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HAND SOLDERING PROCESS TRAINING MATERIAL USING ADDIE APPROACH TO SUPPORT E-LEARNING IMPLEMENTATION IN XYZ COMPANY

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ABSTRACT

Training is very important to increase the productivity of the company. Without the right training, worker will not understand and not know how to do right process. Worker with right process will be achieve good product. Sometimes, the problem of lack training is no proper training material availability for process. In this paper, author want to create training material for soldering process because soldering process is one of critical process, no proper soldering training material and support e-training as new implementation in XYZ company, and author is using ADDIE approach to create it. From ADDIE approach, author create 2 training phase and 2 types of assessment and training use multi – sensory learning which are visual, auditive, kinesthetic and tactile. In visual, using interactive video, participants watch the video, do the process as they see in the video, give the explanation, and they can ask the trainer if any question. Then worker will get training more about product especially for quality, output and ergonomic. After implementing it, workers is more understand and they can produce good product and right quantity, and trainer is more comfortable to give training for workers.

Keyword: ADDIE Approach, E-training, Hand Soldering

1. INTRODUCTION

Training is one of the important things in manufacturing company to increase the productivity. Training will be impacted to quality and the quantity of the product. Various training approach have been developed to fulfill the needs of each company. Right approach to define the training material will be impacted to quality of the training.

In XYZ company, there are more than 50 processes. One of them is hand soldering process, which is one of the critical processes. Now, for this process, trainer will give training for the operator directly to the operators with no proper guideline, and now e-training system will be implemented in XYZ company.

ADDIE approach will be used to create training material and implement it into soldering process. Articles can be written in English or Indonesian using Times New Roman 12 pt font, 1.5 pt spacing, 0 pt spacing before and after, a maximum of 12 pages, and a margin of 2.5 cm (left-right-top-bottom). The introduction should include at least four aspects: (1) the background of the researched problem; (2) a summary of relevant theoretical studies related to the researched problem and may be supplemented with a discussion of previous research (if any), specifying the gap between the conducted research and previous studies; (3) insights and plans for solving the problem; (4) research objectives. The writing of research objectives should be descriptive in the last paragraph of the introduction, without using bullets and numbering. Authors may also add expectations or benefits from the research results."

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2. LITERATURE REVIEW

According to Sari, (2016) that the reason to choose the ADDIE model because it described the process of developing a simple and consists of five sequential stages in a systematic and interactive. In addition, ADDIE models were often used to describe a systematic approach to the development of this material.

ADDIE first appeared in 1975. It was created by the Centre for Educational Technology at Florida State University. The ADDIE model developed by Dick and Cary in 1978 and Russell Watson revised in 1981 and was considered essential in the development of educational and training programs ADDIE approach. Below is the ADDIE Model (Muruganantham, 2015):

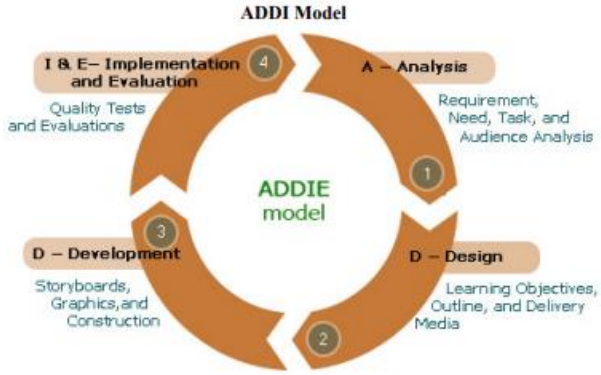

Figure1. ADDIE Model

3. METHODOLOGY

3.1 Analysis

Analysis is to determine what is the problem related the training of hand soldering process. In this phase, author interviewed the trainer and the operators, how is the current situation when they train the operator for hand soldering.

3.2 Design

The design of training materials is based on competency analysis from engineering. Engineer will define what is the skill and knowledge that the hand soldering operator needed.

3.3 Development

From the competency analysis, author can create content, learning type and duration for hand soldering process training.

3.4 Implementation

After author develop the content, it will be implemented for hand soldering training operator to understand how is training materials works.

3.5 Evaluation

This phase measures the effectiveness and efficiency of the instruction. Evaluation should occur throughout the entire instructional design process - within phases, between phases, and after implementation ((Muruganantham, 2015).

Below is the summary of the methodology that author define for hand soldering training material using ADDIE approach:

Table 1. Summary of ADDIE Approach

Phase	Task
Analysis	Need assessment
	Problem identification
	Task Analysis
Design	Check skills in competency analysis
	Check knowledge in competency analysis
Development	Create content
	Learning type
	Training Duration
	Place for training
Implementatio	Operator Training
	Trial
Evaluation	Record the result
	Interview the operator

4. RESULT AND DISCUSION

Hand soldering process ask some skill and knowledge as below:

Skill:

1. Able to do hand soldering process following work instruction.
2. Able to meet quality requirement of soldering process.
3. Able to meet performance requirement of soldering process (10sec/pc)
4. Able to implement good practice in performing soldering process.

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Knowledge:

1. Understand output target for soldering process.
2. Understand yield target for soldering process.
3. Know bad habits in soldering and understand why such habits must be avoided.
4. Able to describe do & don't in soldering process and explain why.

The result of the paper, for hand soldering training it will be 3 phases. Phase 1 is interactive learning video with 4 learning loops. Phase 2 is In-depth classroom training with special focus via 4 Learning Stations are motor skills and impact of reject part. Phase 3 is theoretical assessment and Phase 4 is practical assessment.

Tabel 2. Hand Soldering Training Syllabus

Phase	Duration	Content
Phase 1	45min- 1h	Interactive Learning Video with loops, OJT
Phase 2	2-2.5h	a) In-depth classroom training w focus via 4 Learning Stations: *motor skills, impact of reject part, ergonomic& efficient working, Quality* b) Comparison of Solutions and
Assessment	30min	Theoretical Assessment
Assessment	30min	Practical Assessment

4 learning loops in phase 1 is Multi-Sensory learning (visual, auditive, kinesthetic and tactile)..

Picture 2. Learning Loops in Phase 1

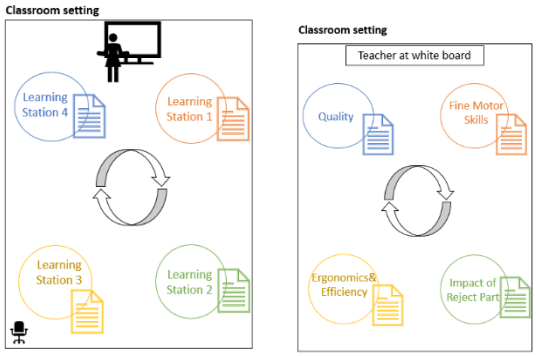
In phase 1, they are watching and listening video, teaching, and explaining again about what she is watching from video. This training is executed in production line. In Table 2 is describe about how to do the execution in phase 1.

Table 3. Execution in Phase 1

Topic	Method
Work Preparation	1. Watching & listening the video in classroom 2. Call-to- Action (Prepare your workstation including 5S and specific process requirement) in production line 3. Learning by Teaching (Explain the process) in production line 4. Questions (optional)
Testing Part	5. Watching & listening the video in classroom 6. Call-to- Action (Prepare 5pcs and measure them according to self check) in production line 7. Learning by Teaching (Explain the process) in production line 8. Questions (optional)
Good Habits	9. - Watching & listening the presentation from trainer
Process and end of shift	10. Watching & listening the video in classroom 11. Call-to- Action (Produce 5 pcs in 50 sec, compare all and shutdown the workstation) in production line 12. Learning by Teaching (Explain the process) in production line
Comparison bad & good sample	13. Watching & listening the video in classroom 14. Learning by Teaching (Explain the reason for good & bad product) in classroom.

In phase 2, the training is done in classroom, so author need to define setting of the classroom as below.

1. Everyone attends every station one after another (order is irrelevant)
2. Every station demands a certain *learning product* after 15-30min.
3. *Learning product* is recorded on personal work sheet.
4. The material to answer/ create learning product is placed at each learning station and stays there.
5. Rotating when solutions are individually discussed with trainer.
6. Associative Learning: Every station has specific place in classroom.



Picture 3. Setting of the Classroom Phase 2

Learning Station 1 is Fine Motor Skills Station, operator create one creativity using material and the activities is more likely hand

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soldering process, and author observe their cycle time to produce it and train their fine motor skills (eye-hand- coordination)

Learning Station 2 is Impact of Reject Part. In this station, author explained about what the definition of yield and output target.

Learning Station 3 is Ergonomic and efficiency working. In this station, operator will learn about other characteristics related to work habits, earn skill in healthy working ways to maximize efficiency and wellbeing (ergonomic and healthy sleep habits).

Learning Station 4 is Quality, what is and type of reject part and what will be happened if company produce reject part.

For Phase 3, author create theoretical assessment related the phase 1 and 2 and do practical assessments at the end of training period (phase 4).

5. CONCLUSION AND SUGGESTION

Author creates training material consist of 4 phases based on competency (skill and knowledge) from engineering. Phase 1 is four learning loops, phase 2 is four learning station, phase 3 and phase 4 is theoretical and practical assessment.

The operator feels happy and more understand about hand soldering process. They get new knowledge such as ergonomic and yield definition. Author gets this information from interview and observation from the participants. And they hope ADDIE approach could be implemented in other processes

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