



Contents lists available at ScienceDirect

Currents in Pharmacy Teaching and Learning

journal homepage: www.elsevier.com/locate/cptl

Experiences in Teaching and Learning

Comparison of student confidence and perceptions of biochemistry concepts using a team-based learning versus traditional lecture-based format



Rebecca Gryka^{a,*}, Mary E. Kiersma^b, Tracy R. Frame^c, Stephanie M. Cailor^a,
Aleda M.H. Chen^a

^a Cedarville University School of Pharmacy, Cedarville, OH 45314

^b Accreditation Council for Pharmacy Education (ACPE), Chicago, IL 60603-4810

^c Belmont University College of Pharmacy, Nashville, TN 37212

ARTICLE INFO

Keywords:

Team-based learning

Biochemistry

Pharmacy students

Confidence

ABSTRACT

Purpose: To evaluate differences in student confidence and perceptions of biochemistry concepts using a team-based learning (TBL) format versus a traditional lecture-based format at two universities.

Educational Activity: Two pedagogies (TBL vs lecture-based) were utilized to deliver biochemistry concepts at two universities in a first-professional year, semester-long biochemistry course. A 21-item instrument was created and administered pre-post semester to assess changes in confidence in learning biochemistry concepts using Bandura's Social Cognitive Theory (eight items, 5-point, Likert-type) and changes in student perceptions of biochemistry utilizing the theory of planned behavior (TPB) domains (13 items, 7-point, Likert-type). Wilcoxon signed-rank tests were used to evaluate pre-post changes, and Mann Whitney *U* tests for differences between universities.

Findings: All students (N=111) had more confidence in biochemistry concepts post-semester, but TBL students (N=53) were significantly more confident. TBL students also had greater agreement that they are expected to actively engage in science courses post-semester, according to the perceptions of biochemistry subscale. No other differences between lecture and TBL were observed post-semester.

Summary: Students in a TBL course had greater gains in confidence. Since students often engage in tasks where they feel confident, TBL can be a useful pedagogy to promote student learning.

Background and purpose

A basic sciences foundation is important in the education of pharmacists.¹ The Accreditation Council for Pharmacy Education (ACPE) Standards emphasize the need for the curriculum to provide the scientific foundation and practice competencies for the development of students as professional and lifelong learners.² Standards 1.1 and 12.1 specifically support basic science faculty in creating strategies to develop, integrate, and apply the appropriate breadth and depth of knowledge for the integration of science

* Correspondence to: Cedarville University School of Pharmacy, Cedarville, OH 45314.

E-mail addresses: rgryka@cedarville.edu (R. Gryka), mkiersma@acpe-accred.org (M.E. Kiersma), tracy.frame@belmont.edu (T.R. Frame), scailor@cedarville.edu (S.M. Cailor), amchen@cedarville.edu (A.M.H. Chen).

<http://dx.doi.org/10.1016/j.cptl.2016.11.020>

concepts into therapeutic decision making.² In higher education, team-based learning (TBL) has been frequently used as an active learning method to promote self-directed learning and enhance critical thinking skills.^{3,4} According to a systematic review, TBL can significantly improve knowledge scores.⁵ Utilizing TBL in a basic pharmacokinetics (PK) course resulted in higher grades in a subsequent clinical PK course.⁶ In addition, pharmacology exam scores improved for students taking a TBL-based pharmacology course.⁷

While TBL may improve outcomes, its impact on confidence is less-clear. Self-efficacy (confidence), students' perceived ability to learn or perform a specific task, can play a major role in the student's perception of successfully or unsuccessfully completing a task as defined within Bandura's social cognitive theory.^{8,9} Self-efficacy can influence future actions of a student to either choose to participate in tasks where they feel confident or to avoid tasks where they do not.^{12,13} At one time, Bandura stated that self-efficacy and perceived behavioral control were interchangeable; however, other researchers have advocated self-efficacy as a better predictor of intentions and behavior since it is based on internal control factors, whereas perceived behavioral control reflects external factors.^{12,13}

Additionally, the Theory of Planned Behavior (TPB) is used to predict and explain human behavior in specific circumstances.¹⁴ In this theory, the relationship between attitudes (the positive/negative evaluation of the behavior), subjective norm (the perceived social pressure to perform/not perform a behavior), and perceived behavioral control (an individual's perception of the ease or difficulty in performing a behavior) are described as the foundational beliefs regarding the intention to perform a specific behavior. Essentially, TPB suggests that behavior is a function of beliefs relevant to that behavior. Therefore, TPB can be used as an additional measure to evaluate self-efficacy in performing specific tasks or behaviors.

The impact that TBL can have on confidence and perceptions of biochemistry concepts is not known. More specifically, does TBL influence student behavior in electing to apply the concepts in later pharmacology and therapeutics coursework because they feel confident? For this study, applying science concepts was the specific foundational behavior assessed. The goal of this study was to evaluate changes in student confidence and perceptions of biochemistry concepts when using a TBL format versus a traditional lecture-based format.

Educational activity and setting

Setting

A cross-sectional study was conducted with first professional year pharmacy students at Cedarville University and Manchester University, which are small, private, liberal arts institutions located in southwestern Ohio and northeast Indiana, respectively. The maximum pharmacy class size is 65 for Cedarville and 73 for Manchester. Participation in the study was voluntary and approved by the Institutional Review Board (IRB) at both universities.

Educational activity

Each university utilized a different pedagogical approach for a required Fall 2012 semester-long biochemistry course. Cedarville University implemented TBL, while Manchester University utilized a traditional, lecture-based pedagogy. At Cedarville, students were divided into diverse teams of five to six students with respect to personality as described previously.¹⁵ Each week at Cedarville University, content was delivered in a lecture format that covered specific core concepts such as gluconeogenesis and glycogen metabolism. Pre-class reading was assigned, followed by a lecture in the first two hours of the week that incorporated an audience response component, and then these concepts were reinforced in TBL groups for the second two hours of the week. These components were delivered in this same order every week. Each TBL session was conducted as previously described.¹⁶ In short, TBL sessions were developed using the fundamental TBL core concepts which included (in sequential order): a 10-question individual readiness assurance test (iRAT), the same 10-question assessment taken as a team (tRAT), discussion, clarification, elaboration, followed by an application exercise. Peer evaluations were completed twice during the semester to promote accountability.¹⁶ At both universities, the courses were taught primarily by one faculty member (greater than > 90% of the biochemistry course at Cedarville, > 80% at Manchester). Grading in the course at Cedarville University was based on the TBL components, three exams, and a cumulative final, while grading at Manchester University was based on six quizzes and three exams. Both universities had course objectives that covered similar core concepts (see [Table 1](#)).

Educational activity evaluation

Students completed The Biochemistry Questionnaire (consisting of Biochemistry Confidence Assessment and the Perceptions of Biochemistry Assessment) pre- and post-semester. Appropriate instruments were not available, so surveys were developed *de novo*. Similar course learning objectives across institutions ([Table 1](#)) were utilized to create items to measure confidence in learning biochemical concepts (eight items, 5-point, Likert-type scale, 1= Not at all Confident to 5= Extremely Confident), hereafter called the Biochemistry Confidence Assessment. To assess student perceptions of biochemistry, the TPB domains were utilized to create 13 items (seven-point, Likert-type, 1=Strongly Disagree to 7=Strongly Agree) designed to measure perceived behavioral control, subjective norm, and attitude regarding biochemical concepts, hereafter called the Perceptions of Biochemistry Assessment. The Biochemistry Questionnaire underwent student review (a student read for clarity and understanding), peer review (multiple faculty at both institutions) and expert review (an assessment expert). Demographic data were collected via a 10-item instrument that

Download English Version:

<https://daneshyari.com/en/article/4938032>

Download Persian Version:

<https://daneshyari.com/article/4938032>

[Daneshyari.com](https://daneshyari.com)