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COMBATING EXCESSIVE FOOD CONSUMPTION THROUGH *AUGMENTED REALITY* PACKAGING: AN EXPLORATIVE STUDY OF GENERATION Z

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ABSTRACT

In 2020, The Indonesian Food and Drug Authority published Front of Pack Nutrition Labelling to ease consumers decide their diet preferences. In line with this effort, digital campaigns can effectively educate society and reduce the high consumption of Sugar, Salt, and Fat (SSF) in Indonesia. This research discusses the effectiveness of SSF consumption restriction messages delivered using Augmented Reality (AR) technology. This research uses a quantitative descriptive method. The data were collected from randomly selected 100 youngsters living in Jakarta, Bogor, Depok, Tangerang dan Bekasi (Jabodetabek) area and followed by the EPIC (Empathy, Persuasion, Impact, and Communication) model analysis. All four dimensions of EPIC fell on effective category within range 4.23-4.29 out of 5.8. These findings suggest that, in general, the advertisement for limiting the consumption of SSF with Augmented Reality media stands in the very effective category with a final score of 4.25 and represent that AR application in packaging can effectively be used for promoting or advertisising particular information.

ABSTRAK

Pada tahun 2020, Badan Pengawas Obat dan Makanan Republik Indonesia menerbitkan Front of Pack Nutrition Labelling untuk memudahkan konsumen menentukan preferensi diet mereka. Sejalan dengan upaya ini, kampanye digital dapat secara efektif mengedukasi masyarakat dan mengurangi konsumsi Gula, Garam, dan Lemak (GGL) yang tinggi di Indonesia. Penelitian ini membahas efektivitas pesan pembatasan konsumsi GGL yang disampaikan menggunakan teknologi Augmented Reality (AR). Penelitian ini menggunakan metode deskriptif kuantitatif. Data dikumpulkan dari 100 anak muda yang dipilih secara acak yang tinggal di wilayah Jakarta, Bogor, Depok, Tangerang, dan Bekasi (Jabodetabek) dan diikuti dengan analisis model EPIC (Empathy, Persuasion, Impact, and Communication). Empat kategori tersebut berada dalam rentang 4,23-4,29 dari nilai maksimum yakni 5,8. Studi ini menunjukkan bahwa secara umum, iklan pembatasan konsumsi GGL dengan media AR berada pada kategori sangat efektif dengan skor akhir 4,25 dan menunjukkan keefektifan dalam upaya promosi atau mengiklankan pesan tertentu.

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INTRODUCTION

In Indonesia, non-communicable diseases (NCDs) such as cardiovascular, cancer, diabetes, and chronic obstructive pulmonary disease (COPD) contribute to the highest mortality rate (61%). In fact, communicable diseases are diseases that can be avoided and modified in their risk factors, such as poor dietary quality in the intake of sugar, salt, and fat (SSF). The Indonesian government, through Permenkes No. 30 of 2013, has tried to protect the public from the dangers of NCDs, namely with the mandatory regulation of the inclusion of SSF information and health messages on processed and ready-to-eat foods, which aims to increase consumer knowledge on SSF consumption. The problem in packaging design today is its consumer-centered form; in other words, packaging focuses on appearance

rather than the value of the product provided to consumers such as health information and eco-friendly/material aspects. One way that is currently trending is to add a Humanist aspect to packaging design by involving consumers (Atmarita et al., 2017; Juleha, 2018; Prihatini et al., 2017).

SSF labeling is a standardized measure that a country can take to control the consumption of sugar, salt, and fat in its population. The World Health Organization (WHO) recommends using Front of Package Traffic Light (FoPTL) labels so that consumers can more easily choose foods that suit their dietary needs. However, this policy has been met with resistance from food manufacturers, for instance, Canada, Portugal, Peru, India, and most developing countries (Nohlen et al., 2022).

This study focuses on Generation Z, sometimes known as "Gen Z" or "zoomers," who were born between the mid-to-late 1990s and the early 2010s andmore optimistic about the transmission and communication of Internet technology (Lubis, 2018). This generation is the largest consumer group in the world, and their influence and purchasing power help to upgrade all kind of goods consumption (Hawkes, 2010).

Augmented Reality offers an interaction between the virtual world and the real world. Markers will interact with the database to display audio-visual information in the form of text, video, three-dimensional objects, or animations (Prakash Yadav & Rai, 2017; Prasertsith & Kanthawongs, 2022). This technology enables audio-visual delivery in a limited print space by adjusting the area of the marker as needed. Othes AR applications in food packaging from the previous studies are indicators of nutritional content on durian packaging (Brata & Brata, 2018), promotional media on the packaging of souvenirs of MSMEs typical of West Java, detection of expiration dates on food packaging and digestive learning media (Hartanti & Nurviana, 2019).

The respective contribution of AR-based, visual appearance, and auditory packaging material properties for educational media purposes has not been deeply investigated. The objective was to evaluate the effectiveness of visual and auditory properties embedded in AR packaging and their perceptual interactions on SSF information towards consumer knowledge.

METHODS

The approach in this study used quantitative descriptive statistics to explain the position of the variables studied and the relationship between one variable and another.

Data Analysis

The data were analyzed using SPSS V.22. This study also assessed the respondents through the EPIC model. The EPIC approach is one of the measuring tools to measure the effectiveness of advertising with a communication approach developed by AC Nielsen, one of the companies involved in the world of global marketing research (Amira & Nurhayati, 2019; Pancaningrum & Ari Rahayu, 2017; Lutfie & Marcelino, 2020) . In the EPIC model, four dimensions or realms of approach are known, namely: Empathy, Persuasion, Impact, and Communication – EPIC (Sattari & Mehrabi, 2016).

Population and Sample

In this study, the population was aged 18-23 years who were domiciled in the Jakarta, Bogor, Depok, Tangerang and Bekasi areas.

Bernoulli's formula determined the number of samples used in the study:

$$n \geq \frac{(Z.\propto/2)^2.p.q}{(e^2)} \quad \text{.....(1)}$$

Information:
n = Minimum number of samples
Z = Square of the confidence interval
$\alpha/2^2$ = Confidence level (95%) = 1.96
e = Acceptable error rate
p = estimated proportion of success
q = approximate proportion of failures or 1-p

In this study, $\alpha/2^2$ set the value at = 1.96. This study determined an error rate of 10%. Meanwhile, the probability of a true q (accepted) or wrong p (rejected) questionnaire is 0.5 each. Hence, the number of respondents is 100 who can represent a population to make it easier for researchers to spread the questionnaire. The sampling technique used in this study was n*on probability Sampling*. The sampling method used in this study was *Purposive Sampling* with criteria in selecting samples were generation Z users who were domiciled in Jabodetabek.

Data Collection Method

The primary data were obtained by means of questionnaires. Meanwhile, secondary data were obtained through comprehensive literature studies. This study used an ordinal scale. Secondary data were collected through the deployment of questionnaires using the *Likert scale* (1-5) i.e. : Strongly Agree (SS)= 5, Agree (S)= 4, Slightly Disagree (SD)= 3, Disagree (TS)= 2, Strongly Disagree= 1.

This research measured effective health promotion advertising restrictions on excessive SSF consumption using Augmented Reality in food packaging. Furthermore, the responses were assessed by using the EPIC method. The survey is carried out by referring to the following rules obtained at the survey form along with the software by downloading and installing the application on an Android phone. After installing and scanning the packaging respondents watched the promotional video and filled out the form afterwards.

RESULT

The packaging used in this research can be seen in the figure 1. These packaging mockups were designed inspired by Betawi traditional culinary i.e. egg crust. After following provided material's instructions, the respondents filled out the electronic survey forms.

Figure 1. Contemporary Design Egg Scale Packaging designed by the Author (left), promotional video (on the right side).

The figure 1 shows that coversion of spoon and the amount of weight i.e. 1 table spoon of sugar is equal to 50 grams, 1 tea spoon of salt is equal to 5 gram, and 5 tea spoons of fat is equal to 67 gram. In this study, male were 29 % and female were 71% of the total 100 respondents. Respondents in this study were aged in the range of 17-20 years. The majority of respondents were 19 years old (42%) the rest were 18 years old (37%), 20 years old (18 %) and 17 years old (3 %).

Validity Test and Reliability Test

The criteria for determining the validity test are as follows:

a. If r count > r table then the question is valid.
b. If r count < r table, then the question is invalid

Table 1. Validity and reliability test of the survey questions

Empathy Question Instrument Validity Test Results (X1)			
Indicator	**Calculated r value**	**Table r values**	**Information**
The health promotion advertisement "Restrictions on Consumption of Sugar, Salt and Fat" is an easy-to-understand advertisement	0.58	0.19	Valid
The health promotion advertisement "Restrictions on the consumption of Sugar, Salt and Fat" is interesting to listen to	0.42	0.19	Valid
Persuasion Question Instrument Validity Test Results (X2)			
The health promotion advertisement "Restrictions on the consumption of Sugar, Salt and Fat" was able to make me understand the overconsumption of these 3 ingredients	0.45	0.19	Valid
After seeing the ad impression, I was interested in limiting my consumption of Sugar, Salt and Fat.	0.54	0.19	Valid
Impact Question Instrument Validity Test Results (X3)			
I want to limit my consumption of Sugar, Salt and Fat after seeing the ad impression	0.55	0.19	Valid
I believe the impact of consuming sugar, salt and fat that crosses the recommended limit after seeing the ad impression	0.60	0.19	Valid
Communication Question Instrument Validity Test Results (X4)			
I want to limit my consumption of Sugar, Salt and Fat after seeing the ad impression	0.63	0.19	Valid
I believe the impact of consuming sugar, salt and fat that crosses the recommended limit after seeing the ad impression	0.55	0.19	Valid
Instrument Reliability Test Results			
Instrument Reliability (N=8)	0.82	0.19	Reliable

Based on table 1, the results of the *empathy* (X1), persuasion (X2), impact (X3), communication (X4) Question Instrument Validity Test Results (X4) showed that the r count > the r table value, meaning that each variables statement from four groups were declared valid, and feasible to be used in this study. Meanwhile, according to reliability tests, all 8 question items from

the empathy, persuasion, impact and communication variables were declared reliable or consistent and feasible to use in this study.

EPIC Model Average Score

The assessment of EPIC questions model used a Likert scale with a scale range (SR) used in the form of scores of one to five. The calculation of scale range based on the weight of the scoring scores obtained in the questionnaire can be seen as follows:

$$\mathbf{SR} = \frac{\mathbf{5-1}}{\mathbf{5}} = \mathbf{0.8} \quad \text{.....(2)}$$

0.8 + 1.0 = 1.8 (Very Ineffective/VI)
0,8 + 1,8 = 2,6 (Not Effective/TE)
0.8 + 2.6 = 3.4 (Less Effective/LE)
0.8 + 2.6 = 4.2 (Effective/E)
0.8 + 4.2 = 5.8 (Very Effective/VE)

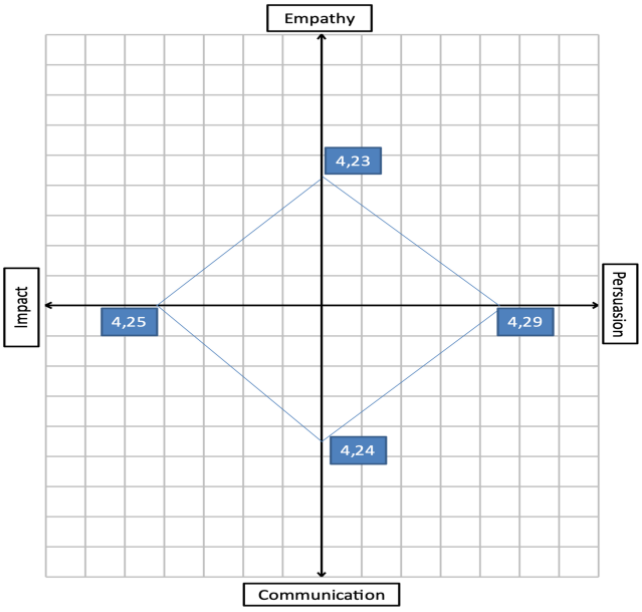

Figure 2. EPIC Model analysis on SSF restriction advertising with AR method on egg crust packaging.

In the figure 2, all four dimensions reached effective category at minimum (Emphaty=4.23). Meanwhile, Persuasion category reached the highest result (4.29).

DISCUSSION

Based on the results of the EPIC Model analysis, namely empathy, *persuasion, impact and communication* separately showed very effective results and the overall advertising assessment was included in the very effective category. In general, advertising has three important communication functions: providing information, influencing, and reminding.

Empathy

The empathy dimension is the ability to relate to the feelings of others or to feel what the other person is feeling. *Empathy* involves affection in the form of feelings and cognitions and cognitive involves the thinking of the consumer . From the results of the EPIC analysis, empathy variable model is included in the very effective category (4.23/5.8). This value showed that respondents understood and

were tempted to listen to advertisements for restrictions on SSF consumption and the impact of excess consumption of the substance on egg crust packaging. Using relevant method such as empathy advertisement to reach the targets or customers will more be effective than conventional method. This view is supported by Ali Hussain & Wieffering, 2021; Amira & Nurhayati, 2019; Kılıç & Yolbulan Okan, 2021 who find that in order to produce seamless and gratifying service interactions, "interaction routing" approaches, which pair consumers with staff according to their psychological profiles has a stronger influence on the viewer's empathy.

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Persuasion

This dimension has an average value of 4.29 /5.80 and effectiveness values falls slightly below highly effective category and has the highest average value of the EPIC sub-variable in this study. The dimension of persuasion is an important aspect of advertising effectiveness. The mission of an advertisement includes persuading or persuasion, namely where the advertisement is to persuade the user so that what is conveyed can be received properly by the user / consumer. In this study, the effectiveness of messages can be seen from the ability of messages in advertisements to invite respondents to make decisions after understanding message in the video and a sense of wanting to limit SSF consumption following watching advertisements on the packaging. In this research, the video is presented by animation and explained with general language which is understandable and relatable to persuade the respondent. In the same vein, Oktanizar & Kurniawan, 2021 in their research notes the effectiveness of motion graph for promoting shipping industry to the general public. Furthermore, previous studies documented persuasive audiovisual communication was genuine in terms of its substance, making it a useful technique for reducing salt intake among heart failure patients (Sousa et al., 2021) and to propagate the notion that food equals enjoyment and pleasure (Connor, 2006).

Impact

From the results of the EPIC Analysis Model the *Impact* variable is included in the very effective category with a score of 4.23/5.8. The impact dimension focuses on the consumer's decision after watching the ad, whether the ad affects consumer behavior or not. The questions presented in the questionnaire showed that the majority of respondents agreed to limit SSF consumption and believed in the impact. Health problems that can be caused in the form of hypertension, diabetes (Marine & Adiningsih, 2015), hypercholesterolmia / cholesterol levels that exceed normal levels (Saputri & Novitasari, 2021; Wiardani et al., 2011), stroke (Jayanti et al., 2017).

Communication

Our result showed that communication variable falls in very effective category (score 4.24/5.8). This variable focused on how the respondent comprehend the message and awareness raised after watching the video. The result suggest that the information and message communicated in the exhibited promotional video are straightforward and easy to comprehend. Similar results have been reported by Sun & Tsai, 2021 who observed VR animation technology not only draws customers' attention to agricultural brands and encourages the consumption of their products, but it also promotes regional identity and disseminates regional culture, motivating the potential awareness of tourism and shopping and fostering economic growth. Support for this view has come from studies of Wang & Lee, 2021 who confirmed VR animation has altered the passive manner in which an audience observes a video, hence enhancing the interaction and expressive power of animated films.

CONCLUSION

The study shows that the packaging is effectively used for deliver the particular healthy-related information. Furthermore, it represents a further step towards developing AR technology in label or packaging for health promotion, especially for young generation. Health advertising services limiting SSF consumption on AR media were included in the very effective category. This can be seen from the total EPIC rate score of 4.25.

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