, I observed during the health professions camp during the summer of 2023, I began researching how health care is affected by active learning methods. The best active learning style in health care is simulation-based learning. Manikins, models, and hands-on practice are utilized in health care graduate and undergraduate programs. "The growing complexities of patient care require doctors to master not only knowledge and procedural skills but also the ability to effectively communicate with patients, relatives, and other health care providers and also to coordinate a variety of patient care activities," quoted from the scholarly article Simulation-based learning: Just like the real thing written by Dr. Fatimah Lateef in 2009. Simulation based learning in health care programs provides experience in real life application of reviewing cases and coordinating plans of care based on patients and team-based care (Saleem & Khan, 2022). Mr. Munazza Saleem, M.B.B.S., MHST, and Dr. Zuhera Khan, FCPS (Plast) Assistant Professor, Plastic Surgery are the authors of the article Healthcare Simulation: An effective way of learning in health care. In this article, simulation-based learning "encompasses the knowledge, skills, and behaviors attained by healthcare

professionals toward better patient-centric care." (Saleem & Khan, 2022) Simulation based education provides students with learning that is retained and applicable to their future in the medical field. This is active learning in health care that provides benefits that go beyond simply memorizing information from a slide or book. Active and collaborating learning allows students to build new ideas and transform concepts based on their situation presented in real life (Saleem & Khan, 2022). Saleem and Khan present Kolb's Experiential Learning Theory (Kolb, 1974) which explains how new experiences, reflection of experience, analyzation and development of conclusions, and active experimentation empowers learners for real life settings (Saleem & Khan, 2022). This theory explains that active learning takes ideas previously learned and uses them to further knowledge in a practical setting. Active learning provides students with the ability to utilize clinical judgment, decision making, and critical thinking in settings that they had previously learned how to work through but now get hands-on experience (Saleem & Khan, 2022). A study performed on anesthesiologists and clinicians during simulated crises was high for teams in malignant hyperthermia and cardiac arrest simulations. Simulation based tests like these are useful for educational tracking of progress made by students in health care (Gaba, D. M., Howard, S. K., Flanagan, B., Smith, B. E., Fish, K. J., & Botney, R., 1998). Another study was carried out in the Neonatal Intensive Care Unit of Marmara University in Istanbul, Turkey where midwifery students study newborn care. The students who were trained with simulation-based care were more competent than the students who were not trained with simulations (Saleem & Khan, 2022). Not only is simulation-based learning extremely beneficial to better patient care but students are also learning professionalism in situations where they practice working on manikins in a real-life practice setting (Saleem & Khan, 2022).

While simulation-based learning is important for healthcare students, all students have been shown to benefit from active learning styles in many areas of study. The Harvard Gazette published a study on active learning in a physics classroom through the National Academy of Sciences. Louis Deslauriers led the study along with Logan McCarty, Kelly Miller, and Greg Kestin, and Kristina Callaghan. In 2019, students in an introductory physics class were randomly divided into an experimental group and a control group. Both groups of students were taught using standard, passive learning methods for 11-15 weeks. In the 12th week, the experimental group switched to active learning methods while the control group continued to learn from lectures. Students were then tested over information taught in both styles and given surveys. While the surveys showed that students thought they learned more from lectures, the actual data proved that the students who received active education scored higher on tests. This data has also provided the theory that the feeling of learning and active learning is anticorrelated which was observed by Deslauiers (Reuell & Parsons, 2023). Active learning is proven to increase test scores and knowledge of the information taught. (Reuell & Parsons, 2023) “In all the courses at Harvard that we’ve transformed to active learning,” Deslauriers said, “the overall course evaluations went up.” (Reuell & Parsons, 2023).

Research shows that both sides of the brain are activated by hands-on learning versus lectures (Arnholz, 2021). Both sides of the brain have different functions (Oglesby, 2023). The Split-Brain experiments by Roger Sperry in 1981 won a Nobel Prize. The corpus callosum was removed during surgery of a patient who suffered seizures and after the surgery, the patient functioned normally. The tests conducted on the brain after surgery yielded results that showed the left and right side of the brain functioning differently. This means that both right and left sides of the brain are needed to function and learn at the highest capability, thus active and

engaging learning leads to stronger overall connections and ability to retain information (Arnholz, 2021). According to Caleb Backe, Health and Wellness Expert for Maple Holistics, "The left hemisphere is said to be more objective, practical, and analytical, while the right hemisphere is said to be more subjective and thoughtful. Yet of course the two sides work together to help us function properly." (Oglesby, 2023).

The many effects of active learning give students a deeper education than lecture learning alone. Students are equipped with skills that are not learnt through lectures alone. Skills including retention of information, connection and social skills, cognitive skills, and real-life application are learned through active and engaging methods. Student engagement literature review quotes, "… productive engagement is an important means by which students develop feelings about their peers, professors, and institutions that give them a sense of connectedness, affiliation, and belonging, while simultaneously offering rich opportunities for learning and development." Quote by Bensimon, E.M. (2010) (Trowler, 2010). During the Health Profession Exploration Program during the summer of 2023, participants socialized together in groups during sessions and were able to form relationships throughout the camp. They learned about health careers and made connections with the professors and leaders of the sessions because of engagement. In the article Student engagement literature review, Vicki Trowler quotes Rush and Balamoutsou, "Effects of engagement listed by Rush and Balamoutsou (2006, 4) include that: Engaged students … share the values and approaches to learning of their lecturers; spend time and energy on educationally meaningful tasks; learn with others inside and outside the classroom; actively explore ideas confidently with others; and learn to value perspectives other than their own. When students are part of a learning community, they are positive about their identity as a member of a group; focused on learning; ask questions in class; feel comfortable

contributing to class discussions; spend time on campus; have made a few friends; and are motivated in some extracurricular activity." (Trowler, 2010). I observed participants of the Health Professions Exploration Program talking about sessions with each other and reviewing what they learned later in the day. These students thought about what they value and what health career they could prosper in. I saw the progression of the students during the week as they began to think about what health career they were interested in and discussed aspects of health care with their peers and coordinators. The students also participated in extracurricular activities and had made friends with each other while being in sessions and learning in groups. The active learning style of various sessions provided high school students with confidence in their groups, friendships, new perspectives of health care, and information on health careers.

Active learning has been proved to be effective and beneficial to students in all areas of study and levels of schooling. From elementary school to graduate level health care programs, active learning has been studied for improved learning methods. Active learning comes in many forms such as simulation-based learning in health care programs, group activities, application problems, learning with models, presentations, and real-life application problems (Active Learning Strategies - Active Learning - Purdue University, n.d.). I have observed the benefits of active learning in a camp for high school students which compelled me to research and view data that supports the conclusion that active learning and engagement is the most beneficial learning style for students.

References

Active Learning Strategies - Active Learning - Purdue University. (n.d.). https://www.purdue.edu/activelearning/Need%20Help/alstrategies.php

Arnholz, J. & Build Your Future. (2021, May 14). Is Hands-On learning better? Build Your Future. https://www.byf.org/is-hands-on-learning-better/#:~:text=The%20students%20who%20went%20through,course%20than%20students%20who%20did.

Bensimon, E.M. (2009) Foreword. In: Harper, S.R. and Quaye, S.J. (eds.) Student Engagement in Higher Education. New York and London: Routledge, pp. xxi-xxvi.

Gaba, D. M., Howard, S. K., Flanagan, B., Smith, B. E., Fish, K. J., & Botney, R. (1998). Assessment of clinical performance during simulated crises using both technical and behavioral ratings. Anesthesiology, 89(1), 8–18. https://doi.org/10.1097/00000542-199807000-00005

Lateef F. Simulation-based learning:Just like the real thing. J Emerg Trauma Shock. 2010;3(4):348. doi:10.4103%2F0974-2700.70743. [PMC free article] [PubMed] [Google Scholar]

Oglesby, P. (2023, December 12). Right Brain vs. Left Brain Functions. Owlcation. https://owlcation.com/social-sciences/Right-Brain-VS-Left-Brain-Functions

Reuell, P., & Parsons, L. (2023, November 9). Lessons in learning. Harvard Gazette. https://news.harvard.edu/gazette/story/2019/09/study-shows-that-students-learn-more-when-taking-part-in-classrooms-that-employ-active-learning-strategies/

Rush, L. and Balamoutsou, S. (2006) Dominant Voices, Silent Voices and the Use of Action Learning Groups in HE: A Social Constructionist Perspective. Paper presented at the British Educational Research Association Annual Conference, University of Warwick, 6–9 September.

Saleem, M., & Khan, Z. (2022, September 19). Healthcare Simulation: An effective way of learning in health care. PMC PubMed Central. Retrieved March 28, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10364267/#:~:text=Effectiveness%20of%20simulation%20based%20education%3A&text=Several%20research%20investigations%20have%20proven,just%20on%20an%20individual%20basis.

Trowler, V. & Department of Educational Research Lancaster University. (2010). Student engagement literature review. The Higher Education Academy, 01904 717500. https://www.heacademy.ac.uk