

The impact of Bybee (5E) teaching method on learning of physiology textbook among nursing students

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Background: Using active teaching methods is one of the crucial elements of today's education. One of the active teaching methods is Bybee method. This study aims to evaluate the impact of Bybee (5E) teaching method of learning of physiology textbook among nursing students.

Methods: This study is pre-test and post-test with control group as semi-experimental design. The study population is all B.Sc. students of nursing in Medical Science University of Alborz in academic year 2015-2016. The study sample is 30 students and by convenient sampling method, the students are dedicated to two classes (15 students in each class). The studies measure is learning tests with the reliability 0.89 and the face validity is supported by the lecturers (experts). For data analysis, independent t-test is used by SPSS, version 18 software.

Results: The results of study show that learning ($p=0.001, 0.513$) of the students being instructed by Bybee method is higher than those instructed by traditional method.

Conclusion: based on the impact of Bybee method on learning of physiology in nursing, using this teaching method is recommended in nursing and medical education.

Keywords: Bybee teaching method, Physiology course, Learning, Education effectiveness

تأثیر أسلوب تدریس بایبی (BYBEE(SE) علی مستوى تعلم درس الفیزیولوجیا عند طلاب التمريض

المقدمة: إن استخدام أساليب تدريس ذو نشاط هو جزء غير قابل للإغفال في مجال التعليم في العصر الحاضر إن إحدى أساليب التدريس الفعال هو أسلوب تدریس بایبی . إن الهدف من إجراء هذه الدراسة هو تعيين مستوى تأثير استخدام أسلوب بایبی التدریسی علی مستوى التعلم عند الطلاب التمريض في مادة الفیزیولوجیا .

الأسلوب : إن الدراسة الحالية هي عبارة عن اختبار قبلي و اختبار بعدي مع مجموعة الشاهد وهي من الاختبارات النصف اختيارية .

إن العينة الإحصائية في هذه الدراسة هم جميع طلاب التمريض في جامعة البرز للعلوم الطبية في العام الدراسي ٩٤-٩٥. تم تقسيم العينة التي اشتملت على ٣٠ طالب إلى صفین يحتوي كل صف علی ١٥ طالب . تم إشتمال اختبارات التعليم بمستوى ثبوت ٠.٨٩ . والتأييد الصوري بواسطة الاساتذ المختصة تم استخدام اختبار T المستقل و برنامج SPSS النسخة ١٦ في تحليل المعلومات .

النتائج : أشارت نتائج هذه الدراسة إلى مستوى التعليم ($P=0,001$) بحيث إن هذه المستوى كان أعلى عند أسلوب بایبی بالنسبة إلى الأسلوب التقليدي.

الاستنتاج: نظراً إلى مستوى تأثير أسلوب تدریس بایبی علی مستوى التعلم في درس الفیزیولوجیا في كلية التمريض نوصي باستخدام هذا الأسلوب في مجال التعليم الطبي.

الكلمات المفتاح: أسلوب تدریس بایبی - مادة الفیزیولوجیا- التعلم - تأثير التعليم .

تأثير روش تدریس بایبی ((Bybee (5E)) بر میزان یادگیری درس فیزیولوژی دانشجویان رشته پرستاری

مقدمه: استفاده از روش‌های تدریس فعال جزء جدایی ناپذیر آموزش عصر حاضر است. یکی از روش‌های تدریس فعال، روش تدریس بایبی است. هدف از انجام این پژوهش، تعیین تأثیر استفاده از روش تدریس بایبی بر میزان یادگیری دانشجویان رشته پرستاری در درس فیزیولوژی بود.

روش: این پژوهش از نظر طرح، پیش‌آزمون- پس‌آزمون با گروه کنترل و در زمره طرح‌های نیمه‌آزمایشی است. جامعه آماری این پژوهش کلیه دانشجویان مقطع کارشناسی رشته پرستاری دانشگاه علوم پزشکی البرز بودند که در سال تحصیلی ٩٥-٩٤ مشغول به تحصیل بودند. نمونه پژوهش ٣٠ دانشجو بودند که با استفاده از روش نمونه‌گیری در دسترس در دو کلاس ١٥ نفره گماشته شدند. ابزار مورد استفاده شامل آزمون‌های یادگیری با پایایی ٠/٨٩ و با تأیید روایی صوری توسط اساتید به عنوان متخصص موضوع بود. برای تجزیه و تحلیل داده‌ها از آزمون تی مستقل با کمک نرم‌افزار Spss نسخه ١٨ استفاده شد.

یافته‌ها: نتایج پژوهش نشان داد میزان یادگیری ($p=0.001$ و 0.513) دانشجویانی که با روش تدریس بایبی آموزش دیده‌اند، نسبت به دانشجویانی که به صورت سنتی آموزش دیده‌اند، بیشتر است.

نتیجه‌گیری: با توجه به تأثیر روش تدریس بایبی بر میزان یادگیری درس فیزیولوژی پرستاری، بکارگیری این روش تدریس در پرستاری و آموزش پزشکی توصیه می‌شود.

کلیدواژه‌ها: روش تدریس بایبی، درس فیزیولوژی، یادگیری، اثربخشی آموزش

نرسنگ کورس مین فیزیالوجی کے موضوع کے اسٹوڈینٹ پر بایبی bybee5e کورس کے اثرات

بیبا گراؤنڈ: فی زمانہ فعال تدریس معیاری تعلیم کا جزء لاینفک ہے۔ اس کی ایک روش بایبی روش ہے، اس تحقیق کا هدف نرسنگ اسٹوڈینٹ کے فیزیالوجی موضوع پر اس روش تدریس کے اثرات کا جائزہ لینا ہے۔

روش: اس تحقیق میں البرز میڈیکل کالج کے تمام نرسنگ طلباء شریک تھے۔ ان کا تعلق دوہزار پندرہ اور دوہزار سولہ سے تھا تحقیق میں تیس طلباء شریک تھے۔ ان کو پندرہ پندرہ طلباء کی دو کلاسوں میں تقسیم کیا گیا تھا۔ اس تحقیق میں طلباء کو کچھ سوالات دئے گئے تھے جن کو ماہرین نے بنایا تھا۔

نتیجے: اس سے پتہ چلتا ہے کہ جن طلباء نے بائی روش سے تعلیم حاصل کی تھی ان کے نمبر روایتی طور پر تعلیم حاصل کرنے والے طلباء سے اچھے تھے۔

سفرار: بائی روش تدریس کے مفید اثرات کے پیش نظر یہ کہا جاسکتا ہے کہ اس روش سے میڈیکل کے طلباء اور نرسنگ طلباء کو تعلیم دی جائے۔

کلیدی الفاظ: بائی، فیزیالوجی، تعلیم کے اثرات .

INTRODUCTION

Today, most Universities attempt to find educational methods to develop clinical decision making capacities and continuous learning of students. The trained students with traditional methods memorize the items instead of perceiving the concepts and they only receive information from the teachers. Such students at the hospital, only apply their routine works and are passive in new situations and there is no attempt for innovation to meet the existing needs [1]. It seems that today's traditional instruction methods don't meet the continuous changes of the community's needs. The education department of medical groups, namely nurses apply conventional methods yet. The application of new instructional methods is important as some educational science theorists consider the mentioned methods much more significant than the scientific knowledge of a teacher [2].

Teaching is an activity at the center of all educational elements and it is the most important performance of the teacher at the classroom to increase learning. As we cannot teach any topic by any method, we need suitable instruction methods to teach different topics [3].

The instructional methods are two types: One is teacher-centered instruction or direct method, another one is learner-centered instruction or indirect method. [4]. Learner-centered instruction is the instruction in which the learners are aided by the teacher and they are responsible for their perception [4]. The learner-centered instruction stems from constructivist theory. This theory is mostly based on the creation and design of learning environments [5].

Bybee (5E) five-phase instruction method is one of the constructivism learner-centered instructional methods. This method was raised at first by Karplus, Their [6] and then was revised by Roger Bybee [7]. This method was at first based on three stage exploration Invention and discovery based on Piaget cognitive growth and was changed into constructivism by Roger Bybee. This instructional method increases the learning consequences for the students with different cognitive levels [8]. This instructional method consists of five phases as:

- 1- Engaging: In this stage, the teacher evaluates the previous knowledge of learner as the administrator and helps them to perform new activities to be involved in new concepts and be motivated.
- 2- Exploration: In this stage, explorative experiences are provided for students. The students use their previous knowledge and by explorative questions and tests generalize their previous knowledge.
- 3- Expanding: In this stage, the learners explain their perception of concepts and the teacher by his explanations can guide the learners to deep learning.
- 4- Elaboration: The learners develop the concepts they have learnt and use their learning.
- 5- Evaluation: In this stage, learners evaluate themselves and the teacher evaluates the progress of learners [9].

Bybee method has the following advantages: Learner-centered, significant learning activities, avoiding memorization of items. Also, this method enables the

learners to absorb and adjust the information via problem solving and information acquisition. Also, the learners are encouraged to more activities, critical and creative activities [10].

Heidari (2006) in a study found that Bybee teaching method was effective in comparison to lecture method in academic achievement of students [11]. Shokuhi (2012) in a study found that Bybee teaching method had high impact on academic achievement of students [12]. Khoftedel (2013) in a study showed that academic achievement of students trained with Bybee method were higher than the mean score of the academic achievement of the students receiving collaborative teaching method [13].

Guasch et al., (2010) in a study of medical students found that the experimental group who received active method had better academic performance compared to control group who were trained by traditional method [14]. Fazelian et al., (2010) in a study "found that this educational design considerably increased the learning and retention of students [15]. Moradi et al., (2012) in a study found that Bybee education method was effective on learning and creativity and this effect was for the benefit of experimental group [16]. Moradi et al., (2012) in a study found that Bybee instruction method was effective in learning and creativity and this effect was for the benefit of experiment group [16]. Amirteimuri et al., (2014) in a study showed that this model facilitated critical thinking and learning in education [17]. In a study Acisli et al., (2011) found that Bybee model increased the learning among students [18].

Acish (2011) in a study showed that there was a significant difference between two groups regarding critical thinking and learning [19]. Walia (2012) in a study found that this educational model had significant impact on math creativity of students [8]. Suciati et al., (2015) in a study showed that Bybee model increased the creativity of students [10].

The studies have shown that in case of using suitable education method, we can achieve effective learning in the learning - teaching process [20, 21]. The studies on using active teaching methods have supported the effectiveness of this method, but no study has been conducted on using active instruction methods in medical education namely nursing. However, the nurses have found the gap between the theory and practice in nursing [1]. One of the proposed methods to close this gap between education and practice is changing the traditional instruction system of active instruction methods. One of the active methods in teaching learning process is Bybee method. The present study aims to determine the effect of Bybee teaching method on learning of nursing students in physiology. The study hypothesis shows that:

Bybee teaching method is effective on learning of nursing students in physiology textbook.

METHODS

The present study is semi-experimental with pre-test and post-test and control group. The study population consisted of 30 students and by convenient sampling method, the students are dedicated to two classes (15 students in each class) as randomly into control and experiment groups. The

inclusion criteria are the tendency of students to participate in the study. At first and before entering the educational intervention, pre-test is performed on two groups. After teaching physiology by Bybee teaching method (despite traditional teaching methods can activate the learners in the learning process) an experimental group and traditional method on the control group during 6 sessions (1 hour), the learning post-test is performed on two groups. The collected data were analyzed using independent t-test and SPSS software, version 18. The study measures include:

Pre-test and post-test of researcher built learning of nursing physiology: after raising the questions by the researcher, they were corrected by some nursing lecturers. 20 questions were defined for two tests. The objective questions were used in these tests. After the support of face validity of the 3 lecturers as experts, to measure the reliability of tests, learning test was performed by nursing students and the pre-test, post-test reliability of learning was 0.89. The scores in pre-test and post-test were ranging 0-20.

In descriptive statistics, some indices as mean and standard deviation of scores and in inferential statistics, independent t-test was applied. The inclusion criterion was the willingness to participate in the research. It should be noted that all the participants were informed about the research goals and they expressed their oral consent.

RESULTS

The descriptive characters of subjects are shown in Table 1. **Bybee teaching method is effective on learning of nursing students in physiology**

The results of analysis of statistical test for learning variable are shown in Table 2. The results are shown as follows:

As shown in Table 2, as the calculated t (t=2.35) is bigger than t of Table (t=1.65) at the $\alpha=0.05$ and the test is one way, by confidence interval 95%, we can say the mean difference of experiment group is higher than the mean of scores of control group. Thus, the study hypothesis regarding the effect of Bybee teaching method on learning in

physiology textbook is supported.

DISCUSSION

This study aims to evaluate the effect of Bybee teaching method on learning of students of nursing in physiology textbook. The present study is a new research in medical science and there is no in this regard in Iran. The results of study regarding the hypothesis “The effect of Bybee teaching method on learning of nursing students in physiology textbook showed that Bybee teaching method increased the learning of students. The research finding was in line with those of Heidari which found that Bybee teaching method was effective in comparison to lecture method in academic achievement of students [11], shokuhi which found that Bybee teaching method had high impact on academic achievement of students [12], Khoftedel which showed that the academic achievement of students trained with Bybee method were higher than the mean score of academic achievement of the students receiving collaborative teaching method [13], Guasch et al., in a study on medical students found that the experimental group who received active method had better academic performance compared to control group who were trained by traditional method [14], Fazelian et al., which found that this educational design considerably increased the learning and retention of students [15], Moradi et al., which found that Bybee education method was effective on learning and creativity and this effect was for the benefit of experimental group [16], Amir Teimuri et al., which showed that this model facilitated critical thinking and learning in education [17] Acish which showed that there was a significant difference between two groups regarding critical thinking and learning [19], Walia which found that this educational model had significant impact on math creativity of students [8], Suciati et al., which showed that Bybee model increased the creativity of students [10] showing that Bybee method increased learning, academic achievement and creativity.

CONCLUSION

This study showed that the Bybee method in physiology increased the learning of nursing students. The increase of learning among the students who received Bybee instruction is analyzed as: This method is a constructivism method and this emphasizes on keeping the learners active during the learning process. The higher the engagement of learners in learning process, the better the learning and retention.

Table 1. Descriptive characteristics of subjects

Educational groups	Academic level	F	Present
Control	B.Sc.	15	50%
Experiment	B.Sc.	15	50%

Table 2. The analysis results of t-test of scores of two groups in learning

Group	Test	N	Mean and SD	F test	Significance level	df	t	p-value
Control	Pre-test	15	6.45±1.3	0.312	0.513	28	2.35	0.001
	Post-test	15	8.78±1.34					
Experiment	Pre-test	15	7.21±1.12					
	Post-test	15	14.23±1.14					

Recommendations of study

Based on the study findings, it is proposed to the active administrators in education namely medical education to use

Bybee teaching method to make the learner active during the learning process and this increases the learning and memorizing of students.

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