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Development of E-Handout Based on Local Wisdom of Betawi Traditional Food in Junior High School on Digestive System Materials

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ABSTRACT

This study aims to examine the nutritional content of traditional Betawi foods and develop an e-handout *as a learning medium for the Digestive System material. The research involved 67 students from grades 8A and 8B of SMPN 105 Jakarta and used two methods: Field Exploration to identify food ingredients in traditional dishes, and Research and Development (R&D) in five stages—potential and problems, data collection, product design, validation, and revision—limited by time and cost. Data were collected through product assessment questionnaires and analyzed using percentage scores for each item. The* e-handout *was validated by six experts: two subject matter experts (V Aiken = 0.81), two media experts (V Aiken = 0.83), and two linguists (V Aiken = 0.92), all categorized as "very feasible." Student responses also showed positive results, with interest at 88.45%, material quality at 87.3%, and language clarity at 89.9%. Overall, the* e-handout *based on traditional Betawi food was deemed highly feasible and suitable as an accessible learning tool anytime and anywhere.*

INTRODUCTION

Technology has a very important role in supporting the progress of education. Technological advances in this era are inevitable, because they go hand in hand with scientific advances (Maritsa et al., 2021). Technology plays an important role in supporting the learning system so that it can run well. Teachers have become easier to convey material to students by using technology. Technology helps humans to create an innovation by making it easier for a job that requires a lot of energy (Jauharati et al., 2022).

The rapid development of technology also affects teaching materials so that the development of teaching materials is needed for learning. The development of teaching

materials is one of the things of the learning process in improving or improving the quality of existing learning. The success of the learning objectives is largely determined by the learning process and the development of teaching materials carried out by teachers (Nurjanah & Arif, 2021). When developing teaching materials, it is crucial to consider the use of electronic-based technologies.

Electronic teaching materials provide convenience for students to access learning materials flexibly. According to Atsani (2020), the advantages of using electronic teaching materials include supporting independent and interactive learning, enriching the learning experience, and making it easier to deliver and update materials. One form of electronic teaching materials that is relevant to be developed is e-handout, which is teaching materials in digital form that can be downloaded and learned at any time.

The development of e-handouts that contain local Betawi wisdom can be a means to relate subject matter to the local culture. In the context of science learning in junior high school, integrating elements of Betawi culture into e-handouts is expected to increase students' motivation to learn because the material feels closer to their daily lives. This is in line with Wahyuningtyas & Saputra (2023) who stated that learning motivation has a significant influence on the learning outcomes of junior high school students. Therefore, the development of e-handouts based on Betawi local wisdom not only supports learning independence, but also fosters a sense of ownership and preservation through science.

One of the science materials that is still not optimal in the use of teaching materials is the digestive system material. Digestive system material is a material that contains abstract concepts so that it is still difficult for students to understand (Uslifatun et al., 2012). This is because the digestive system cannot be seen directly. Therefore, with electronic teaching materials, students can see and understand correctly the shape of the digestive organs in humans.

Learning the material of the digestive system can be integrated with character education through local wisdom. One way to deal with an increasingly developing era can be done with character education taken from the values of local wisdom. Local wisdom is the identity of a region (Nurrahmi, 2018). Local wisdom is the heritage of the ancestors of the Indonesian nation which is currently starting to fade or can be said to be almost lost (Adinugraha & Ratnapuri, 2020). Local wisdom is very important to be applied in the learning process. If you look at the lifestyle of the Indonesian people, they guarantee the needs of life that come from nature by developing local wisdom (Shirley, 2015).

Local wisdom literacy in science learning has an important role in improving the quality of education. By integrating local wisdom, students not only understand scientific concepts, but also learn cultural values that are in accordance with daily life. In addition, this approach also helps students understand and preserve local culture in the midst of globalization currents. Local wisdom in learning can also help students to think critically, creatively, and collaboratively about the surrounding environment (Saputri & Desstya, 2023).

According to research Rikizaputra et al (2021) Based on the data analysis he conducted, it can be concluded that in general, Biology teachers at Pekanbaru City State High School do not know the concept of ethnoscience and teachers have never implemented ethnoscience in learning with a percentage of 40.90%. This is due to the lack of information possessed by teachers so that they do not implement it in the learning process. One relevant example is the material of the digestive system. A study by Permanasari et al (2018) It shows that students who have a good understanding of local wisdom related to traditional food processing tend to be more motivated and understand concepts in the digestive system. This is because students can easily relate these processes to phenomena they are already familiar with in their environment. Until now, there has not been much research that specifically develops innovative learning media, such as ethnoscience-based e-handouts, to help teachers integrate local wisdom into Biology materials. Therefore, this study emphasizes the importance of developing ethnoscience-based e-handouts as one of the novelty solutions to bridge the gap in the application of ethnoscience in schools, especially in the material of the digestive system.

One of the traditional foods in Indonesia that is quite well known to the public is Betawi traditional food. The Betawi tribe is geographically located in DKI Jakarta Province and is a tribe that inhabits the city of Jakarta. History records that this tribe is the result of acculturation from various tribes in Indonesia and even several nations in the world (Untari et al., 2016). Some of the traditional Betawi foods that are quite well known to many people include egg crust, Betawi soto, fried toge, pletok beer, es selendang mayang, Betawi laksa, and many more. In this study, three types of food will be focused, namely egg crust, Betawi soto, and pletok beer. The selection of these three foods is based on the varied nutritional content: egg crust represents a source of carbohydrates, Betawi soto is rich in protein and vitamins, while pletok beer contains spices with minerals that are beneficial to the body.

The selection of traditional Betawi food is justified because the manufacturing

process and its content can be used as contextual teaching material in Biology subjects, especially the topic of the digestive system and enzymes. For example, in pletok beer there is a simple fermentation process that can be used to explain the role of microorganisms in producing certain enzymes that are beneficial for digestion. In addition, the processing of Betawi egg crust and soto can also be associated with an explanation of nutritional value, function of food substances, and how the body processes carbohydrates, proteins, and vitamins through the digestive system.

Students not only learn the concept of Biology abstractly by raising Betawi food, but also understand its application in daily life through local wisdom. This is expected to foster a sense of pride in Betawi culture, as well as increase motivation to learn because the material feels close to the cultural and culinary reality that they are familiar with.

The obstacle faced by teachers is the limited facilities owned by the school. Therefore, it is very necessary to take innovative steps to overcome this obstacle so that explanations become more interesting, increase students' curiosity, and introduce local wisdom owned by Indonesia. Based on the results of the questionnaire for the analysis of learning media needs, students have the idea that science is a difficult subject. The results conveyed that almost all students have a desire to learn, there is visual media to make it easier for students to understand. Many students are unfamiliar with e-handouts due to teachers not using them, and they also lack knowledge about traditional Betawi foods, including their names and nutritional content.

Efforts to overcome the above problems are to develop teaching materials in the form of E-handout based on local wisdom. E-handout is a teaching material in the form of writing containing important points from the material that contains interesting pictures, videos, and animations. Availability of use E-handout reduce the oral delivery of material and can help students understand and increase the active role of students in the digestive system material (Pitoy et al., 2020). E-handout is a simple and concise teaching material that is sourced from several relevant literature and in accordance with the material to be studied (Supriyati et al., 2019). This is expected to be able to help teachers to facilitate students to understand the material to be studied (Mensi & Setiawan, 2021).

RESEARCH METHOD

Method

This research used field exploration and development methods which were carried out from October 2023 to March 2024. The development method was used to

develop *the* Digestive System e-handout including media validation and student perception. This method is a research method that produces a new product or develops a product after which the feasibility and effectiveness of the product will be tested (Sugiyono, 2022).

In this R&D research, it will produce learning media products in the form of E-handout based on local wisdom of Betawi traditional food. The researcher only uses the stage of seeing potential problems, data collection, product design, design validation, design revision, and haunting at the product trial stage, namely by knowing the perception of students (Sugiyono, 2022). Researchers limited the stages due to time constraints and costs. The ten stages of research and development require significant time and financial resources.

Data Collection

Exploration was carried out to obtain data on the food ingredients used in each food and its nutritional content. Research was also conducted at the Betawi Cultural Village, Situ Babakan to obtain information about the food ingredients used in each traditional Betawi food. Meanwhile, data collection in the form of student perception was conducted at SMPN 105 Jakarta.

Data Analysis

The data were analyzed using descriptive statistics and qualitative methods. Descriptive statistical analysis was applied to student perception data through percentage scores for each questionnaire item. Meanwhile, qualitative analysis was used to explore Betawi local wisdom and describe the content of the e-handout, including the relevance of traditional food to the digestive system material.

RESULTS AND DISCUSSION

Development of The Digestive System E-Handout

The result of this study is the development of *e*-handout of the digestive system based on local wisdom of Betawi traditional food. Product development in the form of E-handout It uses the research and development steps of (Sugiyono, 2022) There are 10 steps, which are started by looking at potentials and problems, data collection, product design, design validation, design revision, product trial, product revision, usage trial, product revision, and mass product. However, in this study, the researcher only carried out the potential and problem stages until the design revision. After the product revision is carried out, it is continued with the students' perception of the E-handout as teaching materials that will be used in the learning process.

Potential and Problems

The problem obtained is that there has been no e-handout used in the learning process that takes place because teachers use

science package books provided by schools and *powerpoints made by teachers*. Students also feel less enthusiastic about the learning process because they still use conventional teaching materials. In addition, through this initial observation, it is also known that there are still many students who do not know about local wisdom in an area, especially the Betawi tribe.

The potential for development can help reduce problems for students who do not have teaching materials in the form of e-handout*s* as an effective learning resource in the classroom. Students at SMPN 105 Jakarta only use package books as teaching materials where the book is an integrated science package book. Integrated science books not only contain Biology subjects but there are other science subjects, namely Chemistry and Physics, so the material provided for Biology is still not optimal. Therefore, e-handout*s* are made as a complement to the needs of interesting teaching materials so as to make it easier and increase students' enthusiasm and motivation in the learning process.

Data Collection

After identifying the potential and problems that need to be addressed, the next step is to collect data or information that will be used as a basis for designing a product that can meet the needs of students. Data or information collection is obtained through initial observation. Based on observations, students lack enthusiasm in learning science, especially digestive system material. Students feel bored with the learning process caused by the teaching materials used are very monotonous.

The researcher provides a solution to the problem faced by teachers regarding boredom with monotonous teaching materials used during the learning process, namely with interesting and interactive teaching materials. With these teaching materials, it can increase students' enthusiasm for learning. Therefore, the researcher created *an interesting and interactive* e-handout that can be used by students independently and easier to access. This e-handout is interesting because it contains images, videos, and audio in explaining the material so that students do not only see text. This makes students' curiosity even higher because they have to see interesting features in the e-handout.

Meanwhile, this e-handout is interactive because it causes two-way interaction between teachers and students and other students. At the end of the learning activity, there was a food test practicum activity that made interaction in the learning process so that it could increase motivation to learn. Not only that, to introduce local wisdom in Indonesia to students, the researcher developed *an* e-handout that connects with one of the local wisdom of one of the regions, namely the Betawi tribe.

Therefore, this e-handout has the title "E-handout of the Digestive System Based on Local Wisdom of Betawi Traditional Food". The appearance of This e-handout is made very attractive so that students are able to achieve learning goals and encourage students to be more enthusiastic in learning and independent. This e-handout is presented digitally so that students can access it in a flexible time and place.

Product Design

The design of This e-handout based on traditional Betawi food was chosen to gain an understanding of the product concept to be developed. The process of developing this e-handout is by integrating Betawi culture, namely egg crust, Betawi soto, and pletok beer in the material. This e-handout connects nutritional materials with traditional Betawi food. In addition, there is also a food test practicum and the food tested is Betawi soto. In making this e-handout, the apps used are *Canva, Google form, Quizizz, Wordwall,* and *Heyzine*. The product is presented in **Figure 1.**

The Canva application is used in the preparation of materials and designing the front page to the layout using the features contained in it. *Google forms* are used for the creation of diagnostic tests to test students' understanding of the digestive system material before reading *the* e-handout. *Quizizz* is also used for online quizzes on each sub-material to test students' understanding after reading the material presented on the e-handout. *Wordwall* is used for formative tests which are the final evaluation for students regarding the material that has been studied from beginning to end. *Heyzine* is used to support this e-handout into an interactive teaching material that contains videos, audio, pop-up animations, and hyperlinks. Readers can view and access *the* e-handout of the digestive system based on local wisdom of traditional Betawi food.

Product Validation

The stage carried out after designing is validation by experts and the collection of student responses through questionnaires. Validation aims to ensure the feasibility and effectiveness *of* e-handout*s*, while questionnaires are used to evaluate students' responses to e-handout*s*. Validation *of the* e-handout needs to be done to get input from validators. In addition, the goal is to see how feasible the e-handout is. This validation involves 6 validators, namely, two material validators, two media validators, and two language validators. Each expert field uses two validators from lecturers and teachers.

The e-handout *material expert validator* received a very good assessment on the aspects of the suitability of the material with learning outcomes, aspects of the up-to-date material, aspects of encouraging curiosity, and supporting aspects of the material.

Figure 1. Display of e-handout*s* based on traditional Betawi food digestive system material

Meanwhile, *the* e-handout received an assessment of both the accuracy of the material and the aspect of material delivery. The final assessment results of the material validation obtained a V Aiken value of 0.81 which is included in the category of "very feasible". After validation is carried out, the validator concludes that *the* e-handout can be used but with revisions or improvements. Based on the results of the assessment of the material expert validator, it shows that the author can design the material on the e-handout very well. This can be evidenced by the increased number of "very feasible" assessments of e-handout*s*. In the diagram presented for the green color is a "very

feasible" assessment while the blue color is an assessment of "feasible".

The e-handout *media expert validator* gets a very good assessment on the aspect of size, aspect of cover design, and ease of use. Meanwhile, e-handout*s* get a good assessment on the content design aspect. The final assessment results from the media validation obtained a V Aiken score of 0.83 which is included in the "very feasible" category. After validation is carried out, the validator concludes that *the* E-handout can be used but with revisions or improvements. Based on the results of the assessment of media expert validators, it is shown that the author can design *the* e-handout to be interesting, interactive, and easy for users. This can be evidenced by the increased number of "very feasible" assessments of e-handout*s*. In the diagram presented for the green color is a "very feasible" assessment while the blue color is an assessment of "feasible".

The e-handout *media expert validator* received a very good assessment on the aspects of transparency, communicative aspects, dialogical and interactive aspects, aspects of conformity with student development, and aspects of conformity with language rules. The final assessment results of the language validation obtained an Aiken V value of 0.92 which is included in the category of "very feasible". After validation is carried out, the validator concludes that *the* E-handout can be used without revision or improvement. This proves that the author is able to design *an* e-handout very well in terms of language and in accordance with the guidelines, namely PUEBI (General Guidelines for Indonesian Spelling).

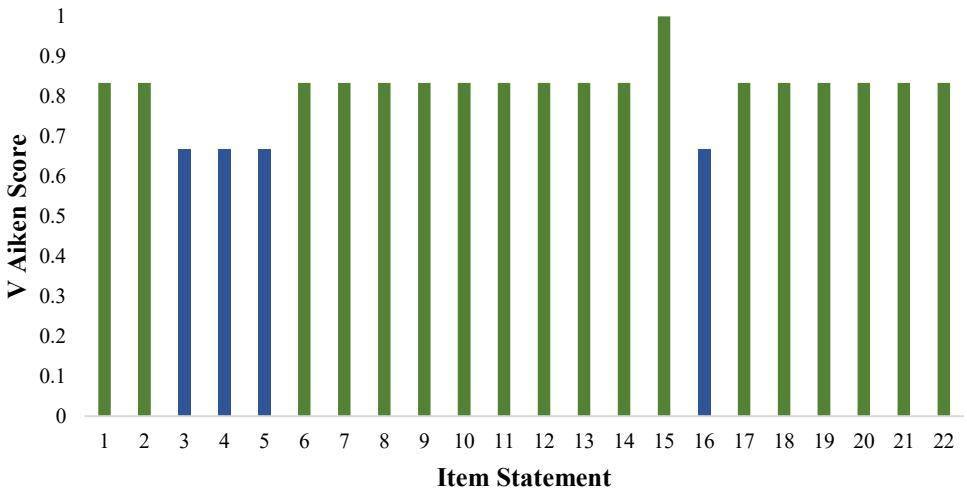

Figure 2. Results of subject matter expert validation of e-handout*s*

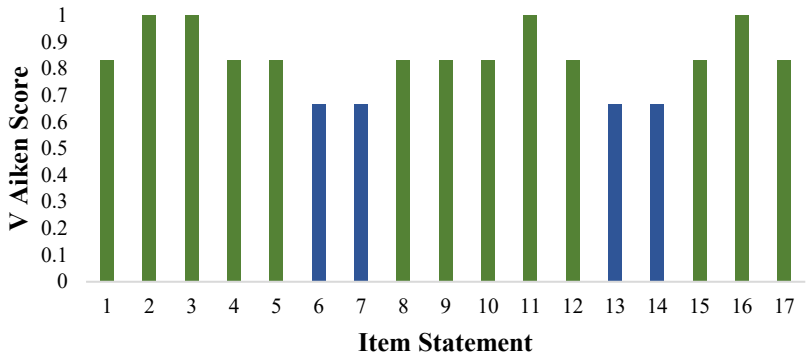

Figure 3. Media expert validation results of e-handout*s*

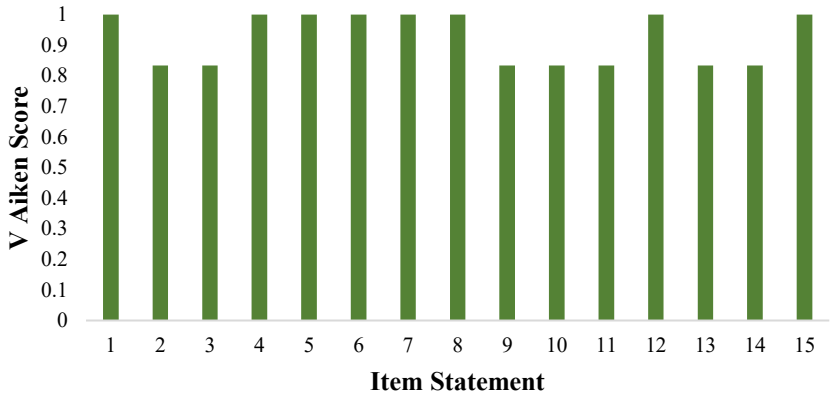

Figure 4. Results of linguist validation of e-handout*s*

Students' Perception of *the Digestive System* E-handout

Students' perception of *the* E-handout of the Digestive System Based on Local Wisdom of Betawi Traditional Food was obtained by providing *an* e-handout along with a questionnaire to students in grades 8A and 8B of SMPN 105 Jakarta. The student perception questionnaire was filled out by 67 students after viewing and reading *the* e-handout. The responses from students then become data that will be analyzed by calculating the average answer based on the assessment of each answer.

E-handout This has gone through the stage of disseminating perception questionnaires to students. The distribution of this questionnaire aims to collect direct responses from students regarding E-handout which will be used in the learning process. In the distribution of this questionnaire, students were asked to assess various aspects such as attractiveness, material, and the language used. The results of these student perceptions are analyzed to evaluate the quality of E-handout in supporting learning. Each assessment item uses a scale of 1 to 5, then the average score is calculated using the percentage value formula. After that, the assessment criteria will be determined to be included in the categories of very feasible, feasible, quite

feasible, less feasible, and not feasible according to the results obtained (Arikunto, 2014).

The first aspect is the aspect of attractiveness which includes the appearance of E-handoutdesign E-handout, concepts, illustrations and images used. The average result on the interest aspect was 88.4% which fell into the "very feasible" category because it showed that the display E-handout on the material of the digestive system is interesting. The display of teaching materials must attract students' attention for example with illustrated cover designs, interesting learning materials such as images, videos, and audio (Aliyyah, 2021). In addition, the design given to the E-handout Interestingly showing that students also pay attention to design E-handout Not only material. Nowadays, educators are required to create teaching materials that are interesting and entertaining so as not to lose to information technology and the world of entertainment which is increasingly sophisticated (Nurseto, 2011). Not only that, these results show that E-handout this makes students more excited in learning science. This shows that the attractive design of the E-handout can make students enthusiastic in the learning process.

Based on the results of the perception, students also showed that by using E-handout based on local wisdom traditional Betawi food can make learning science not boring. This proves that concepts relevant to everyday life can make for a different and memorable experience for students. E-handout Based on local wisdom, this traditional Betawi food also supports students in mastering science lessons, especially digestive system materials. In addition, that the existence of illustrations in the form of interesting images can provide motivation to study the material.

Table 1. Students' Responses to Aspects of Interest

Assessment Indicators	Score	Percentage	Criterion
The display of *the* e-handout on this digestive system material is interesting	303	90,4%	Strongly agree
Not only looking at the content of the material but also looking at the *design of the* e-handout.	286	85,3%	Agree
The e-handout has material on the digestive system that makes you more enthusiastic about learning science	298	88,9%	Agree
Using this e-handout can make learning science not boring	302	90,1%	Strongly agree
This e-handout supports me to master science lessons, especially the material on the Digestive System	300	89,5%	Agree
With illustrations in the form of interesting pictures, it can provide motivation to study the material	301	89,8%	Agree
This e-handout has an illustration of an image that I often see in everyday environments	290	86,5%	Agree
By using this e-handout, interested in learning about the digestive system	293	87,4%	Agree
Average Percentage Results			**88,4%**
Criterion			**Highly Worth It**

Table 2. Students' Responses to Material Aspects

Assessment Indicators	Score	Percentage	Criterion
The material explained in the e-handout is in accordance with the learning objectives	301	89,8%	Agree
The delivery of e-handout material on the digestive system material is related to daily life	295	88,05%	Agree
The material presented in this e-handout is easy for me to understand	306	91,3%	Strongly agree
In this *digestive system* e-handout there are several quizzes that can give you the enthusiasm to learn the material	306	91,3%	Strongly agree
The terms used are easy to understand	284	84,7%	Agree
The presentation of material in *the* e-handout on the digestive system material encourages discussion with other friends	295	88,05%	Agree
This e-handout contains exploration assignments that can encourage learning by exploring the surrounding environment	293	87,4%	Agree
This e-handout contains practice questions that can test how far you can understand the material of the digestive system	253	75,5%	Agree
There are several examples on the material that are related to everyday life	300	89,5%	Agree
The practice questions and practicum provided provide reinforcement to the material of the digestive system	295	88,05%	Agree
Average Percentage Results			**87,3%**
Criterion			**Highly Worth It**

The use of illustrations by utilizing images can increase student motivation so that it affects student students more (Achmad & Lestari, 2016). Next E-handout It has illustrations of images that are often seen in everyday environments. By relating real concepts that are often found in daily life, students are more relevant in learning a material (Alimah, 2019). Students also feel interested in learning the material of the digestive system by using E-handout.

The third aspect is the language aspect which includes the sentences and language used and the use of letters and fonts in E-handout. The average result in the material aspect was 89.9% which was included in the category of "very feasible" because it showed that there were no sentences that gave rise to double meanings in the E-handout. The use of appropriate language in teaching materials greatly affects students' understanding of the material being studied (Djumingin et al., 2022).

Therefore, in developing E-handout It is necessary to observe the correct use of sentences, terms, and spelling. These results also show that the sentences used in the E-handout clear and easy to understand. Therefore, this proves that it is important for the author to pay attention to spelling and grammar rules in accordance with PUEBI (General Guidelines for Indonesian Spelling). At E-handout There are also no sentences that are difficult for students to understand on E-handout. Furthermore, the language used in the E-handout simple and easy to understand.

Table 3. Students' Responses to Language Aspects

Assessment Indicators	Score	Percentage	Criterion
The sentence used does not mean double meaning	276	82,3%	Agree
The sentences and paragraphs used in this e-handout are clear and easy to understand	335	100%	Strongly agree
In the e-handout, there are no sentences that are difficult to understand	296	88,3%	Strongly agree
The letters used are simple and easy to read	301	89,8%	Agree
This e-handout does not contain the local language of the local community	303	90,4%	Strongly agree
This e-handout is in Indonesian	296	88,3%	Agree
The language used in *the* e-handout does not contain elements of SARA (Ethnicity, Religion, and Race)	303	90,4%	Strongly agree
Average Percentage Results			**89,9%**
Criterion			**Highly Worth It**

E-handout Good ones are arranged using good language and easy to understand by students so that teachers can use them in the learning process (Ningtyas & Yunianta, 2014). Not only that, but the letters used in the E-handout simple and easy to read. This proves that the author was successful in choosing the type of font used so that it was easier for readers to see. Deep E-handout There is also no regional language of the local community. Based on the results of the perception of the use of the language used, the author uses Indonesian as a whole so that students do not feel confused in reading. It also shows that in E-handout there is no language that contains elements of SARA (ethnicity, religion, and race).

CONCLUSION

The development of the E-Handout of the Digestive System Based on Local Wisdom of Betawi Traditional Food was declared "Very Feasible/Very Valid" to be used in science learning. This was obtained from the results of the assessment by linguist validators with an average score of 0.92 with the category "very valid". Media expert validators of 0.83 with the category "very valid". Validator of subject matter experts of 0.84 with the category "very valid". Based on the perception of 67 students on the E-handout of the Digestive System Based on Local Wisdom of Betawi Traditional Food, an average result was obtained in the aspect of attractiveness of 88.4% which is included in the "very feasible" category, in the material aspect, an average result of 87.3% was obtained which was included in the category of "very feasible", and in the language aspect, an average result of 89.9% was obtained which was included in the "very feasible" category. For researchers who want to continue the same development research, it is recommended to research in depth about traditional Betawi food and add the type of food and analyze the influence of

e-handouts on the level of student understanding.

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