

## การศึกษาประสิทธิภาพของการใช้สื่อการสอนในรูปแบบ ซี เอ ไอ ช่วยในการสอนการฝึกหัดเจาะเลือด

วิโรจน์ วิวานิชกิจ

อาจารย์, ภาควิชาเวชศาสตร์ชันสูตร คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย กรุงเทพมหานคร 10330

## Efficacy of CAI as Additional Media for Medical Procedure Training, a Trial in Blood Collection Procedure Training

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**Objective:** Computer Assisted Instruction (CAI) is a modern education technique in the present day. In medical education, it is accepted as an effective tool to improve the students' knowledge. In this study, evaluation of efficacy of CAI as additional media for medical procedure training was performed.

**Method:** A trial was set in a session of blood collection procedure training in Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University. 30 medical students were recruited into this study. They were simple randomized into equal groups, group A for conventional training program and group B for CAI training program.

**Result:** Evaluation of effectiveness score after study, revealed that the second group presented significant higher score than the first group ( $P < 0.05$ ).

**Conclusion:** This indicated that CAI can also help medical students improve their cognitive in procedure practice. The author recommended usage of CAI as additional media in teaching other medical procedures.

**Key Words:** CAI, training, procedure

**Short running title:** CAI for blood collection training

**วัตถุประสงค์:** ซี เอ ไอ เป็นสื่อการสอนชนิดใหม่ที่เป็นที่ยอมรับว่าสามารถสร้างองค์ความรู้ที่ดีแก่นิสิตแพทย์ได้ และถูกนำมาใช้ในทางแพทยศาสตร์ศึกษาในประเทศไทย ได้ทำการศึกษาประสิทธิภาพของการใช้สื่อการสอน ซี เอ ไอ ช่วยในการสอนการฝึกหัดการเจาะเลือดสำหรับนิสิตแพทย์ไทย โดยใช้รูปแบบการศึกษาแบบการศึกษาเชิงทดลองแบบวัดผลภายหลัง

**วิธีการ:** ได้ทำการศึกษาเชิงทดลองโดยได้ทำการศึกษาในกลุ่มตัวอย่างนิสิตแพทย์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยจำนวน 30 คน (ชาย 15 หญิง 15) คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย โดยแบ่งนิสิตทั้งหมดเป็น 2 กลุ่มเท่าๆกันโดยการสุ่ม คือ กลุ่ม A ได้รับการฝึกหัดแบบประเพณีนิยม และ กลุ่ม B ได้รับการฝึกหัดแบบใช้ซี เอ ไอ เป็นสื่อในการสอน

**ผลการศึกษา:** ภายหลังจากการฝึกหัดเสร็จสิ้นได้ทำการประเมินประสิทธิภาพของวิธีการฝึกหัดในแต่ละกลุ่ม โดยพบว่าเต็มประเมินประสิทธิภาพโดยเฉลี่ยในกลุ่มที่ใช้การฝึกหัดโดยใช้สื่อ ซี เอ ไอ ร่วมด้วยมีค่าสูงกว่าอย่างมีนัยสำคัญ ( $P < 0.05$ )

**บทสรุป:** เห็นได้ว่าการฝึกหัดแบบใช้ซี เอ ไอ เป็นสื่อเป็นการฝึกหัดที่ให้ผลสัมฤทธิ์ที่ดีสามารถใช้เป็นสื่อการสอนองค์ความรู้ทางทักษะทางการแพทย์

**คำสำคัญ:** CAI, การฝึกหัด, หัตถการ

**หัวเรื่องย่อ:** ซี เอ ไอ ช่วยสอนเจาะเลือด

Computer Assisted Instruction (CAI) has had an educational role since the 1960s when the University of Illinois made a CAI terminal available to students. In the present day, the advent of low-cost, modular micro-computer technology can help create new interest in the use of CAI for teaching and evaluation.

In Thailand, the CAI for medical students has been used for a few years. CAI becomes important in medical education because they are adaptable to distinctions between individuals. In addition to providing knowledge the system also stimulates the students to find the additional information resulting in self-directed learning.

This sort of education had been used in many medical schools in Thailand. Its efficacy in improvement of knowledge of the student is accepted<sup>1-3</sup>. However, in the real medical practice, the efficacy of CAI should also be evaluated.

In this study, the author try to set a CAI topic "Evacuated blood collection system" to use as an additional media for procedure training and also evaluate its effectiveness.

## Materials and methods

### Materials

1. The CAI lesson was written by the staff of the Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University and compiled into the CHULA CAI system. This CAI was placed onto the website of the Faculty of Medicine, Chulalongkorn University as the HTML pages.

The CAI used in this study composed of both texts and exercise for study. Graphic images and animation coupling with the functional text was also used. The multiple choices questions examination was also provided intending to assist the memorization of the practical point in real procedure practice. The program will automatically repeat in case that the students answers the false choice. The total time to use this CAI is about 30 minutes. The cost of production of this CAI was about 2,000 baht.

2. Computer in the Faculty of Medicine, Chulalongkorn University was used as the server of the website.

3. Materials for the routine training course of venipuncture as needle, holder, blood collection tube and blood collection set.

### Methods

This study was set as a after only experimental study. Thirty medical students who attended the

venipuncture course of the Department were recruited into this study. All students were in the previous same class and same level. All were simple randomized into two equal groups as group A and group B.

The students in group A (n = 15) was set into the conventional program as listening to the lecture, practice the procedure using the manikin then practice in real humanistic model. The second group (group B, n = 15) was set into the test program.

They experienced the same educational program as the first group with 1 - hour additional session for studying the prepared CAI media before real humanistic model.

Once the study complete, all students were evaluated. Evaluation for effectiveness score for both groups in real humanistic practice was done. Check-list for evaluation for the procedure performing was used. The check-list was based on the routine considerations on procedure practice according to the standard venipuncture technique. The total score for the check-list evaluation was 10 points. Each 1 point was given to the correct technique in these following items; a) preparation of the procedure, b) cleaning process, c) applying tourniquet, d) preparing for the equipment, e) performing venipuncture, f) collection of blood specimens, g) stopping procedure, h) caring of the patient wound, i) processing of the collected sample and j) checking for the completeness. After the study, all subjects in group B were also asked about their attitude to additional CAI lesson by open end interviewing. They also asked to give their satisfaction scores in the rating scale system (1 = least satisfaction and 5 = most satisfaction)

### Statistical analysis

The effectiveness score between both groups was compared using Fisher exact test. All statistical comparison was tested at significant level = 0.05.

### Results

The results of statistical analysis of the post-study test of both group indicated that group A scored an average of  $7.0 \pm 1.4$  points (95 % CI = 6.3 - 7.7 points) and group B scored an average of  $9.3 \pm 0.5$  points (95 % CI = 9.0 - 9.6 points). It revealed that the variability of average score in group B was significantly more than group A ( $P < 0.05$ ).

From interviewing the students in group B. 12 indicated that the CAI is good media while the 3 left indicated that the CAI is not good media (table 1). The average satisfaction scores of them was  $4.5 \pm 0.8$ .

**Table 1.** Attitude of the students in group B to usage of CAI as an additional media for procedure training.

Attitude	number	%
1. good	12	80.0
<input type="checkbox"/> Attractive	10	66.7
<input type="checkbox"/> fulfill some knowledge	2	13.3
2. not good	3	20.0
<input type="checkbox"/> use long time	2	13.3
<input type="checkbox"/> expensive	1	6.7

### Discussion

Procedure training is important in medical practice<sup>4-5</sup>. However, the method for teaching medical procedure must be carefully considered. Based on the principle of patient rights, such unnecessary training by poor skilled medical students should be avoided<sup>5</sup>.

In this study, CAI, an effective media in providing the knowledge to medical students, was tested for its efficacy in application for medical procedure training aids. Interestingly, the result indicates that usage of CAI as an additional media in blood collection procedure training is effective. CAI can promote better medical skill comparing to conventional training program.

Furthermore, the subjects who used CAI media presented satisfaction to this media. Attraction of the media becomes an important point to consider in improvement of any CAI media.

According to this study, the author recommended usage of CAI media as an additional media in medical procedure training. Producing of attractive CAI media to serve the emotional desire of the students as users should also be concerned.

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