

Self-Perceived Competency of Bachelor of Science in Biology in Performing Basic Life Support Training in Enhancing Emergency Response Preparedness

Asnar L. Aloro^{1*}, Joel C. Bondad², Albert R. Castillo³

College of Arts and Sciences-Faculty, Laguna State Polytechnic University-San Pablo City Campus, San Pablo City Laguna, Philippines

Corresponding Author: Asnar L. Aloro asnar.aloro@lspu.edu.ph

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ABSTRACT

Emergencies often call for quick thinking and decisive action; thus, this study explores how Bachelor of Science in Biology students perceive their ability to perform Basic Life Support (BLS) and respond to such situations. Using pre-test and post-test evaluations, the research captures their journey from uncertainty to confidence after receiving hands-on BLS training. Responses from 35 participants revealed that the majority were females, aged 21–30, and predominantly fourth year students, indicating a level of maturity and academic exposure contributing to their baseline competencies. Based on these findings, the study recommends integrating BLS training into the curriculum, alongside refresher courses and expert-led workshops, to continuously enhance students' emergency response skills. By equipping future biology professionals with this essential knowledge, our goal is to equip them not only for academic achievement but also for critical, life-saving situations where their skills can make a profound impact.

INTRODUCTION

Basic Life Support (BLS) is a crucial life-saving skill that involves recognizing and responding to medical emergencies such as cardiac arrest, choking, and respiratory failure. It is widely recognized that immediate and effective BLS interventions significantly improve survival rates. Ability in Basic Life Support (BLS) is vital for healthcare professionals, including those with a Bachelor of Science in Biology. American Heart Association (2020) BLS encompasses critical procedures such as cardiopulmonary resuscitation (CPR), and training to maintain circulation and breathing in individuals experiencing cardiac arrest or other emergencies. However, their preparedness and confidence in applying BLS skills remain underexplored.

Lund-Kordahl, I., et al. (2019) stated that self-perceived competency in performing BLS is one significant factor influencing the likelihood of healthcare providers initiating life-saving

measures. Studies have demonstrated that individuals with higher levels of BLS training exhibit better CPR quality and greater confidence in their skills. For instance, a research study on the relationship between CPR training levels and self-reported skills found that participants with advanced training had shorter start-up times and better compression depth, correlating with higher self-assessed preparedness both before and after testing.

For instance, a study by Süss-Havemann et al. (2020) explored the implementation of BLS training in schools and its impact on students' self-efficacy and skill retention. It suggested that self-regulated learning approaches in BLS training can be as effective as instructor-led methods, particularly in promoting long-term retention skills among students.

Additionally, research by Elsharkawy and Ibrahim (2020) examined the impact of simulation-based training on nursing students' competency levels and perceived self-efficacy in pediatric BLS. The study concluded that such training significantly improved both the knowledge and practical skills of students, thereby enhancing their confidence in performing BLS.

According to Htay, M. N. N., (2023), pre-test and post-test study designs are commonly employed to assess the effectiveness of BLS training programs in enhancing emergency response readiness. These studies evaluate participants' knowledge, attitudes, and perceived competencies before and after training interventions. Such quasi-experimental research among medical students in Malaysia assessed the impact of a BLS program on participants' knowledge and perceived competency, highlighting the value of such training in improving emergency preparedness.

This research employs a pre-test and post-test study design to evaluate the effects of Basic Life Support (BLS) training on students' confidence, knowledge, and self-perceived competency in life-saving interventions. It assesses their initial understanding of BLS techniques and identifies knowledge gaps. Post-training evaluations will measure changes in competency, focusing on skills in CPR. The study aims to uncover areas needing reinforcement and provide insights to enhance BLS educational strategies for improved student competency.

While prior research has evaluated BLS competency among nursing and medical students, limited studies focus on non-medical but science-related students, particularly those in Biology programs. Examining their self-perceived ability to perform BLS before and after training can offer valuable insights into whether BLS should be incorporated into the biology curriculum or established as a mandatory skill-training program.

THEORETICAL REVIEW

Significance of the Study

Bachelor of Science in Biology students and other biology-related fields often work in laboratories, field research, and wildlife settings, where accidents or medical emergencies can occur. Additionally, as potential future healthcare professionals, educators, or researchers, their ability to respond to emergencies is valuable. This study examines their self-perceived competency before and after undergoing BLS training, evaluating whether such training enhances their emergency response preparedness.

General Objective:

To assess the self-perceived competency of BS Biology students in performing Basic Life Support (BLS) and its impact on their emergency response preparedness before and after training.

Specifically, it aims:

1. to evaluate the baseline self-perceived competency of BS Biology students in performing Basic Life Support before undergoing training;
2. to determine the effectiveness of Basic Life Support training in enhancing self-perceived competency and emergency response preparedness among students;
3. to identify factors influencing changes in self-perceived competency in performing Basic Life Support among BS Biology students;
4. to explore the willingness and confidence of students in applying BLS skills in real-life emergencies after training; and
5. to assess the correlation between self-perceived competency and performance in pre- and post-basic life support procedures.

METHODOLOGY

The study utilizes a quasi-experimental pre-test and post-test design to assess the self-perceived competency of Bachelor of Science in Biology students at Laguna State Polytechnic University – San Pablo City Campus in Basic Life Support (BLS) training. Data collection includes a self-perceived competency questionnaire using a Likert scale and a pre- and post-training knowledge assessment. Participants also undergo practical skills evaluation by certified instructors. The intervention features a standardized BLS training program with lectures, hands-on practice, and simulated scenarios. Data analysis involves descriptive statistics and a paired t-test for competency improvement, while

ethical considerations, including informed consent and confidentiality, are prioritized.

RESULTS AND DISCUSSION

This section presents the findings of the study on the self-perceived competency of Bachelor of Science in Biology students in performing Basic Life Support (BLS) training and its effectiveness in enhancing emergency response preparedness.

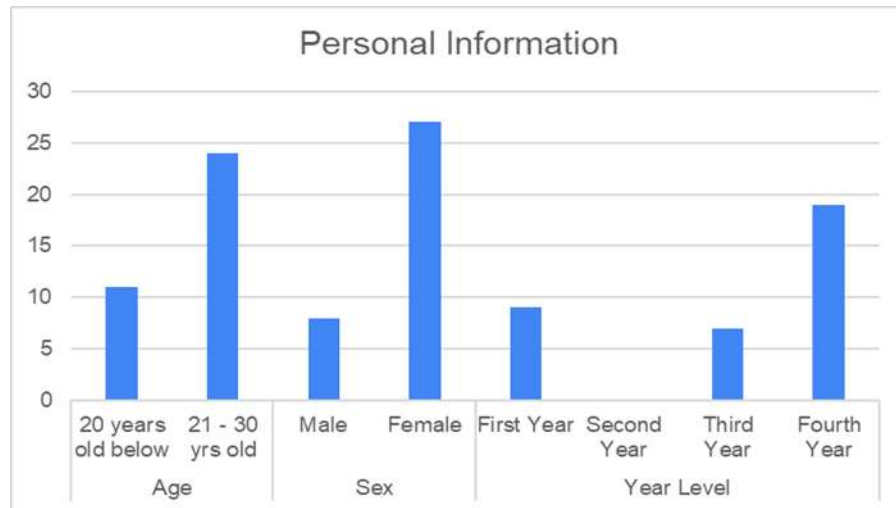


Figure 1. Demographic Profile

The study gathered responses from 35 Bachelor of Science in Biology students to assess their self-perceived competency in performing Basic Life Support (BLS) as a means of enhancing emergency response preparedness. In terms of age, majority of the respondents (24) were between 21–30 years old, while 11 were 20 years old or younger. This shows that most participants were at an age associated with greater maturity and responsibility, which may contribute to better understanding and application of BLS techniques.

When considering sex, the sample was predominantly female, with 27 female respondents compared to only 8 males. This gender distribution is noteworthy, as some studies suggest that females often demonstrate a strong engagement in health and caregiving activities, potentially influencing their self-perception toward emergency preparedness skills. Meanwhile, regarding academic year levels, most participants were fourth-year students (19), followed by first-year students (9), and third-year students (7), with no representation from the second-year level. The concentration of upperclassmen, particularly fourth-year students, suggests that many respondents had substantial academic exposure, possibly impacting their baseline competency and learning absorption during the training.

These demographic characteristics are important in interpreting the results of the pre- and post-test assessments. Abbas et al. (2021) stated that the maturity, academic experience, and gender distribution of the participants likely contributed to their initial confidence in performing BLS and may have enhanced their ability to benefit from the training provided.

Table 1. Baseline self-perceived competency of BS Biology students in performing Basic Life Support.

	Pre		Post	
	Mean	SD	Mean	SD
1. I am confident in my ability to recognize a medical emergency.	3.029	0.609	3.514	0.500
2. I understand the steps involved in performing Basic Life Support.	2.943	0.532	3.714	0.452
3. I feel confident in performing chest compressions correctly.	2.543	0.648	3.343	0.583
4. I know how to provide rescue breaths effectively.	2.457	0.602	3.434	0.630
5. I can operate an Automated External Defibrillator (AED) if available.	1.857	0.798	2.686	0.820
6. I can remain calm and take leadership in a medical emergency.	3.143	0.682	3.371	0.590
7. If needed, I am prepared to perform BLS on a real person.	2.800	0.668	3.486	0.554
8. I understand the importance of an immediate response in an emergency.	3.600	0.490	3.829	0.377
9. I am aware of legal and ethical considerations in performing BLS.	3.086	0.732	3.714	0.452
10. I feel that I need further training before I can effectively perform BLS.	3.800	0.400	3.657	0.532

Legend: 1 - 1.4 Strongly disagree; 1.5 - 2.4 Disagree; 2.5 - 3.4 Agree; 3.5 - 4 Strongly agree

Table 1 shows that the Bachelor of Science in Biology students demonstrated significant improvements in their self-perceived competency after undergoing Basic Life Support (BLS) training. Before the training, students had moderate confidence in recognizing medical emergencies (Mean = 3.029) and understanding BLS steps (Mean = 2.943), which increased post-training (Means = 3.514 and 3.714, respectively). Skills involving technical procedures, like chest compressions (Pre Mean = 2.543) and rescue breaths (Pre Mean = 2.457), initially scored lower but showed marked improvements after training (Post Means = 3.343 and 3.434). These results align with the research findings of Özbilgin et al. (2020) and Reder, Cummings, and Quan (2006), who emphasized that hands-on BLS training significantly enhances both skill confidence and performance.

Additionally, students initially showed low confidence in using an AED (Pre Mean = 1.857), which improved after training (Post Mean = 2.686), consistent with Perkins et al. (2021), who highlighted the importance of AED-focused instruction. Leadership and calmness during emergencies also improved from a high baseline (Pre Mean = 3.143 to Post Mean = 3.371). Interestingly, while the perceived need for further training remained relatively high (Pre Mean = 3.800 to Post Mean = 3.657), this reflects Perkins et al. (2015) findings that BLS skills require continual practice to maintain.

Table 2. Self-Perceived Competency

	Pre		Post	
	Mean	SD	Mean	SD
1. Understanding the importance of BLS	3.571	0.495	3.914	0.279
2. Recognizing signs of cardiac arrest	2.829	0.774	3.771	0.420
3. Performing chest compressions correctly	2.543	0.690	3.657	0.474
4. Delivering effective rescue breaths	2.486	0.692	3.571	0.599
5. Using an Automated External Defibrillator (AED)	2.000	0.894	2.886	1.010
6. Following the correct BLS sequence	2.714	0.658	3.571	0.645
7. Handling choking emergencies	2.743	0.840	3.800	0.400
8. Managing stress in an emergency situation	3.000	0.632	3.686	0.464
9. Communicating with emergency responders	3.200	0.623	3.771	0.420
10. Performing BLS despite fear of making mistakes	2.829	0.560	3.571	0.495

Legend: 1 - 1.4 Not competent; 1.5 - 2.4 Slightly Competent; 2.5 - 3.4 Competent; 3.5 - 4 Very competent

Table 2 shows how Basic Life Support (BLS) training significantly increased participants' confidence in handling emergency situations. Key skills like recognizing cardiac arrest (Mean = 2.829 to 3.771), performing chest compressions (Mean = 2.543 to 3.657), and using an Automated External Defibrillator (AED) (Mean = 2.000 to 2.886) showed remarkable improvement after the training. This aligns with studies like those by Perkins et al. (2021), which confirms how structured training enhances practical abilities. Similarly, research by Hansen et al. (2015) highlights how hands-on experience with devices like AEDs builds confidence to something clearly seen in the participants' progress.

Beyond technical skills, the training also helped participants feel more capable of managing stress during emergencies (Mean = 3.000 to 3.686). The shift in self-perceived competencies underscores the value of BLS training, not just in teaching life-saving techniques but also in empowering individuals to act confidently when it matters most. The data emphasized the compelling transformative effect that focused, well-designed programs can have on people's readiness to save lives.

Table 3. Willingness and Confidence

	Pre		Post	
	Mean	SD	Mean	SD
1. Providing BLS to family members, friends, and strangers in an emergency	3.229	0.796	3.829	0.377
2. Performing BLS if the victim has visible injuries (e.g., bleeding)	3.029	0.774	3.543	0.648
3. Performing BLS in the presence of medical professionals	3.000	0.756	3.486	0.649
4. Fear of legal consequences (e.g., liability) affects my willingness to perform BLS.	2.914	0.603	3.200	0.709

5. Fear of causing harm to the victim affects my willingness to provide BLS.	3.114	0.622	3.086	0.692
6. The presence of other bystanders influences my decision to perform BLS.	2.657	0.754	3.086	0.732
7. Having more BLS practice opportunities would increase my confidence in performing BLS.	3.686	0.622	3.800	0.400
8. My knowledge and skills in BLS are sufficient to respond in an emergency.	2.743	0.769	3.429	0.599
9. Confident in recognizing when BLS is needed in an emergency situation.	3.057	0.475	3.351	0.495
10. Confident in remembering and applying the correct BLS steps under pressure.	2.971	0.506	3.600	0.489

Legend: 1 - 1.4 Strongly disagree; 1.5 - 2.4 Disagree; 2.5 - 3.4 Agree; 3.5 - 4 Strongly agree

Table 3 highlights how the willingness and confidence of BS Biology students to perform Basic Life Support (BLS) improved after their training. Before the training, students already showed a good level of willingness to help, especially when providing BLS to family, friends, or even strangers (Pre Mean = 3.229), but this became even stronger afterward (Post Mean = 3.829). Their confidence in handling visible injuries, like bleeding, also increased (Pre Mean = 3.029 to Post Mean = 3.543). This increase reflects what Qian et al. (2021) found, that more training leads to greater readiness and courage to act in real emergencies. Interestingly, students also felt more comfortable performing BLS even when medical professionals were around (Pre Mean = 3.000 to Post Mean = 3.486), showing that training helped ease some of the pressure and anxiety that can come with being watched by experts (Hunziker et al., 2010).

The training also helped reduce fears that could stop someone from acting, such as fear of legal issues or accidentally hurting the victim. These small but meaningful shifts are similar to what Bonizzio et al. (2019) found that legal education included in BLS courses can help people feel safer stepping in to help. On top of that, students became much more confident in their actual skills (Pre Mean = 2.743 to Post Mean = 3.429) and in remembering the correct steps during emergencies (Pre Mean = 2.971 to Post Mean = 3.600). This supports the research of Ricci et al. (2022) that hands-on, practical training is key to making people feel ready to act when it matters most. Altogether, these results show that BLS training not only strengthens technical skills but also builds the mindset needed to confidently and willingly respond to emergencies.

Table 4. T-test analysis of baseline for self-perceived competency in pre- and post-basic life support procedures

Mean	SD	t-cal	t-crit	df	p	Decision	
Pre Test	2.925714	0.616	-5.08178	2.262157	9	0.000661	Significant
Post Test	3.465714	0.549					

Table 4 shows that the T-test analysis reveals a significant improvement in participants' self-perceived competency in basic life support procedures following training. Initially, the pre-test mean score of 2.93, with a standard deviation of 0.616, indicated a moderate level of confidence. After the training, the post-test mean increased to 3.47, accompanied by a lower standard deviation of 0.549, suggesting both enhanced competency and greater consistency among participants. The calculated t-value of -5.08 surpasses the critical t-value of 2.26, confirming a statistically significant difference between pre- and post-training perceptions. Furthermore, the exceptionally low p-value of 0.000661 indicates that the observed improvement is highly unlikely to be due to chance. Considering the degrees of freedom (df = 9), the results validate that structured training programs effectively enhance self-perceived competency in life-saving techniques, equipping participants with the necessary confidence and skills for real-world application.

The significance of the findings aligns with existing research on the impact of basic life support training. The study of Waelveerakup (2019) on village health volunteers found that participants showed significant improvement in their perceived self-efficacy and basic life support performance after undergoing training. Additionally, Pati AK, Thakur L, Damke S. (2021) stated that an investigation into the impact of basic life support training on first-year medical students revealed a substantial increase in confidence and skill acquisition following hands-on workshops.

Table 5. T-test analysis of self-perceived competency in pre- and post-basic life support procedures

	Mean	SD	t-cal	t-crit	df	p	Decision
Pre Test	2.791428	0.686	-10.6287	2.26216	9	0.00000214	Significant
Post Test	3.62000	0.521					

Results presented in Table 5 indicate a significant improvement in self-perceived competency in basic life support procedures after training. The pre-test mean score of 2.791428 (SD = 0.686) reflects participants' initial confidence levels, while the post-test mean of 3.62000 (SD= 0.521) demonstrates a notable increase in perceived competency. The calculated t-value (- 10.6287) exceeds the critical t-value (2.26216), confirming a statistically significant difference between pre- and post-training scores. Additionally, the extremely low p-value (0.00000214) suggests that the observed improvement is highly unlikely to be due to chance, reinforcing the effectiveness of the training intervention.

These findings align with existing research on the impact of structured training programs on skill development and confidence in life-saving techniques. Studies have shown that competency- based training significantly enhances participants' ability to perform emergency procedures

effectively. Furthermore, research on basic life support training for healthcare professionals and first responders highlights the importance of hands-on learning in improving both knowledge and self-efficacy.

It is supported by the study of Ravindra et al. (2022) which assessed the impact of hands-on BLS training on nursing professionals. The results showed a statistically significant improvement in knowledge and competency after training, reinforcing the importance of structured education. Thommes et al. (2023) conducted a randomized controlled study on the role of reflective practice in BLS training, where the findings demonstrated that incorporating reflective exercises improved skill retention and performance, highlighting the value of interactive learning methods. Kose et al. (2019) examined the impact of BLS training on nursing students' knowledge and practical skills. The study found a significant increase in competency levels post-training, emphasizing the necessity of periodic BLS education.

Table 6. T-test analysis of willingness and confidence in pre- and post-basic life support procedures

	Mean	SD	t-cal	t-crit	df	p	Decision
Pre Test	3.04000	0.668	-5.7823	2.26216	9	0.0002652	Significant
Post Test	3.462857	0.579					

Table 6 presents a T-test analysis comparing self-perceived competency in basic life support procedures before and after training. The pre-test mean score of 2.791428 (SD = 0.686) reflects participants' initial confidence levels, while the post-test mean score of 3.62000 (SD = 0.521) indicates a significant improvement in perceived competency. The calculated t-value (-10.6287) is much lower than the critical t-value (2.26216), confirming a statistically significant difference between pre- and post-training scores. Additionally, the p-value (0.00000214) is far below the conventional threshold of 0.05, reinforcing the reliability of the training intervention.

These findings align with existing research on Basic Life Support (BLS) training. Studies have demonstrated that structured training programs significantly enhance knowledge, confidence, and skill retention. For instance, Thommes et al. (2023) conducted a randomized controlled study on reflective practice in BLS training, showing that incorporating reflective exercises improved skill acquisition and retention. Similarly, Onan et al. (2018) investigated the effectiveness of traditional and technology-enhanced BLS training methods in high schools, highlighting that interactive learning approaches led to higher confidence and competency scores. Furthermore, a literature review on BLS training by De Oliveira Gomes et al. (2020) emphasized its relevance in healthcare settings, highlighting that continuous education improves emergency response capabilities.

CONCLUSIONS AND RECOMMENDATIONS

The study highlights the significant impact of Basic Life Support (BLS) training on the self-perceived competency of Bachelor of Science in Biology students. The pre-test and post-test results demonstrate a marked improvement in their confidence and preparedness to respond to emergency situations. This underscores the importance of integrating practical BLS training into the curriculum to enhance students' emergency response capabilities.

Recommendation:

Incorporate Basic Life Support (BLS) training as a mandatory part of the curriculum for Bachelor of Science in Biology students. This initiative would not only emphasize the value of emergency response preparedness but also ensure that every graduate possesses the essential skills to confidently handle critical situations. Regular refresher courses should also be conducted to reinforce knowledge and prevent skill degradation over time. These sessions will enable students to stay updated on current practices and improve their ability to respond effectively in emergencies.

Furthermore, collaborating with certified emergency response trainers or organizations is also recommended to provide high-quality, hands-on training. Such partnerships can enrich the learning experience with practical insights, while aligning student training with professional standards. These measures collectively aim to equip students with both the competence and confidence needed for real-world emergency response.

FURTHER STUDY

Future research is recommended to examine more deeply the relationship between self-perceived competency and the actual performance of Biology students in performing Basic Life Support, as well as to explore the effectiveness of simulation-based and technology-enhanced training in improving emergency response preparedness.

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