Assessment of Factors Contributing to the Risks of Accident

D. Prayogo, A. Ndori, V.F. Andromeda, D. Kurnianing Sari, H. Hartoyo & E. Sulistiyowati
Politeknik Ilmu Pelayaran Semarang, Indonesia

ABSTRACT: This study aims to investigate the impact of context, input, process, and products on education and training services of Basic Safety Training at the Politeknik Ilmu Pelayaran (PIP) Semarang.

Methodology - The study is Research and Development by utilizing the ex post facto approach. The research location is at the Politeknik Ilmu Pelayaran (PIP) Semarang with a whole population of 86 people and a sample of 86. The research data was collected using a questionnaire method and then analyzed using evaluative analysis techniques through descriptive-quantitative analysis.

Finding - Mean score of post-test was higher than mean score of pre-test, indicating that there was an increase of 23.17%. Correlation coefficient of pre-test and post-test was 0.895, meaning that there was a correlation with significance level of 0.000 < 0.05. Result of N-Gain was 0.799 which was in high category, meaning that implementation of CIPP application system model was good and effective to improve learning.

Significance - Result of t-test showed that t for statistical test was 95.508 with significance level = 0.000 (p<0.05, meaning that the model was effective. CIPP also concludes that all the aspects embraced were in good categories for education and training services of Basic Safety Training at the Politeknik Ilmu Pelayaran (PIP) Semarang.

1 INTRODUCTION

Transportation by ship has a positive impact on the employees who work as the ship’s crew. The Baltic and International Maritime Council (Bimco) noted that in 2020 the world needed 1,593,198 seafarers. However, there were only 1,555,281 seafarers, so it should be 37,917 more. It is an opportunity for those who wish to work aboard ships, as the seas offer more job vacancies than on land [12].

One of the base educations and training programs that prospective seafarers must follow is Basic Safety Training (BST). The program aims to provide training participants with understanding and skills about the basics of safety on board. They must also be able to practice the knowledge to prevent and overcome emergencies while sailing.

Politeknik Ilmu Pelayaran (PIP) Semarang is an educational institution under the Ministry of Transportation. The campus arranges education and training services of Basic Safety Training (BST) for the general public who want to work as seafarers. The main objective of the training is to strengthen the participant’s skills so that they are capable to perform a rescue in an emergency condition. They must be able to prevent fires and extinguish them. Besides, they are expected to understand various emergencies, occupational health and safety, light medical care on board, and self-rescue. Participants are also required
to engage in preventing marine pollution and develop social communication aboard the ship.

At the initial field observations and interviews with education and training managers, the researchers found many deficiencies in the education and training services of Basic Safety Training program at the Politeknik Ilmu Pelayaran (PIP) Semarang. One of these shortcomings is the schedule of teaching and learning activities in the classroom and field practice, which are arranged in an unstructured and systematic manner. One schedule often collides with another due to inconsistent lesson times. The problem is indicated due to the limited number of lecturers and inadequate facilities.

Other findings indicate that the planning, implementation, and evaluation of education and training are not prepared based on management principles, so the implementation is less effective. From the results of the interview with the Head of the Seafarers’ Education and Training Unit, the learning focuses on conveying knowledge verbally, it has not yet reached the stage of giving training participants the opportunity to develop their own insights and judgment when they face critical situations. That means the lecturer or instructor does not reflect on their own learning methods.

The CIPP evaluation model offers a more complex application since it covers both formative and summative evaluations. The results of the context, input, process, and product evaluation will be useful in making decisions (formative) and create accountable information (summative). Hence, it will add more various strategic options applied by institutions in conducting educational programs [5]. Two CIPP evaluation results register a conventional count of 91,000% and a computational count of 91,600%. Based on the analysis, the Computer-Assisted CIPP evaluation model is able to calculate more quickly and accurately than conventional, although the difference is not significant. Therefore, further empirical research is needed to discuss the controversy [3].

Correct safety training is beneficial to reduce the risk of a work injury that may occur anytime and anywhere. Hence, every ship’s crew is required to join safety training [10, 11]. In the findings of the effectiveness of Basic Safety Training on safety, safety training is efficacious in the sailing world. However, it needs to be supported by appropriate learning methods and models so that they can easily practice it while working. With the support of technology, learning becomes easier and increases the training participant literacy to understand the material [2].

In the evaluation of modification of Basic Safety Training as a response to a disaster, it shows that this training has proven to play an essential role in public awareness, and it is suggested to improve it. Communities experienced Basic Safety Training has proven to be more alert and responsive in dealing with disasters [7].

Context Input Process Product (CIPP) is an Information Service Evaluation Model. It is the answer to solve problems in the evaluation of services. The CIPP evaluation model was designed due to the teacher’s lack of comprehension in assessing the teaching process. This is why the success rate of information services in schools cannot be analyzed clearly. Moreover, the evaluation method’s ineffectiveness also results in weak school accountability and insufficient improvement or development. With CIPP, information services can be evaluated comprehensively [6].

1.1 Management of Training

Joseph Massie (1985: 9) reveals that management is a process of forming cooperation in a group, which later creates a common goal. Meanwhile, [8] asserts that management is the communication of various resources developed from the planning, organizing, and controlling processes to achieve certain intentions.

Based on these ideas, management is defined as a process for solving problems with effective methods to achieve organizational goals and objectives by employing existing resources efficiently. Management consists of many aspects such as control, coordination, motivation, design processes, development, and the influence of organizational goals and resources in achieving goals [4].

Argue that management is the process of directing groups to achieve organizational goals collectively. Administrative experts such as Sergiovanni, Coombs, and Thurson also have a similar sentiment by emphasizing that management is the process of working with and through others to accomplish organizational goals efficiently [1].

Based on the data above, the researchers formulate that management objectives always discuss some aspects, including a) cooperation, b) conducted by two or more people, and c) achieving common goals. Therefore, management is a process involving many people effectively and efficiently to attain organizational purposes. Management in an organization functions as an attempt to carry out certain activities, so its main objectives are achieved productively and efficiently.

1.2 Drill Program

This abilities education and training aim to ensure that participants have basic competency and safety skills while sailing. Participants must demonstrate a series of rescue in an emergency as one indicator of those skills. They have the competency to prevent fires as well as to extinguish them. The participants are also expected to understand several types of emergencies, occupational health, and safety (K3).

Apart from the indicators above, there are other points such as medical care skills, self-rescue during an emergency, preventing marine pollution, and maintaining social communication on board. This Basic Safety Training also emphasizes the participants to comprehend the basic knowledge of safety and practice it to prevent and overcome problems while sailing. Accordingly, training participants are not only proficient in theory, so are the practitioners too.
2 METHODOLOGY OF COLLECTING INFORMATION

This study is evaluative research with research and development. The study population is all training organizers totaling 86 people so that all belong to the population research. The data were collected through questionnaires and interviews. Before the questionnaire was submitted to the respondent, the instrument was through the validity and reliability stages. Valid data in the validity test results can be used for research. Two items of data were found to be invalid during the validity test. Reliability test using Cronbach shows context 0.807, input 0.815, and product 0.907. In addition, all CIPP components were also reliable with a Cronbach Alpha value greater than 0.60.

To analyze the data, the researchers used descriptive statistical methods. The method is then combined with the CIPP, so it can evaluate the implementation of the distance learning program at the Politeknik Ilmu Pelayaran (PIP) Semarang. The next step is selecting the education and training model through the Planning, Implementation, and Control approach to determine the appropriate model for the Politeknik Ilmu Pelayaran (PIP) Semarang and may be useful as a training development strategy.

This study intends to obtain a concrete picture of the Basic Safety Training implementation through the Context, Input, Process, and Product (CIPP) approach. The development research also reports in detail the behavior of training participants, training activities, and exploration to determine the proper method and development. The process also utilizes the Context, Input, Process, and Product (CIPP) components. After the event is thoroughly understood, the next step is exploring the research subject to check the overall situation in everyday life.

Daniel. L. [9] who is a management expert, emphasizes that policymakers must make decisions. The context in CIPP means conducting research based on needs, problems, and opportunities to determine the target, and ensure the quality of graduates. Input plays a role in planning and coordination in maximizing human resources. The process leads to the implementation of planning, and the product serves to identify and assess its effectiveness [9].

3 RESULTS AND DISCUSSION

Table 1 shows that pre-test score before implementation of CIPP management model with correct use and procedure with management functions starting from planning, implementation, to evaluation obtained a mean of 73.7442 with a standard deviation of 4.88259. Furthermore, result of post-test after implementation of CIPP management model in learning obtained a mean of 50.5698 with a standard deviation of 3.80878. Referring to the results, it can be said that implementation of CIPP management model that has been developed has resulted in improvements and is in accordance with objectives of this study. Description results with numerical score in detail are presented in Table 2.

Table 1. Description of Results of Pre-Test and Post-Test of CIPP Management Model in Basic Safety Training at PIP Semarang

<table>
<thead>
<tr>
<th>No.</th>
<th>Score Range</th>
<th>Pre Test</th>
<th>Post Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42 – 49</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>50 - 57</td>
<td>45</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>58 - 65</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>66 - 73</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>5</td>
<td>74 - 81</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>6</td>
<td>82 - 89</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>90 - 97</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Jumlah</td>
<td>86</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>42</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Max</td>
<td>64</td>
<td>93</td>
<td></td>
</tr>
</tbody>
</table>


Table 2. Description of Pre-Test and Post-Test of CIPP Management Score in Basic Safety Training at Politeknik Ilmu Pelayaran Semarang

![Result Pre Test and Post Test](Result.png)

Figure 1. Description of Before and After Implementation of CIPP Management model in Basic Safety Training at Politeknik Ilmu Pelayaran Semarang.

Figure 1 indicates that before implementation of CIPP management model in Basic Safety Training, the highest score obtained was at intervals 50-57 as much as 52% which was in fairly good category. Meanwhile, after implementation of CIPP management model in Basic Safety Training at Politeknik Ilmu Pelayaran Semarang, the highest score obtained was at intervals 66–73 as much as 54% which was in a good category.
Table 3. Paired Statistics of Pre-Test and Post-Test of Implementation of CIPP Management Model in Basic Safety Training

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Test</td>
<td>73.7442</td>
<td>86</td>
<td>4.88259</td>
<td>0.52650</td>
</tr>
<tr>
<td>Pre Test</td>
<td>50.5698</td>
<td>86</td>
<td>3.80878</td>
<td>0.41071</td>
</tr>
</tbody>
</table>


Table 4. Results of Correlation Analysis of Pre-Test and Post-Test of Implementation of CIPP Management Model in Basic Safety Training

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>86</td>
<td>0.895</td>
<td>0.000</td>
</tr>
</tbody>
</table>


Table 5. Gain Index Criteria

<table>
<thead>
<tr>
<th>No</th>
<th>Index</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>g ≤ 0.3</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>0.3 &lt; g &lt; 0.7</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>g ≥ 0.7</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Meltzer.

Moreover, criteria used to interpret Gain score: Gain ≥ 0.7 means high; 0.3 ≤ g ≤ 0.7 means moderate; and Gain ≤ 0.3 means low. Result of pre-test showed that mean value of CIPP management model in Basic Safety Training was 50.56, while result of post-test of implementation of CIPP management model in Basic Safety Training obtained a value of 73.74, indicating that there was an increase after implementation of CIPP management model in Basic Safety Training. Level of effectiveness of the model applied in this study can be calculated using Gain Index above, which is as follows:

\[
\text{Gain Index} = \frac{(73.7442 - 50.5698)}{(93 - 64)}
\]

Gain Index = \frac{23.18}{29} = 0.799

Based on Gain (G) Index criteria table, effectiveness of CIPP management model in Basic Safety Training implemented in Politeknik Ilmu Pelayaran Semarang was in the range of Gain value ≥ 0.7. It means that Gain index value of 0.799 was in high category (high-G). Accordingly, results of above calculation demonstrate that CIPP management model in Basic Safety Training developed was effective to improve basic safety training skills at Politeknik Ilmu Pelayaran Semarang with a high level of effectiveness (high-G). Effectiveness of model testing then used t-test and average increase of pre-test and post-test.

3.2 T-Test on Pre-Test and Post-Test

In this study, there was parametric statistical test conducted using t-test to determine level of effectiveness of model. Results of t-test on data from pre-test and post-test results of CIPP management model in Basic Safety Training using IBM SPSS Statistics 24 are presented as follows:

Table 6. Results of T-Test on Pre-Test and Post-Test of CIPP Management Model

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Sig.</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Difference</td>
<td>t</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dev. Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of t-test in Table 6 show that t value for statistical test is 95.508 with a significance level = 0.000 (p<0.05), meaning that there was a difference between average scores of pre-test and post-test accepted. It indicates that "Ha is accepted". This means that there was a difference between results of CIPP management model in Basic Safety Training for pre-test and post-test. Therefore, it can be concluded that based on statistical test results, CIPP management model is effective to improve management in Basic Safety Training at Politeknik Ilmu Pelayaran Semarang. In summary, effectiveness test can be shown as follows:

Mean score of post-test was higher than mean score of pre-test, indicating that there was an increase of 23.17%.

Correlation coefficient of pre-test and post-test was 0.895, meaning that there was a correlation with significance level of 0.05.

Result of N-Gain was 0.799 which was in high category, meaning that implementation of CIPP application system model was good and effective to improve learning.
Result of t-test showed that t for statistical test was 95.508 with significance level = 0.000 (p<0.05), meaning that the model was effective.

4 CONCLUSION

The research and discussion results conclude that the Basic Safety Training (BST) implemented at the Politeknik Ilmu Pelayaran (PIP) Semarang using the CIPP model is in a good category. Mean score of post-test was higher than mean score of pre-test, indicating that there was an increase of 23.17%. Correlation coefficient of pre-test and post-test was 0.895, meaning that there was a correlation with significance level of 0.000 < 0.05. Result of N-Gain was 0.799 which was in high category, meaning that implementation of CIPP application system model was good and effective to improve learning. Result of t-test showed that t for statistical test was 95.508 with significance level = 0.000 (p<0.05), meaning that the model was effective. Overall, the implementation of BST at the Politeknik Ilmu Pelayaran (PIP) Semarang using the CIPP model is good. Recommendation: Based on the research results, the researchers suggest, Use the application for registration, payment, and sharing of training schedules online, Optimize the use of Learning Media and information technology for training implementation in the classroom, Print the certificate online and deliver it timely.

REFERENCES


