

## Conference Paper

# Introducing the Cooking Process of Gresik's Traditional Food Through Pictorial Book Integrated with Augmented Reality

Trias Widha Andari, Rizky Noviasri, and Irni Resmi Apriyanti

Visual Communication Design, UISI, Gresik, Indonesia

## Abstract

While there are various kinds of Gresik's traditional food, the data indicate that children are still lacking knowledge about them. Therefore, the objective of this study is to educate children about Gresik's traditional food. The research method consists of three parts: pre-design; design; and post-design. The result of this research is a mobile application that supports a pictorial book with augmented reality technology for children from 7 to 11 years old. Within that age range, children are able to classify and identify objects according to their characteristics. Augmented reality technology makes multimedia that contains the cooking process of Gresik's traditional food become more interactive and attractive.

**Keywords:** Gresik's Traditional Food, Augmented Reality, Picture Story Book

Corresponding Author:

Trias Widha Andari  
trias.andari@uisi.ac.id

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## 1. Introduction

Gresik, which is known as 'City of Santri (Islamic Student)', is a district located in East Java Province. Islamization in Gresik occurred long ago, due to a trade route that passes through the port of this town. No wonder that in 15th century, Gresik was known as the richest and the most important sea trading town in Java Island. [1]

Gresik's local culture—including culinary—is influenced by Chinese, Indian, and Arabian culture that came through the trade route. Gresik has more than 200 kinds of traditional food, but unfortunately has lost almost half number of it. The high potential of traditional culinary is seriously challenged by the popularity of modern culinary.

To overcome that problem, we (researchers) designed an attractive educational media to introduce the traditional food of Gresik. The segmentation of this research is children from 7 to 11 years old who reside in Gresik. This segmentation is chosen because children are the ones who will be in charge in preserving Gresik's traditional culinary in the future.

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Dealing with children in this era of industrial revolution 4.0 is challenging for the researchers. They are the new generation that is close to technology—and that is why they are called digital generation [2]. They need more than conventional books. They need a direct interaction with the source of information.

This research results in educational picture story book integrated with augmented reality (AR) technology. It contains animations that will be able to improve children's interest and knowledge about Gresik's traditional culinary. Picture story book with AR technology will be a bridge between printed materials and digital world. It could be an attractive and interactive educational media.

## 2. Methods

The design method, as shown in Fig. 1, consists of predesign, design, and postdesign. In predesign process, researchers conducted problem identification and data analysis. Problem identification is done by distributing questionnaires to measure the children's level of knowledge about Gresik's traditional culinary, field observation and interviews to understand the steps in cooking Gresik's traditional culinary and visualize the environment around Gresik's sea port, and studying related literatures.

In design process, researchers designed schematic design through brainstorming and idea selection to find the best idea that will be implemented in the stage of design development. In postdesign process, researchers conducted evaluation by testing products to children aged 7-11 years old before moving into the design execution.

## 3. Predesign

In predesign process, researchers conducted problem identification through the distribution of questionnaires, interviews, observations, and studying literatures. The analysis of collected data will be shown below.

### 3.1. Phenomenon of Children's Recognition of Gresik's Traditional Food

Based on the result of questionnaires distributed in an elementary school (to children from 7 to 11 years old), most children only recognize 3 of 10 Gresik's traditional food (30%) mentioned in the questionnaire; which are nasi krawu, jenang jubung, and sego roomo.

The result is much different from their recognition of foreign food such as hamburger, pizza, and sausage; which is 94,6%.

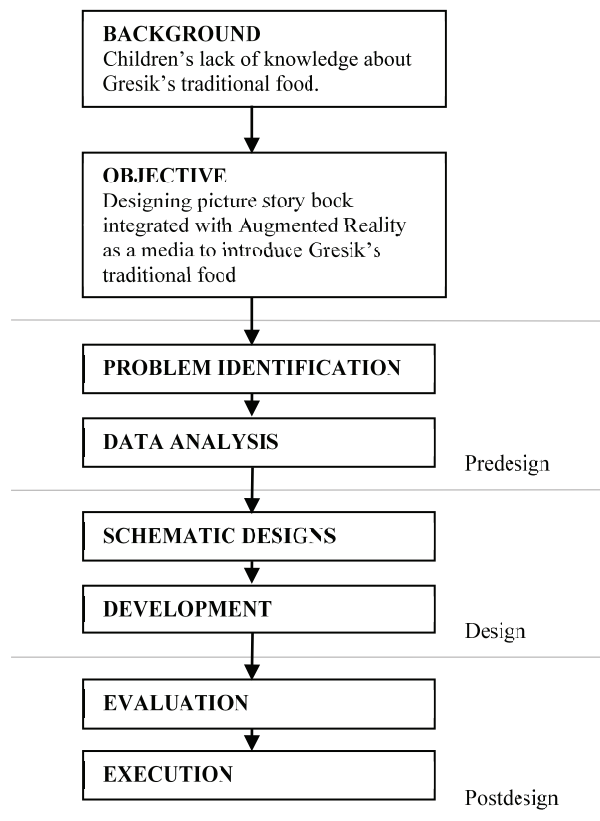


Figure 1: Design methods

This data indicates that they are lacking of knowledge about Gresik's traditional food. Thus, a proper and attractive media to introduce Gresik's traditional food for children is needed.

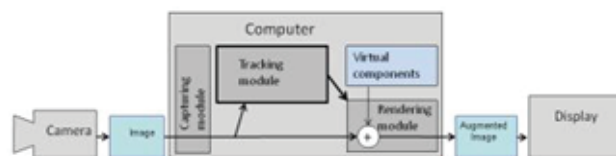
### 3.2. The Life of People Who Live By Sea Port

Based on data released in 2018, there are 956 families in Gresik that are making money by being fishermen. At Gresik's port, there are docks, spots to dry fish, and sight of people who help each others. There are numerous types of vessel in Gresik's port, from ships used to transport goods to ships used to catch fish.

Not far from port, there is a village named Desa Lumpur (mud village). People in the village talk using Gresik's local dialect, for example: using 'sang' instead of 'saya' (I) and 'sira' instead of 'Anda' (you).

### 3.3. Augmented Reality Based Educational Media

Augmented reality can be defined as the process to combine object (static or dynamic picture) by layering an image using a corresponding computational data [3]. AR is a technology using real-time system that involves direct interaction between media and users. It takes three components to design AR: *camera* to catch objects, *display* to display the result, and *computing device* to run the program [3]. The process of how AR works is as seen in Fig 2.



**Figure 2:** How AR works (Source: Sitanen, 2012:20)

AR technology can narrow the distance between virtual world and real world so that the application (as the result) is more attractive and interesting [4]. In the process of education, AR technology has many positive impacts, which are: (1) creating a new way to study, which is simpler, attractive, entertaining, and interactive; (2) enabling the students to decide what to do on their own; (3) enriching learning process with modern technology; (4) providing effective learning media; (5) bringing clearer and a more concise information; (6) supporting interaction between students and teachers; (7) cost-effective and easy to develop; (8) providing practical room to enhance experience; (9) bringing many possibilities to develop innovation; and (10) creating the fun atmosphere [5].

In this design process, static object used as marker is picture in the story book. The object is integrated with application that will be able to process static image to animation using computing device. AR is used as a complimentary to the short narration in story book. There will be animation supported by audio that could stimulate children's visual and auditory aspect, so that the information could be delivered in a more attractive and interesting way.

## 4. Design

### 4.1. Schematic Design

### 4.1.1. Parallax Animation

AR content is used to create 2D animation of background and the process of cooking Gresik's traditional food.



**Figure 3:** Sample of illustration inside story book

Animation shown in the design is using the principle of motion parallax. It is used to provide deeper perception in 2D animation, so that children can feel the 3D effect in that animation [6].

### 4.1.2. Creative Content

Based on the data analysis, this AR based picture story book will be produced as series. Each story book contains background and process of cooking Gresik's traditional food. The first one, a story book titled *Pendekar Masin* (Masin Warrior), is telling about bubur masin.



**Figure 4:** Bubur masin

Bubur masin, as seen in Fig. 4, is a porridge made of corn and commonly found during Ramadan (fasting month). Design of *Pendekar Masin* begins with introduction of daily activities of children who reside near Gresik's Port.



**Figure 5:** Ain, the main character

The story begins with imaginative narration from Ain's point of view. Ain (7 years old) is the main character who was born and currently living in Desa Lumpur. Along with his two friends, Ain discover the mystery behind the making of bubur masin from a vegetable seller.

### 4.1.3. Media Specification

Dimension of picture story book used as marker is 10 x 19 cm. There is one colored image that works as marker for two pages of the book. Computing device that is required here is Android (version 8.1) smartphone with screen sized 6.2 inch and minimum 8 MP in resolution of back camera.

## 4.2. Design Development

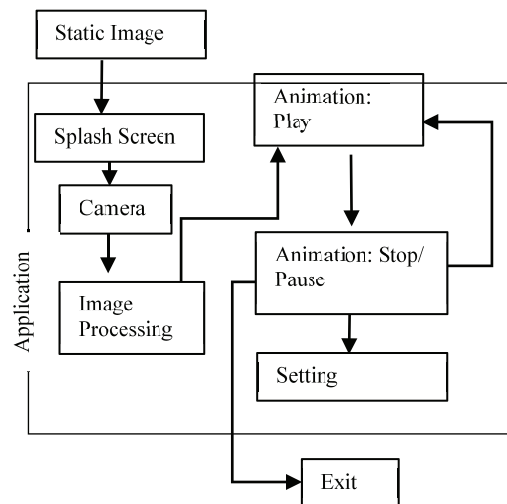
### 1. Content Visualization

The system of images used in visualization design of this picture story book is *Ruang Waktu Datar* (Flat Time Space). By using this system, one page of an image can contain more than one story, without being limited by perspective, space, and time. Besides that, in this system, the important object is shown much bigger than others. For example, in the first image, Fig 5, user can sense the port's early morning atmosphere.

The narration seen in Fig 5, which is represented in AR based animation, is telling about what usually happens before *sahur* (early breakfast before fasting) during Ramadan in Kampung Lumpur. Motion parallax on that animation begins with the motion of sea waves, ships, docks, and the buildings by the sea. The last object shown in the animation is the image of chickens holding traditional musical instrument (*kentongan* and gallon of water) which is commonly used to wake people up—so that

they do not miss *sahur*. As the key objects in that story, chickens are drawn bigger than others.

The style of design that is used in the making of application's assets is flat and asymmetrical (with a touch of 'childish' feel), corresponds to the style of illustrations. Each asset has an edge line (outline) to make identification process easier for children.



**Figure 6:** Flowchart of “Kuliner Khas Gresik” (Gresik’s Local Culinary) application

## 2. Interactivity in “Kuliner Khas Gresik” Application

To access AR based animation in this design, children should download and install “Kuliner Khas Gresik” application. This program, which is integrated with picture story book, is a processor which turns static image (input) into dynamic animation using AR. The interactivity in this design can be found in the process of selecting input images, playing animation, and setting. The selection process is as seen in Fig 6.

The example of static image used as input can be seen in Fig 4. Next, application begins with the appearance of splash screen (as seen in Fig 6). There are hints to direct camera to capture the image. The captured image will be the marker and will be processed into moving object (animation). Animation will automatically started and can be paused if the screen is tapped once.

When animation begins, as seen in Fig 8, there will be two buttons (other than ‘play’ button) that can be selected. The first one is ‘home’ button. When it is pressed, the interface will be swithed back to the first step (capturing image using camera). The other one is ‘setting’ button. When it is pressed, users will be able to control the things related to sound effects and background music.

There are three types of audio that could be found in this design. They are narration, background music, and sound effects. The narration delivered through the voice of a young boy which represents the main character of the story. It is complemented



**Figure 7:** User interface of splash screen



**Figure 8:** User interface when animation begins

by subtitle that is placed in the bottom of the screen. For the background music, the application uses a fun and modern traditional music. Meanwhile, the sound effects is corresponding with the motion displayed in animation, for example: the sound of sea waves, ships, and the wind.

## 5. Postdesign

In postdesign process, this design this will be tested to targets; which are the children, from 7 to 11 years old, who live in Gresik. The testing is aimed to review the effectiveness of the media which is designed as educational media to introduce Gresik's traditional culinary.

Postdesign process is scheduled to be executed after fully completing design process.



## 6. Conclusion

Gresik's traditional culinary is a significant potential that should be preserved by younger generation. So, education about traditional culinary is pretty much needed, especially by children. The education process could be done in an attractive and interactive way, for example by combining printed materials and virtual world using AR technology. Media content is created based on background culture of Gresik. The introduction of Gresik's traditional culinary will be displayed in the form of animation (dynamic visualization). The animation comes with narration which is delivered through imaginative storytelling that is suitable for children from 7 to 11 years old.

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