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DEVELOPMENT OF FLASHCARD MEDIA IN INTRODUCING MEDICINE PLANT BIODIVERSITY

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Abstract

The development of interesting learning media needs to be done because of the very rapid development of technology and coupled with the Covid-19 pandemic which requires the availability of attractive media so that it can help students in learning both face-to-face and virtual. The purpose of this research is to determine the level of success of the flashcard media provided as support for the learning process. The research used the ADDIE development approach. This method leads researcher in producing a product in the form of a flashcard to be tested and measured to assess its feasibility. The trial was conducted on 44 students at SMAN 1 Tangerang Selatan. Affective assessment shows very good criteria with an average of 84. The highest score is shown in a proactive attitude of 90 and the low score is shown in a polite attitude of 80. The process assessment has the lowest score obtained by students in the form of a playing score of 30 while the highest playing score is 75, in the learning process, the lowest score is with two types of assessment, namely the pre-test is 17 and the post-test is 36, the highest pre-test score is 45 while the post-test value is 98. Through the assessment, the percentage score obtained is N-Gain of 0.83. Learning during the Covid-19 pandemic must be accompanied by fun learning so that it is not boring and fosters enthusiasm for learning. Through flashcards students can learn and can become peer tutors for their friends.

Keywords: Flashcard, Media, Medicine Plant, Learning

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INTRODUCTION

Traditional medicinal plants are very important for increasing the body's immunity and supporting the "back to nature" trend, especially during the COVID-19 pandemic. Preservation of medicinal plants, raising awareness of Indonesia's natural wealth, and education for youth is needed, currently young people have knowledge about medicinal plants only based on tradition. Adolescents believe that medicinal plants are only for certain purposes, and not for everyday use (I Wayan R & W.S Binawati, 2014).

Allah said that people think that they are supported in learning with natural tourism as a facility for absorbing knowledge, apart from natural tourism, the media also helps in developing education. Nature tourism enriches the archipelago knowledge because Indonesia is known as the "Spices Island Country" and medicinal plants are the prima donna of civilization whose progress is getting higher and more innovative (Hapsoh & Yaya, 2011). Based on this explanation, God's creation needs to be put to good use, and the potential of the archipelago's flora must be continued for students.

Medicinal plants in the educational process assist students in building skills and digesting the concept of biodiversity. Learning about medicinal plants can also help prevent and deal with the adverse effects of COVID-19. Through various ways of exploring knowledge, a person can become an observer so that communication with each other is formed which they will later imitate (Udin, 2012). Based on this explanation, social learning will lead to habituation and all participants will work together.

Plants appeared and developed around 370 years ago, and diversified by about 290,000 species, plants can develop in every region if conditions permit (Campbell, 2012). Indonesia is varied because it has abundant ecosystems, as many as 47 types of flora that are spread both on land and in the sea on the motherland (Irnaningtyas, 2013). Based on this explanation, Indonesia as a tropical country supports this diversity where the air temperature is humid, it rains frequently and the sun shines for a long time with temperatures of 25-30 degrees Celsius (Ardianto, 2017). Indonesia has a large tropical climate area so that the types of plants in each area are different, society needs to be introduced so they can get to know plants in other areas.

Indonesia is known as mega biodiversity, earned seventh place in the Indonesian Center for Biodiversity and Biotechnology (ICBB) in the category of availability of around 25,000 flowering flora, it is known that 400 trees in the forest contain high selling values and benefits (Irnaningtyas, 2013). Only 20-22% of these forest products are raw sources obtained from the forest, speaking of medicinal plants, throughout. In the world there are 40,000 species of medicinal plants and 30,000 are in Indonesia (Rania, 2019) . Based on these data, Indonesia is a source of greenery in the world with economic stability shows high diversity. This makes scientists feel challenged in identifying the kinship of the archipelago's flora. So knowledge is very important in developing the potential of natural wealth.

The Ministry of Health urges the public to have a culture of planting so that knowledge about medicinal plants can be embedded and change people's mindset about the environment (Susi, 2020). Based on these rules, the public needs to be educated so that they understand the importance of protecting nature, the Directorate of Traditional Medicine Supervision recorded about 100 types of medicinal plants can potentially be used as a living pharmacy in the yard (Baihaqi, 2017). Based on these data, medicinal plants can be an alternative to reduce consumption of chemical drugs that have a major effect on the body.

Based on this, this study aims to direct young people so that medicinal plants can be processed, created, so that knowledge about medicinal plants spreads properly and correctly in society. The efficacy of medicinal plants is very abundant, especially in treating diseases, as Allah says in (QS. An-Nahl: 11), which means "He grows for you with rain water on plants, olives, date palms, grapes and all kinds of fruits. Verily, in that there is a sign (of Allah's power) for people who think."

Allah said in justifying this interaction in (QS. Al-A'raf: 58) which has the meaning "And good soil, the plants thrive with Allah's permission; and infertile soil, the plants only grow evenly. Thus, We repeat (Our) signs for those who are grateful."

The Bogor Botanical Gardens save natural wealth where plants are preserved and developed from time to time since its founder, Prof. Caspar George Carl Reinwardt decided to collect some flora to be immortalized. The Bogor Botanical Gardens has specimen variations of around 3411 species through 1259 genera and 215 families, medicinal plants are also included in 2039 species (Syamsul, 2011). Based on the explanation, the Bogor Botanical Gardens, which have a complete collection, are often used as research sites in development. This is in accordance with the vision of the Bogor Botanical Gardens, which is to become a collection center and research study. The Bogor Botanical Gardens function as a research facility, place of education as well as environmental learning center which is regulated in the Bogor Botanical Garden Plant Conservation Center (PKT-KRB) by Presidential Decree.

Number 103 of 2001, supported by Decree of the Chairman of LIPI 1151/M/2001 (LIPI 20021).
Bogor Botanical Gardens as learning intermediary that promotes student understanding, according to (Permendikbud, 2016) regarding innovative and relevant learning according to curriculum design. Through social learning, such as visiting the Bogor Botanical Gardens, the rules become uniform and in accordance with common goals. The research instrument is presented in line with the graduation standards available in the world of education.
The media is closely related to the model method because it will have an impact on student responses, the method used is in accordance with several considerations such as learning objectives, types of tasks and target responses that will be mastered by students and the learning context which includes student characteristics (Azhar, 2019). This learning media has the task of making learning fun and honing students' intelligence, realizing success with interconnected learning components, developing the quality of learning (Ika, 2018). Based on this explanation, the media has special characteristics, as a bridge for educators to inform students and provide learning benefits. Media can be expressed in various ways according to the needs and innovations of educators who are increasingly relevant. One of the relevant media is flashcard.

Flashcard or picture cards are a media that makes it easier for students to absorb learning in their respective analysis processes. This media can be produced with the help of technology, the display of images provided in technology-based is certainly more detailed and clearer. Such as games or digital card media which are made in an attractive form so that students can play them to understand plant material (Puguh, 2019).

Besides containing pictures, this flashcard can also contain information to support learning. The Ministry of National Education (2004) in the journal Puguh Setyawan gives a category of good teaching materials, namely the media has clear sentences and does not cause multiple interpretations, the language in the media is in accordance with the level of knowledge of students. Based on this explanation, the picture cards aim to send messages to students to focus on pictures and sharpen students' visual concentration on the presentation given by educators during learning. Cards are equipped with a design that contains keywords or important information in a short, dense and clear, this is where language rules are used as well as possible.

Flashcards facilitate communication between students when carrying out learning in class, packaged in fun games, of course, activities become a means of training verbal skill which will be increasingly honed (Veronica, 2012). Based on this explanation, language training must be done from an early age, especially in learning where when discussing a word, the meaning conveyed is clear and does not cause ambiguity.
Flashcards are created to train psychomotor between individuals, through learning methods and supported by the curriculum. An effective model with affordable materials makes the material more concise so students don't get bored during the learning process. Educators process teaching materials and develop them to be more functional psychologically, sociologically, rationally, and up to date (MKDP Development Team, 2012). Based on this explanation, preparing teaching materials makes the learning process more effective.
Students will be assessed for their ability to work together in groups, so this assessment includes affective, cognitive, and psychomotor with their respective calculations. Card media supports this assessment because it is easy to carry anywhere, easy to move, duplicate or arrange in groups so that it trains students to be active and facilitates students' understanding in learning (Sri Mulyani, 2017). Based on this explanation, judging from the advantages of flashcards, the media as a support for assessment, the material presented must be complete with the identity of the material if necessary, provide pictures for the analytical assessment of each student. Zulfia (2012), the teacher is obliged to create learning atmosphere that is meaningful, fun, creative and dialogic.

The relevant research from this first study is from Sholihul Muhibbi, et al, entitled " *Pengaruh Media Permainan Kartu Pintar Terhadap Ketuntasan Belajar Siswa Pada Materi Klasifikasi Tumbuh-tumbuhan*". The class average value is 85 and in the control class is 71. Student learning outcomes have increased in terms of Gain Score = 0.78 with high criteria in the experimental class, and = 0.66 with moderate criteria in the control class.

Furthermore, research from Warda in, "*Peningkatan Hasil Belajar Mahasiswa Biologi Menggunakan Media Flashcard pada Mata Kuliah Ekologi Tumbuhan*". The method used is Quase Experiment with primary and secondary data, data collection techniques with observation and tests at the beginning of ecological learning. The results showed that the learning outcomes in student plant ecology courses before using flashcard media were in the medium category at 37.04% with an average value of 60.05% and learning outcomes in student plant ecology courses after flashcard media were in the high category at 75% with an average average 80.57%. Based on this data collection, it can be concluded that the use of flashcard media improves student learning outcomes.

Next research is from Fardani Annisa, et al, "*Desain dan Implementasi Marker Dengan Media Flashcard untuk 10 Sample Tanaman Obat Keluarga*", the aim of this journal is to hone the potential of students in understanding family medicinal plants. The method used is Augmented Reality (AR.). Middle school student respondents totaled at least five people who contributed to each process, the result was 81.2% success. It can be concluded that "*Desain dan Implementasi Marker Dengan Media Flashcard untuk 10 Sample Tanaman Obat Keluarga*" can be an interesting new learning media to increase knowledge about Family Medicinal Plants (TOGA).

The latest research is from Puguh Setyawan, "*Pengembangan Media Flashcard Berbasis Pictorial Riddle Pada Materi Plantae Untuk Meningkatkan Motivasi Dan Pemahaman Konsep Siswa Sma/Ma Kelas X*." The method used is this research is a media development research using a 4D model which consists of define, design, development, and disseminate stages. This research only reached the development stage. The results showed that the validity of flashcards based on pictorial riddles based on the validation results obtained a mode of 4 so that they were declared very valid. The practicality of the media based on the implementation of student activities is obtained by a mode of 4 so that the media is stated to be very practical. The learning outcomes obtained classical completeness of 95% with a gain score of 0.64, as well as increased motivation based on students' positive responses of 0.43 so that the media was declared effective. It can be concluded that the developed media is declared feasible based on its validity, practicality, and effectiveness.

Based on the problems above, several problems can be identified as follows; Students still do not know the identity, the location of these plants, and their benefits. In addition, there is a lack of opportunities to observe the surrounding environment and visit educational facilities, for example the Bogor Botanical Gardens. As well as the lack of innovative media development in schools, especially flashcard media in medicinal plant education.

The research problem formulation is how the results of the development of medicinal plant flashcard learning media. So, the purpose of this study is to determine the success of the flashcard media provided as a support for learning. The problem limitation in this research is to introduce the biodiversity of medicinal plants in the Bogor Botanical Gardens (KRB) to include the identity of the plants and their health benefits. As well as applying flashcards as learning aids that make students easily recognize the types of medicinal plants.

This research novelty is the use of flashcard media with plant samples taken from the plant's original habitat in the Bogor Botanical Gardens. In addition, the flashcard media originality has been validated by two botanical experts, so that the material quality in the media used is most relevant.

METHOD

Research design

The research uses the ADDIE development approach, this method requires stages in the research. Self-development research means producing a product to be tested and measured to assess its feasibility.

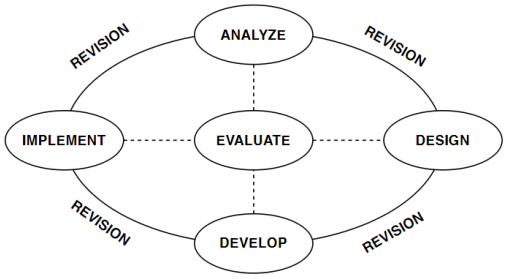

Figure 1. ADDIE stages

ADDIE Model (*Analisis, Desain, Pengembangan, Implementasi, Evaluasi*). Consists of several stages namely:

Analysis, the observation seen from the characteristics of the object under study to obtain maximum results to achieve the purpose of observation. Designing a study requires clear and precise data collection methods so that later researchers can make the right instruments. According to Purnamasari (2019), analysis is usually carried out through observation and interview methods to obtain information from competent people in the field to be studied.

Design, the researcher makes a design or description of the media that will be used when conducting research with students when the information is complete or has been collected. This design considers effectiveness and innovations so that they can be developed more optimally, the design makes it easier for observations to assess the strengths and weaknesses of the content contained therein.

Development, the supervisor evaluates media development. At this stage, the media becomes more interactive and effective. Input and suggestions during guidance are presented in tabulations so that the information contained in them is easy to understand and clear. Development focuses on innovations in order to be effective.

Implementation, the school becomes a means of implementing as well as using and applying it in

learning so that it becomes an aspect that can be assessed for its usefulness.

Evaluation, this stage is a form of evaluation by assessing overall progress, as well as covering deficiencies in its development. At this stage things that are less renovated and repaired become more relevant.

Developers in carrying out research trials, through assembling, manufacturing, developing so that they are in a normative form, in this stage there are two trials, namely field trials and expert trials which are described as follows:

Test experts on validity, media experts and material experts in the development process directing and discussing together. When there are things that are lacking, of course there will be a revision stage to become an ideal media product. To enter the field stage, of course, it must be carefully prepared and requiring input and criticism.

Field trials, science students under the guidance of the relevant biology teacher at school, are given ready-made media. This implementation was carried out in accordance with conditions during a pandemic, which means it was relative and samples were viewed by purposive sampling technique.

The author must provide an overview of the research design either in the form of pictures/schematics or descriptions. If the design used is the result of adaptation, adoption, or modification, the author must state the source of the design.

Research Objectives

Media and material experts, in this case, are lecturers at UIN Syarif Hidayatullah Jakarta, Faculty of Tarbiyah and Teacher Education, as well as researchers at the Bogor Botanical Gardens, who were the flashcard test subjects for the biodiversity of medicinal plants and also school participants. The other participant is the Biology subject teacher at SMAN 1 South Tangerang, Ms. Noor Lailah Sahlan, M. Pd. Students of SMAN 1 Tangerang Selatan, with the total of 44 students in class X MIPA 1 were assessed based on their interest in medicinal plants. The time for collecting research data was February 19th - 20th 2022.

Data collection technique

Developers in carrying out research trials, through assembling, manufacturing, developing so that they are in a normative form, in this stage there are two trials, namely field trials and expert trials which are described as follows:

1. Expert test on validity, media experts and material experts in the development process direct and discuss together. When there are things that are lacking, of course there will be a revision stage to become an ideal media product. To enter the field stage, of course, it must be carefully prepared and requires input and criticism.
2. Field trials, science students under the guidance of the relevant biology teacher at school, are given ready-made media. This implementation was carried out according to the conditions during the pandemic, which means that it is relative and the samples were viewed using a purposive sampling technique.

The primary data taken is the ability of students to study the introduction of medicinal plants where the population is in accordance with the research objectives. The steps that were achieved were the research steps seen from the posttest and pretest scores with the Gain Score accompanied by a questionnaire given.

While the secondary data taken is the result of students' ability to think and memorize about medicinal plants as well as their enthusiastic responses in carrying out activities supported by satisfactory questionnaire results.

The end result can be seen in the score which is a reference for the success of the learning media given during the activity. Judging from the needs of this research, the data obtained there are two categories, namely qualitative and quantitative data.

The data analysis technique uses the average value of the posttest and pretest results where the researcher has set a giant score on the results of the introduction of medicinal plants. The data in the form of these values are compared between students and then supported by qualitative data to obtain a conclusion that the media has benefits. In addition to the results of the score, the researcher also involved the calculation of a questionnaire which would later describe the feasibility of the developed media application by the researcher.

Data processing involves analysis to draw conclusions by translating data in the form of numbers through certain formulas. Researchers translate data through systematic analysis in accordance with scientific studies and based on accurate experiments through creativity and appropriate knowledge (Sandu & Ali, 2015).

Based on this explanation, data analysis is used as a container with numerical processing according to their respective objectives and the style of research that will be planned later. The following is a data analysis test that contains a rating scale:

Table 1. Instrument rating scale

Criteria	Number
Very good	5
Good	4
Enough	3
Not good	2
Very Not Good	1

The formula for processing is

$$P = \frac{\text{The total score of data collection results}}{\text{Total criterion score}} \text{ X } 100\%$$

P = Media eligibility percentage

Criterion score = Highest score for each item × number of items × number of respondents. Furthermore, the calculation results above are interpreted with the following percentages and criteria:

Table 2. Presentation criteria

Presentage	Criteria
81% - 100%	Very Decent/Very Good
61% - 80%	Decent/Good
41% - 60%	Decent Enough/Good Enough
21% - 40%	Less Decent / Less Good
1% - 20%	Not Worth It/Not Good

This processing applies to all validations such as media experts and material experts as well as the response instrument to the teacher which is measured using a rating scale.

The pretest and posttest are calculated using the Gain Score as an assessment score, this calculation is to compare the two values so that it can be concluded the effectiveness of the media from the results of the tests given. The Gain Score is seen from the content of the questions published in the media, thereby strengthening students' understanding of the material being studied. The gain score has standard categories in the form of high, low or medium, a score of more than 0.7 is included in the high category. Scores between 0.3 to 0.7 are categorized as moderate, below 0.3 are low categories. Gain scores also have an interpretation, below 40 are not effective while 40-55 are less effective, 56-75 are quite effective and more than 76 are called effective.

RESULTS AND DISCUSSION

This research uses the ADDIE development model which includes several stages to become learning media, these stages are Analysis, Design, Development, Implementation, Evaluate. Based on these stages with research and development, the following research results are obtained;

Analysis, there are 20 medicinal plants in the Botanical Gardens with their herbarium and 20 for surrounding plants. During the analysis phase it was found that there were 4 categories of plants namely: Spices, health supplements, family medicinal plants (TOGA) and herbal drinks. The analysis was carried out on medicinal plants in the Bogor Botanical Gardens collection which consisted of Health Supplements: Belimbing Wuluh *(Averrhoa bilimbi)*, Guava *(Psidium guajava)*, Sarigading *(Nycthanthes arbor-tristis)*, Hibiscus *(Hibiscus-rosa-sinensis)*, Sambang Colok *(Aerva sanguinolenta)*. TOGA *(Family Medicinal Plants include:* Persimmon *(Quisqualis indica)*, Noni *(Morinda citrifolia)*, Akalifa *(Acalypa compacta)*, Orange Jessamine *(Murraya paniculata)*, Jasmine (*Jasminum sambac)*. Spices: Nutmeg *(Myristica fragrans)*, Karuk *(Piper sarmentosum)*, Javanese Chili *(Piper retrofractum)*, Betel *(Piper betle)*, Screwpine *(Pandanus amarylifolius)*. Herbal Drink which includes: Secang *(Caesalpinia sappan*), Lempuyang *(Zingiber zerumbet)*, Sanrego *(Lunasia amara)*, Kapulaga Jawa *(Amomum compactum)*, Lemongrass *(Cymbopogon citratus)*.

Analysis was also carried out with surrounding plants, namely health supplements: Binahong (*Anredera cordifolia*), Aloe vera (*Aloe vera*), Moringa (*Moringa oleifera*), Bidara (*Ziziphus mauritiana*), Kenanga (*Cananga odorata*). Spices include: Cinnamon (*Cinnamomum burmanni*), Coriander (*Coriandrum sativum*), Clove (*Syzygium aromaticum*), Black Pepper (*Piper nigrum*), Bay leaf (*Syziqium polyanthum*), herbal drinks include: Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*), Kencur (*Kaempferia galanga*), Green grass jelly (*Premna oblongata*), Temulawak (*Curcuma zanthorrhiza*). TOGA (Family Medicinal Plants) includes: Cocor Bebek (*Kalanchoe pinnata*), Celery (*Apium graveolens*), Basil (*Ocimum basilicum*), Leunca (*Solanum nigrum*), Bitter Gourd (*Momordica charantia*).

Design, the design on the surrounding plant card is smaller by about 5 cm with back and forth, the herbarium is on the back, the image contains plant parts that students are familiar with, presented with a white background, namely HVS paper, and is located below the list quartet of plant names. In the right and left corners, below the herbarium picture, there are numbers with a red and green background, which serve for scoring while playing. Next to the picture, there are the benefits of plants with short and clear writing**.**

The name list has a different shade of blue to name each plant, the one in blue is the plant it refers to. Below the picture there is a box for another name and below the benefit box is filled with the morphology of the plant including stem shape, stem color, leaf type, leaf shape, leaf spine, leaf location, flower shape, flower type, number of crowns, flower size, flower color, fruit shape, fruit color, fruit size. Media preparation uses the Borg and Gall model where they assemble media using descriptive studies.

Analysis of the medicinal plants of the Bogor Botanical Gardens is contained in twenty cards with four categories where in one category there are five medicinal plants, health supplements contain, Pule pandak, Jambu biji, Srigading, Kembang sepatu dan Sambang colok. While TOGA (Family

Medicinal Plants) contains Cekugan, Noni, Ekor tupai, Orange Jessamine, Jasmine, for loading spices Nutmeg, Karuk, Javanese Chilli, Betel, Screwpine. Herbal drink contains Secang, Lempuyang, Sanrego, Javanese Cardamom, Lemongrass.

Analysis of plants around the Bogor Botanical Gardens is contained in twenty cards with 4 categories where in one category there are 5 medicinal plants, health supplements contain Binahong, Aloe Vera, Moringa, Bidara, Kenanga. While TOGA (Family Medicinal Plants) contains Cocor bebek, Celery, Leunca, Bitter Gourd, Basil, to load the spices Cinnamon, Coriander, Cloves, Salam, Black Pepper. Herbal drink contains Ginger, Turmeric, Kencur, Green grass jelly, Temulawak. The design of the medicinal plant card is around the design, that is, with a familiar plant part of medium size, beside which there is a efficacy column containing the Latin name of the plant.

There is a quartet card design with the names of the plants, the local names of the plants are marked in light blue to distinguish them from the others, on the right and left side there is an incorrect score in red with a value of 15 and a correct score in blue with a value of 20. At the bottom is morphology plant characteristics which include stem shape, stem color, leaf shape, leaf type, leaf reinforcement, leaf layout, flower color, number of crowns, flower type, fruit size, fruit color.

Figure 2. Medicinal plants flashcard card design

Figure 3. Neighborhood plants flashcard card design

In addition, there is a flipbook for handbooks that are used for learning by students before starting playing activities with flashcards. The contents of the flipbook contain the complete contents of medicinal plants along with the classification of each plant. The flipbook itself is distributed to students via a link so that learning becomes practical and efficient, it can be opened at any time, you just have to click without scattering. At the end of the flipbook, pictures of the cards that will be played along with the rules for playing offline and online are presented. Flipbooks make students prepare knowledge and memorize material so that later it is easy to play.

The flipbook design is adapted to attractive colors thus making learning fun. At the end of the plant material, there is a quiz given at the beginning regarding the plants of the Bogor Botanical Gardens and the plants around them. The quiz contains pictures so students guess the name of the plant, there is a score at the end as a pretest.

Figure 4. Medicinal plants flipbook design

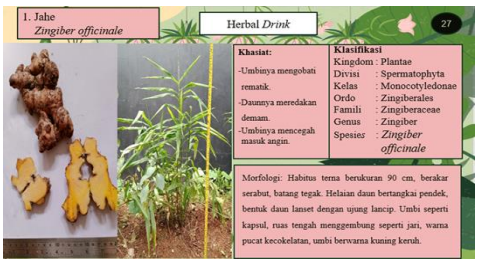

Figure 5. Plants flipbook design around

Development, the guidance process on August 20, 2021 resulted in several renovations related to the design of learning media. The renovation contains photos of tree data showing their habitus so that students can learn about real trees in the environment. The next renovation is regarding the consistency of spelling and the rules in sentences in the learning media, this is so that it pays attention to the linguistic rules, namely PUEBI and makes the sentences appropriate to be heard in learning.

The next renovation was adding new plants so that there were no doubles between the medicinal plants of the Bogor Botanical Gardens and the surrounding plants, because some of them had doubled before. This addition contains Secang (*Caesalpinia sappan*), Jasmine (*Jasminum*

sambac), Noni (*Morinda citrifolia*), nutmeg (*Myristica fragrans*). This change is due to students understanding plants that are familiar to them.

The next additional renovation was related to changing the category, which was originally rhizome and changed to herbal drink with a variety of plants that are widely known by the public. This is useful for the various categories understood by students so that medicinal plants are not only for health supplements, family medicinal plants or spices but can be used as a herbal drinks that are healthy for the body. This development is a biodiversity innovation where plants are multifunctional for life, growing a sense of love for living things.

Material expert validation was assessed by two expert lecturers. There are two assessments, namely the medicinal plants of the Bogor Botanical Gardens and surrounding Medicinal Plants with aspects that are assessed in 4 categories (Spices, Herbal Drink, Health Supplements and TOGA (Family Medicinal Plants) in this assessment the average, number, percentage of validation criteria is calculated.

Table 3. Bogor botanical gardens medicinal plants validation results

No.	Rated aspect	Percentage	Criteria
1.	Herbs and spices	94	Very good
2.	Herbal Drink	92	Very good
3.	Health Supplements	82	Very good
4.	TOGA Family Medicinal Plants	90	Very good

Medicinal plants around have a good rating, the comments are in the herbs and spices category which is assessed from the photos, description of plant morphology, from the suggestions for improvement the percentage, average and assessment are obtained as follows.

Table 4. Results of medicinal plants validation in the surroundings validation

No.	Rated aspect	Percentage	Criteria
1.	Herbs and spices	74	Good
2.	Herbal Drink	84	Very good
3.	Health Supplements	96	Very good
4.	TOGA Family Medicinal Plants	96	Very good

Validation by expert teachers was carried out by 3 validators from schools that were used as research. Media assessment includes material completeness, material up-to-date, presentation techniques, media appearance and language suitability. Based on this assessment, the number, average, percentage and category ratings are as follows:

Table 5. Teacher validation results of SMAN 1 Tangerang Selatan

No.	Rated aspect	Percentage	Criteria
1.	Material Completeness	93	Very good
2.	Material Update	86	Very good
3.	Serving Technique	93	Very good
4.	Media View	93	Very good
5.	Language Use	93	Very good

Calculation:
P = (Total score obtained/sum of criterion score) X 100%
Criteria score = 5 x 17 = 85 x 3 Teacher = 255
$\frac{237}{255}$ x 100% = 92 (Very Good)

Implementation, the results of the student response questionnaire, obtained the following assessment:

Table 6. Aspects of assessment along with the percentage and criteria

No.	Rated aspect	Percentage	Criteria
1.	Material aspects of flashcard medicinal plants	84	Very good
2.	Benefits of using media	82	Very good
3.	Learning Aspects	85	Very good
4.	Visual communication	83	Very good
5.	Linguistic Aspect	82	Very good
	Average	83	Very good

The results of student assessments, in the form of assessments from the Pretest and Posttest. Affective assessment is carried out when using media, the assessment contains seven criteria, namely being honest when reading the morphology and efficacy and being honest when answering without cheating. Discipline when swiftly reading statements and being responsible when sportsmanship writes individual points honestly. Caring and being responsive when understanding friends means wanting to repeat reading when friends are still confused and being proactive where students are enthusiastic about learning. Following are the results of the assessment of the seven aspects assessed, namely:

Table 7. Student Affective Assessment

No.	Rated aspect	Percentage	Criteria
1.	Honest	85	Very good
2.	Discipline	85	Very good
3.	Responsibility	81	Good
4.	Care	87	Very good
5.	Polite	80	Good
6.	Responsive	83	Very good
7.	Proactive	90	Very good
Average		84	Very good

The table above shows that each student is assessed for their character when playing with flashcard media, these seven attitudes are important for the lives of students where the results of the calculations show very good criteria with an average of 84. The highest score is shown in a proactive attitude of 90 and a low value is shown in a polite attitude of 80.

The card is designed with scoring points on the top right and top left, if it is correct it will be worth 10 and wrong points are 5, these points apply when students succeed or not guess the medicinal plants. The mention of the appropriate Latin name and local name will get 10 points, while those that are not quite right get 5. These points are written individually and the total points obtained are added up. The following is a table of student process scores:

Table 8. Assessment of student scores while playing

Score Data	Play Value
Lowest Score	30
Highest Score	75
Standard Deviation	10.05
Mean	64, 20
Median	65
Modus	65

The value data shows several categories, namely the lowest score obtained by students in the form of a playing score of 30 while the highest playing score of students is 75, added with a standard deviation of 10.05. Supporting calculations in the form of a mean (average) of 64.20 with a median of 65 and a mode of 65.

Next is the Pretest and Posttest assessment. The pretest and posttest were carried out by students via the Google form link, containing a total of twenty questions about medicinal plants in the Bogor Botanical Gardens collection and twenty questions about medicinal plants in the vicinity. The work took about 40 minutes after carrying out the play activities in the second meeting with several attitude assessments being assessed for each group member.

Table 9. Pretest and posttest value data

Score Data	Pretest	Posttest
Lowest Score	17	36
Highest Score	45	98
Standard Deviation	9,80	14,59
Mean	26,5	87,88
Median	22,5	94
Modus	20	96

The table above shows some of the data in the form of the lowest score with two types, namely the pretest of 17 and the posttest of 36, the highest pretest value of 45 while the posttest value is 98, this shows a very good increase. The standard deviation of the pretest was 9.80 and the posttest was 14.59 with additional calculations, namely the mean at the pretest was 26.5 and the mean at the posttest was 87.88. The median in the pretest was 22.5 and the median in the posttest was 94 while the mode in the pretest was 20 and the mode in the posttest was 96.

The N-Gain percentage is needed to measure the ideal value of the activity, in this case the pretest and posttest where the score is seen from the effectiveness criteria, the following data is generated:

Table 10. N-Gain percentage

Percentage N Gain (%)	N-Gain Score	N-Gain Criterion
Pretest dan Posttest	0, 83	High

The table above shows that the criteria for a high N-Gain score are seen from the value of the activity on the pretest and posttest, when these criteria are high, an activity is considered effective by looking at the N-Gain score of 0.83.

The N-Gain score in this research is greater than previous relevant research, which is equal to 0.64 in Puguh Setyawan's research (2019) entitled "*Pengembangan Media Flashcard Berbasis Pictorial Riddle Pada Materi Plantae Untuk Meningkatkan Motivasi Dan Pemahaman Konsep Siswa Sma/Ma Kelas X".* As well as Shohilul Muhibbi's research (2017), entitled "*Pengaruh Media Permainan Kartu Pintar Terhadap Ketuntasan Belajar Siswa Pada Materi Klasifikasi Tumbuh-tumbuhan*" with an N-Gain score of 0.78.

The criteria assessment table aims to measure the number of children who get scores in the high, medium and low categories. Through this table it can be classified and drawn regarding which

students have low N-Gain. Based on these objectives can be given an assessment as follows:

Table 11. Number of student assessment criteria

N-Gain	Total	Percentage
High	39	97,5
Medium	5	12,5
Low	2	5

From the table of the number of assessment criteria from the students' N-Gain pretest and posttest, it can be seen that those who get the high N-Gain are 39 students with a presentation of 97.5. The presentation is obtained by dividing the number of 39 with a total of 46 students multiplied by 100. There are 5 students who get medium N-Gain with a presentation of 12.5 and 2 students who get low N-Gain with a presentation of 5.

Evaluation, Evaluation during the game, namely the limited time when playing because remembering the presence of PTMT during the Covid 19 pandemic, while there are many medicinal plant materials that need to be remembered. The writings on the cards were also very tight and in the next evaluation, some students had difficulty memorizing the morphology of medicinal plants because they were too specific. Difficulty in memorizing Latin names and with some properties that are similar to one another.

The flashcard design itself is too large in size so that it can be modified to only be a picture and a card category box, the morphology and its properties are on the back (such as a pocket) where students can later draw the morphology and properties of paper to read. This modification is to make it easier for students later because the previous design was felt to be less effective to grasp, let alone to memorize the material.

This modification is expected to be used by researchers others as a future development process tailored to the needs the times and the relevance of world digitalization. Subsequent development focuses on digital products in disseminating insights related to biodiversity especially in medicinal plants so that they can be used better in society.

CONCLUSIONS AND SUGGESTIONS

Conclusion

The conclusion from this study is that learning must be supported by appropriate methods and media so that students can appreciate the material presented by the teacher, the process of delivering this message establishes communication between students and educators. Learning during the Covid 19 pandemic must be accompanied by fun learning so that it is not boring and fosters enthusiasm for learning for students, through flashcards students can learn while playing and can become peer tutors for their friends. The potential of Indonesia with its various flora needs to be educated to students through learning vehicles for the Bogor Botanical Gardens packaged using flashcards in learning. This makes children aware of the biodiversity of medicinal plants owned by the Bogor Botanical Gardens, as well as understanding the benefits and morphology of these plants. This knowledge is also strengthened by digital developments in the form of flipbooks which make it easy for students to open them anytime and anywhere, and can study comfortably through their respective gadgets. This digitization also supports learning during the Covid-19 pandemic where learning is carried out both online and face-to-face learning.

Suggestions

This research focuses on learning media that are developed according to needs, other researchers who have similar studies with this researcher are expected to make products that are up-to-date and more complex. The development carried out must involve new innovations such as making applications, games, digital dictionaries and others in order to facilitate learning that is relevant to technological developments.

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