Creation and Implementation of a Flipped Jigsaw Activity to Stimulate Interest in Biochemistry among Medical Students

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ABSTRACT
Learner-centered pedagogical methods that are based on clinical application of basic science concepts through active learning and problem solving are shown to be effective for improving knowledge retention. As the clinical relevance of biochemistry is not always apparent to health-profession students, effective teaching of medical biochemistry should highlight the implications of biochemical concepts in pathology, minimize memorization, and make the concepts memorable for long-term retention.

Here, we report the creation and successful implementation of a flipped jigsaw activity that was developed to stimulate interest in learning biochemistry among medical students. The activity combined the elements of a flipped classroom for learning concepts followed by a jigsaw activity to retrieve these concepts by solving clinical cases, answering case-based questions, and creating concept maps. The students’ reception of the activity was very positive. They commented that the activity provided them an opportunity to review and synthesize information, helped to gauge their learning by applying this information and work with peers. Students’ improved performance especially for answering the comprehension-based questions correctly in the post-quizzes as well as the depth of information included in the post-quiz concept maps suggested that the activity helped them to understand how different clinical scenarios develop owing to deviations in basic biochemical pathways.

RESULTS
Quantitative representation of the students’ evaluation data of the flipped jigsaw with respect to (A) learning objectives, (B) organization and facilitation, and (C) relevancy and motivation.

METHODS AND MATERIALS

Before the session: Each disease was assigned a color. Color and group assignments and review questions and cases were posted in the course website a week before the session. The students were asked to read the cases and prepare answers to the review questions assigned to their color.

Mono-color session: Students took the pre quiz as a group. Colored materials with the case questions were distributed. Groups prepared concise answers to the review questions and the case questions assigned to their color.

Rainbow session: Students then formed rainbow groups. Each student presented his/her materials to their group. During the session they were asked to make sure that their group achieves mastery over the four diseases. This is important as peer-teaching is pivotal aspect of this session. The students took the post quiz as a group. Faculty facilitators were going around asking questions and providing help as needed during both sessions.

Consistent with the current focus on peer-teaching or peer-assisted learning in medical education, the flipped jigsaw activity is strongly dependent on teamwork as well as individual contributions to achieve optimal outcomes. As peer-teaching involves cognitive development as well as social collegiality, it plays an important role in enhancing knowledge acquisition and comprehension.

As this activity allows for both individual learning as well as team-work, it may contribute to lessening stress among students as it accommodates different learning styles. Quizzes are taken as a group, which may further contribute to the creation of a reduced stress environment, where students can focus on thinking critically about the concepts rather than worrying about performance in the quizzes.

The activity also ensures active participation from each student.

Main aspects liked by the students were (i) the session helped them to learn and understand the material, (ii) they appreciated collaborative learning and (iii) they found the session to be engaging.

As evidenced from the students’ reception of the activity and their performance in the quizzes, the activity demonstrated clinical relevance of biochemistry by promoting critical thinking and enhancement of comprehension about the concepts learned in the context of clinical disorders, allowed review, and deeper understanding of the biochemical concepts, and encouraged peer teaching and team work among students.

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REFERENCES
