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BREAKING THE LABEL: DEVELOPMENT OF ULTRA-PROCESSED-FOOD INTERACTIVE EDUCATIONAL VIDEO TO IMPROVE NUTRITION LITERACY AND HEALTHY FOOD SELECTION IN STUDENTS

Breaking The Label: Pengembangan Video Edukasi Interaktif Ultra-Processed Food untuk Meningkatkan Literasi Gizi dan Pemilihan Pangan Sehat Pada Mahasiswa

Valentina Wiyanda Ratu Pratikno [1] , Zahra Anggita Pratiwi [1*], Agung Wibowo [2], Aprinia Dian Nurhayati [1]
[1]Program Studi SI Gizi Universitas Negeri Malang, Malang, Indonesia
[2]Program Studi Pendidikan Biologi Universitas Negeri Malang, Malang, Indonesia
Email: valennwy84@gmail.com

ABSTRACT

Consumption Ultra-Processed Food (UPF) in students is classified as high as 50.3%, although as many as 48% of students have good UPF knowledge and 61.7% of students have the habit of reading food labels. This shows that good knowledge is not always directly proportional to healthy food consumption patterns. This research aims to develop interactive educational videos "Breaking The Label" related to UPF as a solution to increase understanding that can change the attitude of choosing healthy food in students. The media development method uses Research and Development (R&D) with design pre-experiment one group pre-test-post-test. The development model used is ADDIE which is carried out in 4 stages, including analysis, planning, development and implementation involving 36 students of the State University of Malang selected using techniques non probability sampling by the convenience sampling. In its implementation from the results of validation tests by subject matter experts showed that S-CVI 0.70 was categorized as valid and the results of the validation test by media experts showed that S-CVI 1.00 was categorized as valid. The interactive educational videos developed are declared feasible as educational media. The results of the analysis showed an increase in the average nutritional literacy score before intervention (24.67) and after intervention (27.58) with p = < 0.001 and an increase in the average score of healthy food selection attitude before intervention (6.72) and after intervention (7.97) with p = < 0.001.

Keyword : *healthy food selection; interactive video; nutrition literacy; ultra-processed food*

ABSTRAK

Konsumsi *Ultra-Processed Food* (UPF) pada mahasiswa tergolong pada kategori tingkat tinggi yaitu 50.3%, meskipun 48 % mahasiswa memiliki pengetahuan UPF yang baik, dan 61.7 % mahasiswa memiliki kebiasaan membaca label makanan. Hal ini menunjukkan bahwa pengetahuan yang baik tidak selalu berbanding lurus dengan pola konsumsi makanan sehat. Penelitian ini bertujuan untuk mengembangkan video edukasi interaktif *" Breaking The Label"* terkait UPF sebagai solusi meningkatkan pemahaman yang dapat mengubah sikap pemilihan pangan sehat pada mahasiswa. Metode pengembangan media menggunakan *Research and Development* (R&D) dengan desain *pre-experiment one group pre-test-post-test*. Model pengembangan yang digunakan adalah ADDIE yang dilakukan 4 tahap, meliputi analisis, perencanaan, pengembangan dan implementasi dengan melibatkan 36 mahasiswa Universitas

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Negeri Malang yang dipilih dengan menggunakan teknik *non probability sampling* dengan metode *convenience sampling*. Hasil uji validasi oleh ahli materi menunjukkan S-CVI 0.70 dikategorikan valid dan hasil uji validasi oleh ahli media menunjukkan S-CVI 1.00 dikategorikan valid. Video edukasi interaktif yang dikembangkan dinyatakan layak sebagai media edukasi. Hasil analisis menunjukkan adanya peningkatan rerata skor literasi gizi sebelum intervensi (24.67) dan setelah intervensi (27.58) dengan p = < 0.001 serta adanya peningkatan rerata skor sikap pemilihan pangan sehat sebelum intervensi (6.72) dan setelah intervensi (7.97) dengan p = < 0.001.

Kata Kunci : literasi gizi; pemilihan pangan sehat; *ultra-processed food*; video interaktif

INTRODUCTION

The consumption of *Ultra-Processed Food* (UPF) has become a trend all over the world. In the last half century, the industrialization and globalization of the food sector is one of the factors that has caused the food industry to develop rapidly (Pagliai *et al*., 2021). In developed countries, UPF has contributed more than the total calories in the diet with a proportion of 40.6% in Australia, 57% in the United States and 56.8% in the United Kingdom (Juul *et al*., 2022; Marchese *et al*., 2022; Rauber *et al*., 2019). Based on the average Badan Pusat Statistik (2024) consumption of instant noodles in Indonesia is 45.11 units/capita/year, finished food is 20.462 units/capita/year and packaged drinks are 8.87 units/capita/year.

The high consumption of UPF attracts attention, especially to the student population which is classified as young adults aged 18-29 years. Students experience a transition period including choosing food independently that is related to food consumption patterns (Diani, 2018). One study showed that 50.3% of students with a high level of UPF consumption had good knowledge of UPF (48.0%) and the habit of reading food labels (61.7%) (Vashtianada, 2023). Data related to UPF consumption at State University of Malang is not yet known, but many students at similar universities, namely in Jakarta, show high UPF consumption.

High consumption habits of UPF in young adults trigger various health risks including obesity, hypertension and type II diabetes (Crimarco *et al.*, 2022; Pagliai *et al.*, 2021). The increase in non-communicable diseases is generally experienced by the elderly group but in the current era it is starting to threaten the productive age group (Kemenkes, 2020). This is supported by the results of the Survei Kesehatan Indonesia 2023, the increased risk of non-communicable diseases in the age group of

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18 and above, namely diabetes, increased from 10.9% (in 2018) to 11.7% (in 2023).

The increase in UPF consumption is due to low nutritional literacy which has an impact on the habit of consuming unhealthy foods and drinks, such as products high in sugar, high fat and processed foods ready for consumption to become a lifestyle of students (Hanifa *et al*., 2024; Hirda *et al*., 2023; Vashtianada, 2023). Exposure to social media advertising media and peer influence encouraged UPF consumption habit behavior with a mass media exposure rate of 81.2% and peer influence of 56.4% (Vashtianada, 2023). Food selection is also influenced by easy accessibility where; 45.6% of students have moderate access to UPF, which is practical and faster without considering nutritional quality (Diba, 2025; Vashtianada, 2023).

Based on the review of research conducted, there is a gap that shows that good nutrition knowledge does not always have an effect on healthy food consumption. Nutrition education interventions using conventional methods such as lectures, leaflets, and pamphlets are considered less effective because they are one-way and lack of interest for the audience and difficult to understand the material (Arsyad *et al*., 2024; Andriyanti & Musniati, 2026). Interactive videos with interaction and animation elements are considered effective in increasing knowledge and helping participants understand better, especially for difficult and visual material (Hung *et al*., 2018; Knapp *et al*., 2022). Research studies Haerawan *et al*.. (2024) involving students stated that interactive videos were more effective in improving learning outcomes as much as 92% of students completed the video to the end. The development of interactive educational videos in this study is expected to be a solution to increase understanding that can change attitudes towards healthy food choices.

METHOD

This study uses *the Research and Development* (R&D) method with a *pre-experiment one group pre-test post-test design*. This research was carried out online or online using *the Quizizz platform*. The subject of the study was a student of the State University of Malang with a sample of 36 respondents selected using *a non-probability sampling technique* with *the convenience*

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sampling method with the criteria of active SI students of the State University of Malang for the period of 2025/2026, aged 18-23 years, signed *an informed consent*, and has not participated in a special education program on UPF or nutritional literacy in the last six months.

Data were collected using instruments in the form of a UPF nutrition literacy questionnaire adapted from an instrument developed by Karel & Kotzaoglan (2025) with a scale of five answer choices with a total of seven items and a healthy food selection attitude questionnaire adapted from an instrument developed by Kaddouri *et al*. (2025) with a scale of three answer choices with a total of eight items, as well as material validation test sheets, media validation test sheets, and research questionnaire language test sheets.

Data were analyzed in a quantitative descriptive manner to describe respondent demographic data and calculate the distribution of data through mean and standard deviation using *Ms.excel software*. The validity of the material, media, and language test of the research questionnaire used *the Content Validity Index* (CVI). The research questionnaire has gone through the content validity test and the reliability test (α=0.79) in the previous study. The data normality test uses the Shapiro-Wilk test, if the data is distributed normally, then the analysis is continued with the Paired Sample T-Test, if the data is not distributed normally, then the analysis is continued with the Wilcoxon Signed Rank Test. The statistical test was processed using SPSS software version 31.

The media development procedure uses the ADDIE (*Analysis*, *Design*, *Development*, *Implementation*, *and Evaluation*) model, but in this study it is only up to the *implementation* stage (Branch, 2009). The steps of the media development procedure in this study are as follows:

Analysis

Identify needs through secondary data and observations. This development is based on problems. The analysis is also carried out by paying attention to the material and indicators to be achieved.

Design

The data that has been collected will be used in the design of interactive educational video media. The media to be

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created lasts 6 minutes and 30 seconds. The creation of videos is based on the high consumption of UPF in students. Video was chosen as an educational medium because the video has audio as well as visuals, it is hoped that the material presented is easy to understand.

Development

In the development of interactive educational video media, before the implementation stage, a media test, material test, and a research questionnaire language test were carried out. The video will be validated by two material experts by nutrition lecturers and two media experts by FMIPA lecturers in the field of media development, nutritional literacy questionnaires and healthy food selection attitudes validated by two linguists by Indonesian language lecturers.

Implementation

At the implementation stage, it is carried out by respondents filling *out a pre-test questionnaire* on nutrition literacy and healthy food selection attitudes, then respondents get intervention media in the form of videos with interactive features with a video duration of 6 minutes and 30 seconds at the end of filling *out the nutrition literacy post-test* and healthy food selection attitudes.

RESULTS AND DISCUSSION

The development of interactive educational videos uses the ADDIE development model which is described as follows:

Analysis

At the analysis stage, the researcher conducts a literature review to ensure that the products developed are needs-based. The study found that as many as 50.3% of students have a high level of *Ultra-Processed Food* (UPF) consumption, which is more than four times per day. Furthermore, only 48% of students have a good level of knowledge about UPF. As many as 61.7% of students reported to have the habit of reading food labels, but it was fully followed by the ability to understand and utilize this information in making consumption decisions (Vashtianada, 2023). The observation results showed that UPF is easy to find in various sales facilities, such as canteens, cafes and campus cooperatives.

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This reflects an obesogenic food environment, characterized by the high availability of ready-to-eat foods that are practical and palatable are important determinants in consumption behavior (Lil *et al*., 2022; Medina *et al* ., 2024; Mengi Çelik *et al*., 2025; Rohde *et al*., 2024).

Based on the integration between the findings of the literature and the results of field observations, it can be concluded that the main problem lies not only in the high availability of UPF, but also in the limitations of nutritional literacy that is able to guide consumption behavior critically. The measurement of nutritional literacy in this study focuses on indicators related to UPF, which include understanding definitions, characteristics, product identification ability, and understanding health impacts. Nutrition label material is presented as a supporting component to support knowledge with practice, so that students not only read labels, but are also able to interpret and use them in producing healthier food selection attitudes.

Design

At the design stage, the design and creation of videos are carried out based on information related to UPF to students. The information contained in the video is expected to increase nutritional literacy related to UPF and healthy food selection attitudes among students. The steps taken in media design are as follows:

a) Make *a story board* as an illustration to facilitate the process of creating media. The creation *of the story board* begins with an opening, materials related to UPF, nutrition labels, the impact of UPF consumption, and healthy food recommendations as well as the creation of questions as *quizzes* in each material.

b) The video is made using *editing software*, namely Canva by displaying animations according to the concept that has been designed, then the video is uploaded through *the Quizizz platform*.

c) The video was created with a total duration of 6 minutes and 30 seconds.

Development

The interactive educational videos that have been made are then validated by validators. The validators consist of two subject matter experts and two media experts. The linguistic test of the research questionnaire was used to ensure that the original meaning of each statement did not

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change after it was translated into Indonesian by two linguists. The results of the validation of the material test obtained a CVI of 0.71 with a valid category. The results of the media test validation were obtained with a CVI of 1.00 with a valid category. The results of the language test, nutrition literacy questionnaire, and healthy food selection attitudes were obtained with a CVI of 1.00 with a valid category.

Based on the results of the validation that has been carried out by material experts and media experts, there are several parts that need to be improved, including improvements to some materials and questions that need to be adjusted, consistency in the use of terms, as well as adding the duration of the video and being given solutions or discussions after *the quiz*.

Implementation

The interactive educational video "*Breaking the Label*" which has gone through the validation and revision stage, then the video is uploaded on the *quizizz platform* and then an interactive element is added, namely *quizzes* in each segment of the material. Education was carried out online *on* Quizizz, respondents were directed to fill *out the pre-test*, then watch interactive educational videos independently by participating in all material sessions in sequence until they are finished and completing *the quiz* in each material session at the end of the respondent filling out *the post-test*. The respondents involved are presented in Table 1.

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Respondent Characteristics

Table 1. Respondent Characteristics

Variable	n (%)
Gender	
Male	5 (14)
Women	31 (86)
Age (years)	
18	10 (28)
19	11 (31)
20	5 (14)
21	5 (14)
22	5 (14)
Year of entry	
2022	7 (19)
2023	5 (14)
2024	5 (14)
2025	19 (53)
Faculty	
FMIPA	14 (39)
FS	7 (19)
FEB	1 (3)
FIS	2 (6)
FIP	3 (8)
FPSI	2 (6)
FIK	2 (6)
FT	3 (8)
FV	2 (6)

The respondents in this study were SI students of the State University of Malang who met the inclusion criteria. The number of respondents in this study was 36 people. The characteristics of the respondents analysed included, gender, age, year of admission, and faculty. Most of the respondents were at the age of 19 (31%) and were female (86%). Students involved in interactive video nutrition education are mostly from the class of 2025 (53%).

Principles of Interactive Video

Application of the principles of interactive video-based *cognitive load theory* Contributing to improving nutrition literacy scores ($p = < 0.001$) and healthy food selection attitudes ($p = < 0.001$). The audience does not only watch and get information or only one direction but the audience can understand, reflect and can identify UPF in the context of daily life. The interactive video used in this study was developed based on an adaptation of

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cognitive load theory with three main principles, namely *reducing external cognitive load*, *internal cognitive load regulation* and *cognitive load increasing* (Gündüzalp, 2024).

Reducing external cognitive load is an effort so that the audience can focus on the target content of the video by combining audio and visuals in each segment. *Internal cognitive load regulation* is an effort to make it easier for the audience to understand the material. The material is divided into several topics in order. *Relevant cognitive load* is an effort to encourage viewers to think more deeply by facilitating the audience in the form of a video repetition feature so that viewers can look back at material that has not been understood and add questions inserted to the material segment to see the audience's understanding of the material.

Student Learning Process through Interactive Educational Videos

Student involvement while watching interactive educational videos is known from the average duration of watching videos, which is with a total duration of 6 minutes and 30 seconds which shows all students watching the video until it is finished. This is supported by another study using video media stating that as many as 71% of students stated that the ideal duration of videos is 6 to 10 minutes (Manasseh *et al.*, 2021). Another finding stated that nutrition video media related to healthy food with a duration of 6 minutes is effective as a nutrition education medium. (Glorious *et al.*, 2022). Overall, the material segment that is often repeated is in the NOVA classification material at 00:00-01:59 minutes as many as 23 students. The number of repetitions per segment of interactive educational material is presented in Figure 1.

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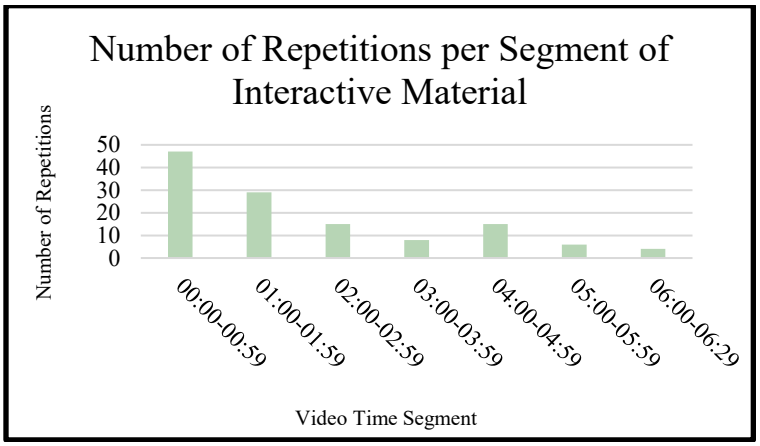

Figure 1. Number of Repetitions per Interactive Material Segment

Student involvement can be reviewed from the results of the *quiz* showing that as many as 20 students got a score of 100 in the initial work without the need to repeat. A total of 13 students experienced improvement after repeating and there were 3 students who did not improve after and before the repetition.

The Effectiveness of Interactive Educational Videos on UPF Nutrition Literacy and Healthy Food Selection Attitudes in Students

The results of the descriptive analysis in Table 2 show that the average nutritional literacy score has increased from *Pre-test* (24.67±0.44) to (27.58±0.37). The minimum and maximum values indicate that there is an increase in scores after the intervention is carried out. The average score of healthy food selection attitudes also increased from *Pre-test* (6.72±0.31) to (7.97±0.02). This shows an increase in attitude scores after the intervention. The Paired-T Test obtained p = < 0.001 showed that p < 0.05 so that the provision of education in the form of interactive videos was effective on related nutritional literacy *Ultra-Processed Food* (UPF). The Wilcoxon Signed-Rank Test obtained p = < 0.001, showing that p < 0.05 so that the provision of education in the form of interactive videos was effective on healthy food selection attitudes. There was a positive increase of 18 respondents, and 18 respondents had obtained a maximum score before the intervention was carried out.

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Table 2. Descriptive Statistics of Nutrition Literacy Score and Healthy Food Selection Attitudes

Variable	Stages	Mean±SD	Min	Max	*P-value*
Nutrition Literacy	*Pre-Test*	24.67±0.44	20	30	< 0.001
	Post-Test	27.58±0.37	24	32	
Healthy Food Selection Attitude	*Pre-Test*	6.72±0.31	1	8	< 0.001
	Post-Test	7.97±0.02	7	8	

The results of this study are in line with the findings Rusfianti *et al*. (2025) that video educational media related to UPF material has an increase in nutritional knowledge (p=0.000). Nutritional literacy in this study is measured at the level of functional literacy competency covering two dimensions, including the conceptual understanding dimension that measures students' knowledge about definition, content and impact on health and the identification ability dimension which measures students' ability to use knowledge to identify UPF products. Functional nutrition literacy competency is the most basic level that includes a person's ability to understand and recognize basic information related to nutrition (Stanley *et al*., 2021).

Nutrition literacy has five components, including *obtain, understand, analyse, appraise* and *apply. Obtain* is that students obtain information through videos related to UPF definition material, NOVA classification, content characteristics and health impacts, *understand*, which is to measure students' understanding of definitions, characteristics of content and impact on health, *analysis* measures students' ability to distinguish *processed food* and UPF based on the characteristics of its content, *appreciation* measure students' ability to assess UPF products based on the presence of additives, such as dyes, preservatives, and sweeteners and *apply the* nutritional information obtained in the attitude of choosing healthy foods. Nutrition label readings are also part of interactive educational video content. The nutrition label education in the video is used as a supporting material for students' understanding to understand the content of sugar, salt and fat in food products that support a positive attitude towards healthy food selection.

The results of the study Nuramilah *et al.* (2022) stated that nutrition education using *multimedia video learning* significantly (p = < 0.001) increased respondents attitudes about *healthy food choices*. Food selection is influenced by several factors, including

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nutritional knowledge, socio-economics, comfort, health, price and preference factors. Personality and psychological factors also influence the food choices in each individual. Individuals who have a *conscientious* or disciplined nature pay more attention to the choice of foods recommended by dietary guidelines which means that the food consumed is nutritious and good for health (Indarwati *et al*., 2023).

Improving nutritional literacy and healthy food selection attitudes are related to the application *of cognitive load theory* principles. In the development of this video, we have ensured that each segment of the material has audio and visual. The material is arranged sequentially and structured starting from understanding definitions, calcification of food based on NOVA, reading nutrition labels, understanding health impacts and healthy food recommendations. The application *of the principle of cognitive load theory* is in line with the findings that the design of Livingstone et *al.* (2022) *interactive online* learning videos based on *cognitive load theory* increases student engagement compared to students who are only given material guidance in the form of text.

The active involvement of students during the learning process can be reviewed from all students who watch to the end and the interaction through the repetition and *quiz* features shows that interactive videos can maintain student focus and encourage in-depth information processing. This is in line with research showing that increased engagement and active response reviewed through active participation and responses to Pradiarti (2025) *quizzes* in videos can improve understanding of material concepts. The findings of the study stated that interactivity in videos, such as Haerawan *et al*. (2024) *quizzes*, can increase student engagement compared to using traditional videos.

This study has several research limitations, including the sampling technique used is *non-probability sampling with* the convenience sampling *method* where the technique is selected based on ease of access. This causes the sample obtained to be less representative of the entire student population of the State University of Malang proportionally so that it cannot be generalized widely. This study was limited to 36 respondents A small sample would potentially lead to a lack of statistical ability to detect the actual effect (Andrade, 2020).

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CONCLUSION

The interactive educational video "*Breaking the Label"* that was developed was declared suitable for use as an intervention medium. It can be proven that interactive educational videos are effective in increasing nutritional literacy related to *Ultra-Processed Food* (UPF) and healthy food selection attitudes in students. For future researchers, it is recommended to use better *sampling* techniques and wider coverage to be more representative and generalized.

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