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REVIEW ARTICLE

Utilizing a Flipped Classroom Approach to Facilitate Learning in the Health Sciences: A Systematic Review of the Literature

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ABSTRACT

It is essential that the training occurring across programs in the health sciences not only provides students with the knowledge necessary to correctly perform their role, but also to safely practice as health care professionals in the workforce. Curriculum in health science programs is typically very content heavy, which requires both the instructor and student to wade through vast amounts of information in order to determine the crucial elements necessary to practice. Additionally, it is not sufficient for a student to simply memorize content; they must be able to apply that content to clinical practice. Utilizing an active learning strategy such as the flipped classroom fosters the student's ability to apply content to practical situations, they are likely to encounter in their professional practice.

Introduction

Active learning replaces the traditional, lecture format of the classroom and replaces it with a format that requires student participation.[1] This shift, from passively receiving information to active involvement with the material, noted an increase in student performance.[2] While student performance is important, more important is the ability of the individual to function safely and competently in the workforce. Utilizing active learning techniques in the classroom assist the student to process knowledge and focus on the application of that knowledge. The ability to apply concepts in the classroom can translate to more prepared clinicians in employment. The objective for this literature review was to examine the existing, current literature in respect to utilization of a flipped classroom approach specific to educational offerings for students across health science programs for recurring themes. Identified themes can assist educators, both in academia and professional development, to determine best practices using active learning strategies to engage students and ultimately positively impact professionals across health sciences.

Literature Review

A review of the literature was conducted to determine common themes found when searching flipped classroom teaching approach. Of particular interest is the use of this specific active teaching strategy within health sciences. Search terms using EBSCO and CINAHL and included flipped classroom, flipped classroom within health sciences, and flipped classroom with clinical application. Literature search was limited to peer-reviewed journals published within the previous five years. Upon completion of the search, the literature review was organized by evolving themes. When evaluating current literature related to flipped classroom, several themes emerge. This paper focuses on themes relevant to education and training specific to individuals in health sciences. With that target audience in mind, themes evaluated covered clinical application and skill development.

Necessity

The research clearly pointed to necessity as being an indicator for utilization of the flipped classroom approach. With the restrictions placed globally on health sciences during COVID-19, faculty members sought alternatives to traditional clinical placement and classroom instruction. Parsing out the required information in a new format, often via virtual tools or with web-based delivery, required faculty to examine the bulk of information typically shared during a traditional lecture course to determine what can be delivered in a modification of the previously used lecture format versus what can be delivered with a novel approach. Researchers have found that allowing the student to pace through pre-recorded lecture of knowledge-based information at their own pace fosters a deeper understanding of clinical concepts when explored in an active learning environment; this understanding extends to the promotion of life-long learning, which is crucial for employees in health science fields.[3]

Application of knowledge

Because the content in health science fields is so dense, supplying the lecture material to students prior to class allows for more time in class to utilize deeper exploration of the ability to translate that knowledge to practice and fosters skill set development. That application of knowledge leads to better utilization of clinical judgment in practice areas.[4] The flipped classroom approach allows for limited lecture time to be more personalized to student needs. As the bulk of knowledge-based information is shared prior to class-time, the actual seated time can be used to address specific areas that students' are not grasping, as well as promoting innovative thinking and scientific inquiry.[5] Active learning promoted by the flipped classroom approach also enhances student accountability. It is essential for students to manage the knowledge material independently to best be prepared for scenarios presented in the classroom requiring the application of those concepts.[9] Working through developed case studies, either independently or in small groups, allows students to access existing knowledge and work towards solving real clinical problems in a collaborative approach.[13] Fostering collaboration within the classroom translates to awareness of the need for inter-disciplinary care in the workforce.

Clinical skill development

By providing knowledge-based information prior to lecture, class time is available to hone clinical skills.[7] Because the flipped classroom approach allows for

more time to focus on skill development, individuals in Residency Training reported an increase in self-perceived skill competence.[8] This perception extends to fostering student readiness to approach new clinical situations as well. It is also appreciated that the flipped classroom approach offers multiple opportunities to develop clinical skills in a safe, non-threatening environment.[10] This low-stakes environment allows the student to utilize repetition for skill development, without worry attributed to patient outcomes. Active learning in the classroom translate to kinesthetic learning opportunities, which students positively identified as strengthening their self-confidence in initiating and completing skills. This opportunity to develop clinical skills fosters the students' perception of enhanced learning.[11]

Skepticism

Research also noted negative aspects about utilization of the flipped classroom approach. A traditional lecture is viewed as largely a passive learning experience for the student; encouraging the student buy-in to actively engage and be held responsible for a portion of their learning was noted to be a major challenge. Many faculty members felt that buy-in was best met by providing points towards grades as an incentive.[6] Additionally, modifying existing lectures to a flipped classroom approach is initially labor-intensive for educators.[12]

Non-clinical subjects

Long term and short-term impact of Flipped Classroom

While most studies focused on using flipped classroom teaching for a specific course(s), very few looked at the long-term effects of this teaching method. One such study[14] found that compared to the control group being taught a basic science course, the experimental group performed better in other subjects one semester after the flipped classroom approach was used to teach a particular subject. It was also seen that this group performed better in the subsequent next two semesters on clinical courses. From this it can be inferred that flipped classroom technique promoted deep learning by putting the onus on the students which strengthened their understanding and application of acquired knowledge. It was also noticed that the flipped classroom model did not affect student performance in other subjects, despite it requiring more time to be studied and understood. Non-clinical courses with a specific emphasis on applied science also had a higher student performance and acceptance in the flipped classroom technique compared to traditional teaching. The authors reason flipped classroom teaching promotes critical thinking, also makes the students feel more engaged.[14,15,16]

Socio-cultural differences, racism and Flipped Classroom

With the rise in globalization and increase in ease of travel, international students' population would increase. These international students face a lot of challenges in terms of acclimating themselves to the new social and cultural environment. They may also be subjected to unconscious racism and bias. Flipped classroom may ease the transition and help them overcome the language barriers that they face.[18]

Flipped classroom may also help the students to grasp the subject with much more ease and the interactive nature of the classroom would foster collaboration between the international and domestic students helping them adjust. Flipped classroom can be used to address non-parity of learning opportunities and how it impacted them can be discussed by creating a "safe space".[19]

Inverted classrooms offer the chance for the students to take ownership of the study material. It also makes them more involved in the class as they have more chances of collaborative thinking and communication with the instructor. It has also been suggested that women prefer collaborative learning and prefer concrete experiences rather than abstract conceptualization.[20] Thus, flipping classroom even within the same ethnic population but different personality types has far better outcome than traditional teaching.

Limitations of current studies

A glaring limitation in most studies conducted to see the effectiveness of flipped classroom technique was the lack of control group. Another acknowledged shortcoming was the training required by the faculty to implement flipped classroom. Rather than the class format focus should be on how the topic being taught can be broken down into short modules which can be understood and implemented by the students.

Future studies can thus focus on the impact on memory and cognitive skills of the students and if

any appreciable change is noticed with flipped classroom. It can also try to decipher if the problem-solving skills is improved with flipping classrooms.

Flipped classroom in conjunction with other teaching methods

It was seen in one study[20] that one-third of the class did not participate in the pre-class preparation. Another study showed that compared to flipped classroom team-based learners scored better in every session.[21]

A blended approach combining flipped and team-based learning seem to be the best way to promote active learning.[22] It was noted that team-based learning particularly improves attitude of students with low academic grades and motivates them to participate in the class as well as score a better grade.[23] The blended technique improved knowledge acquisition and self-directed learning. The blended technique also promotes problem-solving abilities by facilitating teamwork. This may help them later in life when they work in a healthcare setting, which would need collaborative work and problem solving.

Discussion

Regardless of the format, active learning has a wealth of benefits to the integration of knowledge. This literature review identified several themes consistently demonstrated across existing research. Many educators, both in academia and professional development, utilize a flipped classroom approach out of necessity. With the vast amount of material to be covered in health science programs, utilizing an active learning strategy shifts responsibility of knowledge-based information to the learner, freeing up limited class time for deeper exploration of topics. Both students and faculty alike voice a benefit to the application of knowledge and clinical skill development as fostered by a flipped classroom approach. However, due to the amount of work required by both parties, faculty members for class development and students for class preparation, there is some skepticism as to whether or not this approach is more beneficial than a traditional lecture method of learning. Outside of clinical courses, there are both short-term and long-term benefits in the application of a flipped classroom approach. These benefits emphasize the mastery of content by students in the short-term as well as the ability to strengthen their holistic comprehension of difficult content on a long-term basis. Additionally, utilizing this specific active learning strategy assists in leveling the playing fields for non-native English-speaking students, as well as fostering interactive group dynamics. Finally, research supports, at a minimum, a combined approach, wherein the faculty member utilizes both traditional lecture with active learning via flipped classroom for some course sessions.

These concepts promoting the benefits of the flipped classroom approach can be used not only in academia but extended to professional development and continuing education necessary in health science fields. As many health profession fields require ongoing training on an annual basis, utilizing novel approaches to share concepts with practitioners will further enhance their skill development, ultimately positively impacting patient outcomes.

The generational shift in attitude towards maintaining a healthy work life balance and increase in number of two working parents, plays a role in the rise of alternative teaching training methods especially in the healthcare field. Healthcare fields which place a large importance to acquiring clinical skills can use hands-on workshop combined with flipped classroom to limit classroom time, increase practice in a non-clinical setting with better outcomes.[3]

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