

# **FINAL RESEARCH REPORT**

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EDRM 600

May 11, 2014

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## Introduction

In the United States, The American Heart Association (AHA) annually trains more than 12 million people in cardiopulmonary resuscitation (CPR), to equip Americans with the skills they would need to perform bystander CPR (AHA, n.d. ). All clinicians who have patient contact in a healthcare facility are required by the Joint Commission (The national accreditation body for healthcare organizations controlling performance standards), to be certified and to maintain that certification in AHA Basic Life Support (BLS) , commonly known as CPR.

An individual can become certified in BLS by attending an 8-hour class which includes both a live presentation and a hands-on demonstration. The participant completes skills and passes a test to gain certification. To recertify, the individual has 2 options: either attend a 4-hour class (which is a mini version of the 8-hour class), or pass an AHA sponsored set of online modules. Each module poses a series of questions and provides detailed answers that explain the reasoning behind each inquiry. The learner also has the ability to view videos if needed. After a module is done, a mini-test has to be completed before the applicant can proceed to the next module. The participant has eleven modules to complete before going to the final test. After completion of the entire set of modules, the participant has to show his/her BLS skills to an AHA instructor in order to gain or renew his/her certification and complete the requirements.

When the online module system was first set-up at Huntsville Hospital Health System in Huntsville, Alabama, the education department faced two points of resistance. First, the instructors were hesitant to switch to blended (online modules and skills check) learning for the re-certification because of the possible lack of retention. Second, they were concerned that the

employees would not be engaged with the lessons and could easily miss key elements of the live lecture. However, Conrad (2002) states that learners are more connected with their online course materials than in a live class because they can better prepare themselves. On the other hand, the adult learners were nervous to complete the part of their re-certification online because of a discomfort and lack of familiarity with computer technology and a preference for class interaction. However, the blended learning approach offered the opportunity to integrate up-to-date information in an innovative and interactive learning environment with the more traditional one-on-one personal contact during the second part of the module, the skills test. The AHA computer based learning (CBL) is very extensive and offers several options for the learners to enhance their learning experience.

The focus of this research project will be to assess the effectiveness of both methods of learning for the AHA BLS recertification. One of the challenges of a blended approach is to assure that the information is still retained as effectively as it would be in a live class. In addition, the study will consider the decision-making process by which a learner selected one method over the other.

## Literature Review

The traditional model of education has featured the exchange of knowledge, analysis and commentary between a teacher and student, supplemented with class discussions among students and long hours of quiet study of required course materials. However, with the expansion of the Internet, this model has changed and the “delivery of education has evolved into a continuum with traditional face-to-face classes at one end and asynchronous courses

conducted wholly online at the other” (Murray, Perez, Geist, Hedrick, 2013, p. 99). Because the AHA is offering an alternative to its conventional certification classes by offering an online set of modules to gain recertification in AHA BLS skills, it is important to understand which option has more effectiveness (based on retention) and why the students would enroll in an instructor-led class vs. the online module.

#### *Information Retention for instructor-led class.*

The instructor's primary role during a live class is to teach new knowledge by organizing his/her class in such a way that it is clear and informative for students of all backgrounds, to explain key terms, to be available to answer questions and to quiz students on the material. The final test will confirm if the student has understood and retained the information that was presented in the lessons. Conventional CPR classes rely on visual material. Usually, the instructor shows a CPR skill video and answers any questions about the video. Then the students practice on mannequins. An instructor-led class for this type of practical skill can be extremely positive since the instructor can provide constant guidance and reiterate key information. He/she is sensitive to the students learning styles and can design/address the class accordingly. Research shows that in live classes, there is an “emphasis ...on verbal learning, it involves verbal and other types of stimuli (stimulants) such as examples, figures and diagrams. Stimuli that appeal to visual and other senses are used extensively in order to render abstract concepts comprehensible”. (Esgi, 2013, p. 445) Lippmann, Livingston and Craike (2011) pointed out that the increased opportunities to practice CPR skills, preferably to perfection, lead to better initial skills and greater retention. However it has been noted that instructors’ skills and interest can have an impact on the way they teach. They may not always use a standardized

method. Errors in performance are not always corrected, and the students flawed overall performance could be noted as acceptable. (Kaye et al., 1990). The weaknesses and limitations of the conventional method can lead to poor retention of necessary information, or retention of incorrect information.

### *Information Retention for online module.*

Online learning is very different from the traditional live class. The course is self-paced, giving students more flexibility on when and how they do the work. For our research, the CPR course developed by AHA follows its standards, permitting a consistent quality of instruction. Braun (2002) reported that "clicking buttons or dragging icons requires the student to focus and engages ...a [specific] part of the brain" (p.42) making the learning active as opposed to the more passive mode that can prevail in an instructor-led course. However, according to Braun (2002), Emergency University conducted a study of CPR skills retention, and the results showed that even if the instructor-led group and the online module group seemed to perform equally regarding CPR skills, the students who attended the instructor-led class felt more confident to show their skills than did their online module counterparts.

### *Why learners choose online or in person instruction*

For the specific class we are studying, a student has the choice between enrolling in the 4-hour class that is face-to-face instruction with hands-on exercises, or an online module with skills check. Based on Zhan and Mei's research (2013), the choice is largely driven by the type of learning personality. Among the key elements are what he calls "student's academic self-concept and social presence" (p. 132). Self-concept is defined as an individual's perceptions,

based on experience and interactions with the outside world. This aspect has a high correlation with the learner's academic choices and achievements. When equipped with a robust self-concept, the learner is expected to choose more challenging environments (such as, for example, online learning) and to show greater persistence. The student is self-motivated, active, more interested in what he/she learns, patient and equipped with strong organizational skills (Zhan and Mei, 2013). Unlike self-concept, the social presence emphasizes relationships with others. A student with a strong social presence needs the immediate exchange/response during the learning process, the feelings of psychological connection and the energy of the classroom community (students + instructor). He/she enjoys the process of learning collaboration. In addition, the learner needs the instructor to be available to them and to nurture them. According to Zhan and Mei, the influence of both elements in a student mind (self-concept and social presence) will shape a learner's decision to select a live instructor or an online method.

### Statement of Purpose and Research Questions

The studies referenced in this research offer some explanation as to how the information is retained and how a learning method is selected but there are still gaps in the learner information retention associated specifically with the AHA BLS course. Furthermore, there might be elements in addition to self-concept and social presence that could influence why a CPR learner would choose option one vs. option two. The purpose of this study is to seek greater insight into the effectiveness (based on retention) of either method of learning used for the Basic Life Support recertification course. Additionally, it will be beneficial to find out more about what type of learners chooses each option. As researchers continue to gather information

on the benefits of e-learning, there are other perspectives that need further investigation. This raises the following questions for the Basic Life Support course:

1. Is information retention higher for learners who took the online module or the instructor-led class?
2. What reason is pushing the learner to select one method versus the other?

## Research Method

The survey design method for this study fitted the needs of the research. Specifically, it used an efficient quantitative method for collecting data from a large group of individuals. According to Creswell “survey research design are procedures in quantitative research in which investigators administer a survey to a sample of people to describe the attitudes, opinions, behaviors and characteristics of the population” (2012, p. 376). In addition to being versatile and efficient, a survey method of data analysis yields benefits that are both economical and expedient, specially for a healthcare community who must minimize the time it spends away from patients and sitting in a classroom. The results of this survey allowed an analysis of each BLS practices: Instructor-led (IL) and online module + skills.

In order to gain approval to conduct the survey, the researcher contacted the Huntsville Hospital Health System Education Department director and the AHA Training Center coordinator. Both managers agreed to allow the survey to be carried out. In addition, the investigator confirmed with the instructor and instructor assistant that the questionnaire could be distributed to attendees of both classes.



### *Participants*

The population for this study consisted of participants that were certified in Basic Life Support two years previously, specifically the ones whose certification were expiring in March and April of 2014. This demographic included employees of Huntsville Hospital Health System but also non-employees from the general community. The researcher's goal was to collect a minimum of 20 surveys. This number was based on the Instructor-led class maximum enrollment of 12 and on the number of opportunities to poll the scheduled classes available before the final results were reported. The classes are not always full so the sample size was set as a conservative estimation of class attendance. The study sample was reduced to the students enrolled in the two 4-hour recertification classes called "CE22841112 BLS for Healthcare Provider 4-hour classroom renewal". This class is offered only once a month. The study followed the classes on March 19 and April 23. In parallel, the research also polled participants who completed the on-line module and enrolled in the skill-check class called "BLS-7000511+AHA BLS HCP Skills Check-Off (Part 2)". These classes are offered every other Wednesdays, on the hour, from 8am to 11am. The maximum for these classes is 8 participants. The available class surveyed was on March 19. Surveying only one class was enough to reach the goal of participation set for the study. At least 8 students attended the 4 scheduled sessions which resulted in surpassing the goal set of 20 completed surveys. All classes were located on the campus of Huntsville Hospital Health System, specifically in the Education Department. The age, race, gender and education characteristics of the participants were not pertinent to this general, anonymous type of research so the study applied to all attendees.

### *Procedure*

The survey (Appendix A) for the BLS courses was a cross-sectional survey design which means that “the researcher collects data at one point in time...examine current attitudes, beliefs, opinions, or practices” (Creswell, 2012, p. 377). This helped draw conclusions on which AHA BLS method was the most efficient. At the beginning of both the instructor-led and the skill-check class, each participant was given a set of paperwork based on AHA requirements and a class evaluation form from the facility. The researcher attended each polled class and distributed the survey page when the participant came in the class. The survey was copied on a brightly colored sheet of paper (yellow) to avoid confusion with the rest of the course paperwork. During the handout, the researcher briefly told the attendees that the yellow sheet was an in-house survey and was voluntary. Because the survey had an introductory paragraph, the researcher felt that it was not necessary to fully introduce the study in details. In addition, in the facility, employees are polled frequently and are accustomed to fill out similar types of surveys or evaluation forms so the students didn't have any questions. Participants could decide whether or not to participate. If a participant seemed hesitant or declined participation in the survey, the researcher reserved the right to explain in detail the importance of anonymous feedback to the process of designing programs of excellence. If he/she still decided to not participate, the researcher accepted this decision. If questions about the particulars of the survey arose, the researcher was able to answer them. The survey was filled out privately, in handwritten form, and returned at the end of the class time with the facility evaluation form. The number of surveys received was compared to the number of class attendees to determine if the response rate was at 100%. However, the 100% participation was not necessary for the accuracy of the investigation. The researcher decided to conduct a paper survey rather than an

on-line survey because both courses are live classes and feedback can be gathered right away. In addition, the researcher was confident that by giving the survey page directly, the participant might feel a more personal connection to the aims of the data collection and might be more willing to fill out the information. An online survey a few days after each class may not gather maximum feedback.

### *Measures*

The questionnaire contained several different types of questions: one was demographic; four were related to behavior and three dwelled on opinion-type questions, totaling eight questions (Appendix A). Most questions were closed-ended in nature, meaning “the researcher poses a question and provides preset responses options for the participant” (Creswell, 2012, p.386). But few were semi-closed-ended which allows for additional comments. The behavioral and attitudinal questions appeared first on the questionnaire, and the demographic question was last. Clinicians that attend these courses have often little time to linger after a class so the survey had intentionally posed brief, clearly written questions that allowed for a quick answer. The response time was unpredictable but estimated to be short (3 to 5 minutes). In addition, the questions were crafted so as not to overlap several topics, and also to be applicable for both courses: the instructor-led four-hour class and the skill-check class. The researcher created the survey and gathered feedback from the Huntsville Hospital Education Department leadership, the AHA Training Center coordinator and peers. It is important to note that the questions were not tested on potential survey takers. However, all reviewers went through the same methods to be re-certified so they were very familiar with both ways. The questionnaire was designed in

3 parts: 1) introduction statement to the survey; 2) survey questions 3) statement of thanks to the participants.

### *Ethics*

The survey did not require any identification and was completely confidential. There was no need for liability release. The researcher did not know the participants. The consent of participation was assumed by the completion of the survey.

## Results

### *Description of Sample & Demographics*

Participants did not ask the researcher for additional information about the survey during the questionnaire process and the students were willing to complete the survey. However, 22 survey responses were discarded to ensure validity of the results. These surveys were either incomplete or contained a fundamental omission (such as improperly answering question #3, referring to the ranking of the class option). All results reported below are based on 35 responses total. After gathering all surveys, the surveys were divided between 2 different entries (guided by question 2) based on the method of learning: instructor-led or online module. With a codebook defined preliminarily, the data was input for each option in an Excel spreadsheet for analysis.

A total of n=6 students completed the survey for the instructor-led class and a total of n=29 filled out the survey for the online module. The demographic questions were informative, describing what type of participants preferred a particular kind of learning atmosphere. Of

those who chose the instructor-led class, 50% were employees of Huntsville Hospital Health System and 50% non-employees, all female (100%), working during the day shift. 66.7% of them were between 26 and 35 years old and 16.7% were each between 17 to 25 and over 50 years of age. The mean for the age was 34.25. In parallel, the skills-check method had the following demographics: 93% were employees with 79% being female. 72% were from the day shift and 24% from the night shift. The remaining were PRN(Pro Re Nata or as needed). Finally, the age of those who chose the skills-check online method varied widely. 10% were between 17 and 25 years old; 48% between 26 and 35; 28% between 36 to 50 and 14% over 50 years old. The mean age was 35.20 years. More details on the demographics can be found below in table 1.

**Table 1:** Demographics

Response	Instructor-led results		Online module results	
	N	Percentage	N	Percentage
Employee	3	50.00%	27	93.10%
Non-Employee	3	50.00%	2	6.90%
Male	0	0	6	20.69%
Female	6	100%	23	73.31%
Day	6	100.00%	21	72.41%
Night	0	0	7	24.14%
Part Time	0	0	0	0
PRN	0	0	1	3.45%
17 to 25	1	16.67%	3	10.34%
26 to 35	4	66.67%	14	48.28%
36 to 50	0	0	8	27.59%
Over 50	1	16.67%	4	13.79%

#### *Method of learning selected*

As an introductory question, it was necessary to ask the participants which method of learning they chose prior to attending the class. This information helped the researcher

understand if the learning method chosen for the CPR recertification was consistent with previous certification or recertification choices. For the instructor-led class, 33% (2) of students attended the face-to-face class previously, 50% (3) of students participated in the online module & skill-check and only 17% (1) attending the 8-hour initial class. It is important to note that if a student chose the online module and failed the test twice, he/she will have to take the 4-hour class which may be the case for this instance. For the skill-check class option, 27% (8) had attended the blended learning class, 59% (17) had attended the online module & skill-check and 14% (4) had just been certified 2 year prior by attending the initial 8-hour class.

### *Class choice*

The most significant question on the survey asked the participants to rank 7 options, in order of importance, to indicate why they chose one of the two class options. This question was intended to answer one of the research questions: What reason prompted the learner to select one method over the other? For this specific query, the ranking number was entered under each choice option and totaled. Because the ranking was defined as '1' being the first choice and '7' being the last choice, the totals were ranked from lowest to highest with the lowest number showing the most important choice and the highest number showing the least important choice. The ranking results are shown in Table 2 (below) for each class option.

Table 2: Ranking

<b>Option</b>	<b>4-hour class</b>	<b>Skill check class</b>
Most important choice	<b>Better retention</b>	<b>Time flexibility</b>
2nd choice	<b>Interaction</b>	<b>Speed of learning</b>
3rd choice	<b>Format &amp; Better prepared</b>	<b>Format</b>
4th choice	<b>Speed of learning</b>	<b>Better retention</b>
5th choice	<b>Time flexibility</b>	<b>Better prepared</b>
6th choice	<b>Other</b>	<b>Interaction</b>
Least important choice		<b>Other</b>

The last ranking ("7") offered an opportunity for the learner to enter another reason not listed in the standardized choices. Only a few comments were given. The face-to-face group entered only one comment: "receiving continuing education credits for the class." The online module group responded that they liked small classroom sessions and had more time to absorb changes. They also mentioned that it was the only class option available and the best.

### *Study time*

All students responded that they had enough time to study for either method and did not enter any additional explanation.

### *Retention*

For the question that was covering another of the research questions: Is information retention higher for learners who took the online module or the instructor led class? The question was an open-ended query. The researcher re-entered in Excel all the answers for each

method and was able to define some themes based on the frequency of responses. Results for the instructor-led class included how to perform CPR for Adult & Child/Infant and choking victims and how to use an AED (Automated External Defibrillator) in an emergency situation. For the skill-check answers, students were also including the AED usage and compressions/breaths for the 2 main groups of rescuing: Adult + child and Infant. In addition, several students noted the importance to remain calm during such an event in order to give the best care option learned.

#### *Confidence in learning experience*

For 4-hour class and the skills-check class, 100% of the students answered that they felt confident about what they learned.

#### *Method choice for next recertification*

One of the last questions was intended to find out if the students would renew their certification using the same method they had selected that day. For the instructor-led class method, 100% (6) of the students answered that they would use the same format. A few open-ended comments were received mainly stating that this format suited them. As for the online method, 100% of the students agreed that they would enroll in the same format class. The comments confirmed the results drawn earlier. Students stated that this method allowed them time flexibility with the completion of the online portion (at their own pace) and felt that there was less pressure during the skills-check class because the written test was already completed online.



## Discussion

Although the results of the study show that the students' class selection has an impact on their personal learning experience, it does not appear that the type of course affects the retention of information.

Several elements in the study were designed in order to help us understand the reason why a learner selected one method over the other. The first question in the survey helped the researcher define if the participants had chosen the same method of learning previously or if they were new to the chosen method. Some students who had selected the 4-hour class attended the same class before for their certification. However, half of them previously chose the online module and skill-check class. This data could be explained because students who do not pass the online module after two attempts are required to enroll in the 4-hour class. Due to this disparity, the researcher is unable to draw a straight-forward conclusion that all attendees in the 4-hour class prefer this method of learning and enroll in the same preferred class option every two-year. In parallel, for the online module and skill checks method, a majority chose the same learning method two years later. For this option, the data clearly show that students favored the learning method of online modules followed by a face-to-face demonstration of practical skill over the instructor-led class teaching followed by the practical skill test. Another question asked whether or not participants would choose the same option when they will seek recertification in two years. 100% of both method learners confirmed that they would choose the same format again. This level of satisfaction and confidence in either method is important to understand the third element, which was to find out the reason why the learner chose either method which was shown in the study by a ranking of choice that all participants needed to

answer. The ranking revealed a great deal about what each learning method has to offer. For the 4-hour class, the learners' top responses included better retention and interaction. The skill-check responses listed by preference were time flexibility and speed of learning. As mentioned earlier, Zhan and Mei's research (2013) showed that the choice of format is mainly based on learning personality type with two key elements influencing the selection: the student's academic self-concept and his/her social presence. This research appears to support the determining factor of learning style preference as it relates to educational model chosen. The 4-hour format has students that need the social collaboration to learn, while the students in the online module format, would rather have personal choice that fits their environment, confirming that "the optimal learning environment affords the learner a choice of modalities and control over the sequence and pace of learning...improving skills acquisition and retention" (Braun, 2002, p.40) . The results received for this research question match the expectations of the researcher by confirming that either group selected the format of their AHA BLS recertification based on their choice in interaction preference and time flexibility.

The data from the second research question dealt with the effectiveness of one learning method over the other. Both methods yielded the same type of information regarding the retention level. Participants stated that the information they retained were the protocol for using an AED and the different level of compressions for either an adult + child vs. infant. Based on these results, it seems that participants were satisfied with the the level of effectiveness in the learning model they chose and one model did not appear to be superior to the other in terms of self-reported retention levels. According to Iserbyt et al. (2014), motor and cognitive behaviors facilitate learning and maximize effectiveness, however, our study did not show a higher retention in the 4-hour instructor led learning method.

Finally, the results in the demographics question did not offer additional information for the retention information and/or the reason why a learner selected one method over the other. Results could have indicated that older generations may not feel comfortable using a computer, and would select the face-to-face learning method leading to a greater level of retention. However, the mean for the age for the two methods was similar with only 0.95 difference. Also, a trend could have been seen in the attendee gender. However, for the particular classes surveyed, most participants were female.

### *Limitations*

This study was conducted in a limited amount of time. The results gathered for the instructor-led class did not reach the goal that the researcher had set. With students dropping the class prior to attending and surveys not fully completed, the study for the face-to-face class yielded only 6 surveys, which was not enough to draw conclusive data. In addition, the retention question may not have been clear enough for the participants. A multiple-choice question rather than an open-ended question may have been preferable to offer options to the survey takers. In addition, measuring information on retention can be difficult to quantify, especially on the same day as the final test. Further effectiveness research may need to be conducted a few months after students have passed their skills to define if the retention of AHA BLS skills is still acceptable. Extending the study for several months to a year may generate more useful data, allowing for the identification of more dramatic trends or differences. In addition, the demographics in future surveys could be more diverse, allowing for the possibility of more compelling conclusions .

These results will be shared with the Education Department and the AHA Training center leadership. Overall, the two-option class methods are working well and seem suited to fit the learners' needs. However more promotion of these learning options needs to be conducted. Indeed, some participants indicated that they did not know several certification renewal methods existed.

## Conclusion

This research was done to evaluate the retention of AHA BLS recertification based on two methods: instructor-led class and online learning. Additionally, the researcher wanted to know what reasons a learner would give for selecting one method versus the other. While the data showed clearly the reasons why a participant chose either format, further research is needed to validate the effectiveness (by retention) of the AHA BLS recertification methods available. As the need of online learning method expand for AHA, it will be important to discover if the standards set by the association are maintained and upheld by the online format.

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## Appendix A

We are initiating this very brief survey to evaluate the AHA BLS course.  
Your suggestions and feedback will help guide our efforts to provide  
the best education experience for all participants.

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1. **Last time you received the AHA BLS certification, which method of learning did you use? Please check one option**

- Online Module + Skill Check Class
- 4-hour Live Class
- Initial 8 hour certification

2. **Today, you attended the:**

- Skill check class
- 4-hour class

3. **Rank from 1 -7, (with 1 being your first choice), why you chose to use this class option:**

- \_\_\_ Time flexibility      \_\_\_ Speed of learning      \_\_\_ Better retention  
\_\_\_ Format                      \_\_\_ Interaction                      \_\_\_ Better prepared  
\_\_\_ Other, please specify
- 

4. **Do you feel you had enough time to study the materials:**

- Yes
  - No If no, explain, why? \_\_\_\_\_
- 

5. **What two pieces of knowledge or skills did you retain?**

\_\_\_\_\_

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6. **Do you feel confident about what you've learned today?**

- Yes
  - No If no, explain, why? \_\_\_\_\_
- 

7. **For your next recertification in two years, will you consider the same format you used this year?**

- Yes
- No
- Maybe

Why? \_\_\_\_\_

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**8. Demographics**

Employee of Huntsville Hospital Healthy System:       Yes       No

Gender:       Male       Female

Shift:       Day Shift       Night Shift       Part Time       PRN

Age:       17 to 25       26 to 35       36 to 50       Over 50

*Thank you for participation!*



Anne: First, thank you for being so tenacious with this project. I know it took awhile for everything to "click", but once it did, your project moved forward smoothly. The final report shows me that you now have a foundational understanding of the research process.

Your discussion and conclusion looked good. I would have liked to see a bit more in your discussion on the implications of your study....tell us "so what". But, overall, you had good content here.

And, the report as a whole project had good flow and organization.

14/15  
The meaning of the results is discussed. This includes sharing the major findings (if any), their significance, how the findings tie back to the literature review, if the research questions could be answered, and what a reader might be able to "do" with the results (their implications).

5/5  
Limitations of the study shared

5/5  
Suggestions for future research are shared

5/5  
Clear conclusion shares the most important aspects to take away from the study and summarizes the impact/importance of the study as a whole

10/10  
All previous assignments included are in a full, final research report. This includes all necessary revisions, all assignments organized into one coherent report, a title page, a table of contents, full references, any appendices, and page numbers.

5/5  
Coherent transitions, headings, and subheadings used throughout the final report

2/3  
APA citation methods used correctly both in-text and in Reference page

2/2  
Minimal or no grammatical/spelling/mechanics errors (additional points deducted for egregious errors)

48/50  
Total Points