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Gamified Website Design for Calisthenics Workouts Enhancing Motivation and User Engagement

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A B S T R A C T S

Workout is one way to adopt a healthy lifestyle. Workout can minimize disease, one of which is obesity. Even though it has great benefits, there are still many people who don't exercise regularly. Therefore, sports activities need to be increased. One sport that does not require equipment is gymnastics. Gymnastics training is a physical activity that is as beneficial as the gym. One way to help increase motivation is to do gamification. Gamification can increase motivation and make boring things more interesting. In this research, a calisthenics workout website was designed and created using the gamification method. Website was evaluated by 33 people. Based on the survey conducted, the curiosity value was 83.32%, the perceived ease of use value was 79%, the perceived usefulness value was 83.32%, the joy value of 80.6%, behavioral intention to use value of 83.03%, focused immersion value of 80.53%. The final average obtained from all categories is 81.12%.

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Keywords / Kata Kunci — ***Website; Gamification; Workout; Calisthenics; Octalysis***

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1. INTRODUCTION

A healthy lifestyle is a lifestyle that has a purpose improve health and also maintain that health [1]. Only 20 percent of the total Indonesian population understands a healthy lifestyle [2]. A healthy lifestyle can prevent diseases such as obesity. Obesity has become one of the health diseases that is feared because it can increase chronic diseases such as diabetes, heart attacks, cancer, and hypertension [3]. This healthy lifestyle can also be useful for maintaining and managing body weight to avoid experiencing these diseases [4].

There are many ways to implement a healthy lifestyle. One of way to adopt a healthy lifestyle is by doing exercise. Workouts can be done anywhere, for example at home, gym, workplace, until school. If done well, exercise can improve body resistance and also slows down the effects of aging. Besides that, exercise can also help mental health [5].

Even though it has many benefits for body health. Still, Many people in Indonesia do not exercise regularly. Based on the 2021 National Sport Development Index (SDI) Report by Ministry of Youth and Sports (Kemenpora), community fitness level Indonesia is classified as very low. Low fitness level causes diseases such as stroke, diabetes and kidney disease. According to the WHO report, 71% of deaths in Indonesia are caused by diseases [6]. Therefore, sports activities need to be increased to minimize the possibility of the disease occurring. One form of exercise which is easy to do without equipment is calisthenics workout. Calisthenics workout is a physical activity that is as useful as the gym. Calisthenics workouts are generally done outdoors [7], but can be

done indoors due to minimal need for equipment. Calisthenics workout is a sport that only uses body weight, so it is easy to do carried out. Calisthenics aims to develop strength, flexibility, agility, balance, and coordination [8]. One of the factors that contributes greatly to active exercise is motivation. Even, motivation is something that influences the effort expended during the session exercise and efforts to exercise regularly [9]. Lack of motivation has an impact on the active participation of the population in sports, at the moment, active participation exercising in Indonesia is still 32.83% [6].

One way to increase motivation to carry out activities workout is using the gamification method. Gamification can improve motivation and make boring things more interesting [10], [11]. This gamification implements game elements such as scores, objectives, and gifts. With a sense of accomplishment, this can be something to do motivate more, namely by beating the previous score [12]. At this time, many gamification applications for sports have not done gamification with completely, because these applications focus on tracking on sports activities carried out by users [13]. On this research website, Gamification elements are more widely used, such as scores, objectives, prizes and shops.

In this digital era, many things can be helped by devices digital, such as cellphones, computers, and others. As is on that device, the website can be used to assist in workout activities. Websites can be accessed by users anywhere and anytime. Due to to access the website, you only need internet with WiFi or cellular data [14], [15].

One framework for gamification is Octalysis. Frameworks It was developed with the principle that each individual is motivated by the core drives. Octalysis is one of the well-known tools for changing habits users [16]. Octalysis can be used to help overcome low motivation [17]. Octalysis divides 8 types which are grouped together 2 groups, namely the right brain for creativity, the left brain for analytics, White Hat (top), and Black Hat (bottom) [18]. Octalysis is divided into 8 core drives, which makes octalysis easier to accept. Octalysis too emphasizes feelings, making it easier for beginners - newbies to videos games [19]. This website is built using React JS and Node JS, which is expected to make this website run quickly and be scalable

2. RESEARCH METHODOLOGY

1. Requirement Analysis

Website requirement analysis is carried out to design the website according to the core drives in the Octalysis gamification framework. The elements used on this website are as follows:

A. Epic Meaning

The element used in epic meaning core drive is "Beginner's Luck". Users will get a prize when they do gatcha for the first time.

B. Development & Accomplishment

Elements used in core drive development & accomplishments are as follows:

1. Status Points; The status points applied on the website are points. These points, obtained by doing activities. Every activity has points, each activity has a different point value.
2. Leaderboard; The leaderboard functions to display users has the highest average points obtained each week with doing calisthenics activities.
3. Progress Bar; The Progress Bar functions for users to see the points they have made obtained that week. In addition, the progress bar is used for how many points the user needs to reach the target that week.

C. Empowerment of Creativity & Feedback

What is applied to this core drive is milestone unlocks or achievements. Where users get an achievement if they have done or reach a certain point. Examples of things that can get an achievement is "Achieve 1000 points".

D. Ownership & Possesion

The elements used in this core drive are exchangeable points. Points obtained from doing activities can be used to do gatcha. In this gatcha, users have the opportunity to get animals pet.

E. Social Influence & Relatedness

Gamification elements are used using this core drive is tout flag. With the leaderboard, users can see achievements and points - points that have been achieved by other users, so that the user see what other users have done.

F. Unpredicability & Curiosity

On this website, a gatcha system is implemented. The gatcha system is wrong one element of the core drive scarcity & impatience. Gatcha implemented through the shop to buy a pet. Gatcha generates animals automatically random.

G. Loss & Avoidance

The gamification element used with this core drive is progress loss, which is in the form of ranking. To stay in high rankings, users must remain consistent and increase the activities carried out by users.

2. Diagrams

The diagrams in this section are used to illustrate system flow process. The diagram used is a use case diagram and activity diagrams.

A. Use Case Diagram

Figure 1 is a use case diagram for the website. This website only has one actor, namely the website user. Users can do register, which is useful for creating an account. If you have done it register, the user can log in. After logging in, the user can accessing pages, namely, viewing activities, inputting activities, see this week's total score, see the leaderboard, see achievements, looking at statistics, doing gatcha. and view profile.

B. Activity Diagram

1. Sign Up Page Activity Diagram

When signing up, users are asked to fill out a form which contains user data required by the system. After submit, the system validates the data entered by the user. If the data is submitted by the user is correct, the data is entered into the database. Activity sign up diagram can be seen in Figure 2

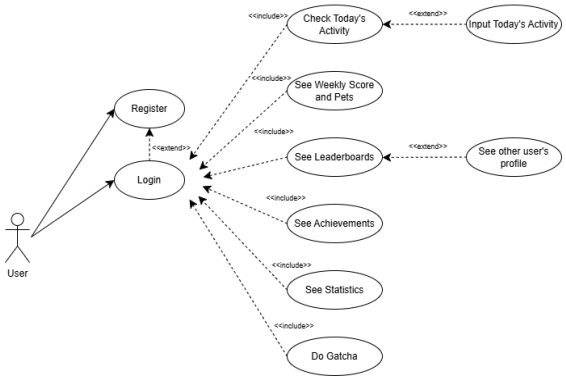

FIG 1. Use Case Diagram Calisthenics Workouts Website

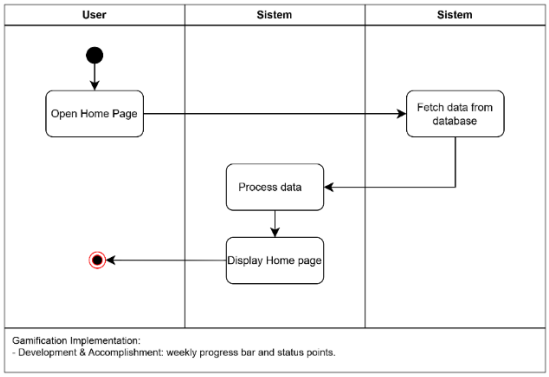

FIG 4. Home Page Activity Diagram

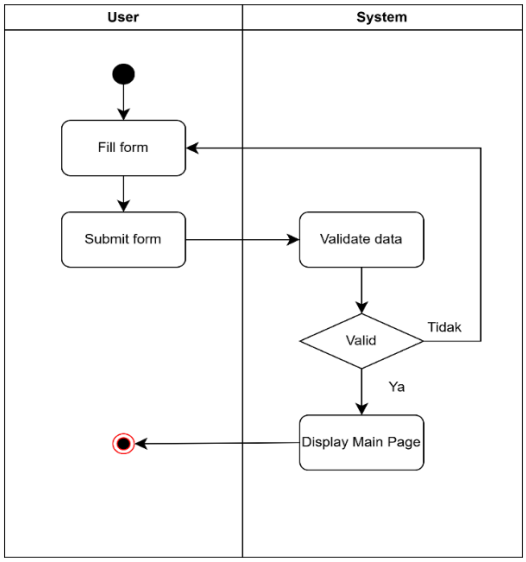

FIG 3. Login Page Activity Diagram

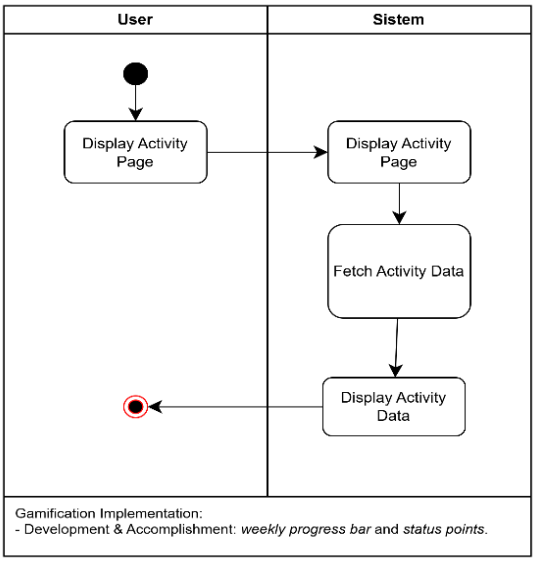

FIG 5. Activity Page Activity Diagram

2. Login Activity Diagram

If the user has signed up, the user can log in into the calisthenic gamification website by logging in. On log in page, the user is asked to enter the data required to log in. Then, the system performs validation for see whether the data is correct based on the database. If the data is correct, the user is redirected to the page home. The log in activity diagram can be seen in Figure 3.

3. Home Page Activity Diagram

In this home, users can see various information. Information on this page is the weekly progress bar, animals pets, and total points. Implementation of in-page gamification is development & accomplishment with a progress bar and status points on the Home page. Activity diagrams can seen in Figure 4.

4. Activity Page Activity Diagram
   In this process, the first thing the system does is displays the activity page. Then, the system performs retrieval of data in the database. Data captured by the system is user activity data on the day the page was opened, so, users can see what activities have been created by him. The activity diagram can be seen in Figure 5.
5. Create Activity Activity Diagram
   To add activities performed today, users need to fill in the form on the website. The form is data - data about activities carried out by users. After fill in and submit the form, the data is entered into in the database and becomes for other features. Activity diagrams adding activities can be seen in Figure 6.
6. Leaderboard Page Activity Diagram
   The leaderboard page can be accessed via the existing navigation bar at the top of the page, this page displays the users who are has the highest average weekly score. In this feature, implementation the octalysis applied is development & accomplishment with a leaderboard. Apart from that, there are other applications of octalysis in this feature is loss & avoidance, users must maintain weekly average points, to stay on the leaderboard. Activity diagrams viewing the leaderboard can be seen in Figure 7.

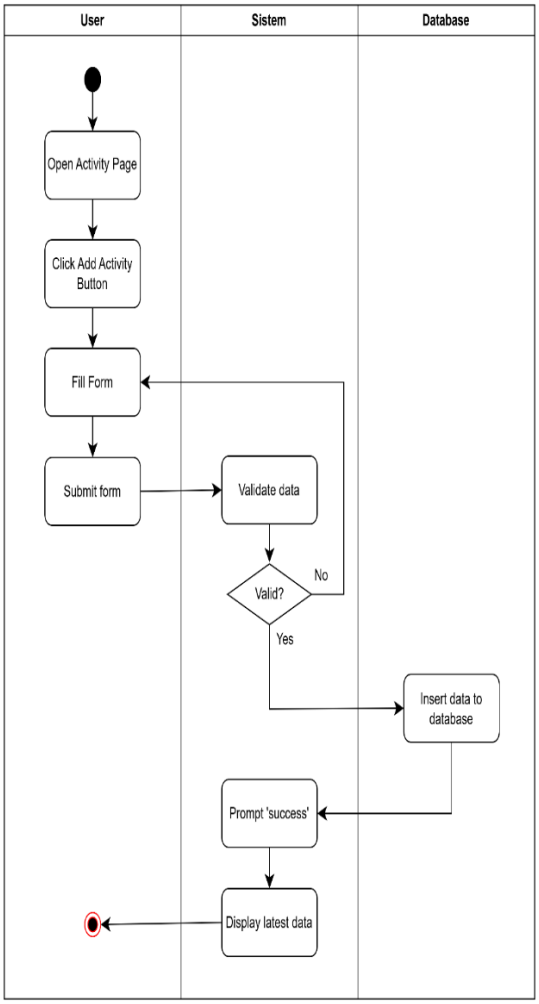

FIG 6. Create Activity Activity Diagram

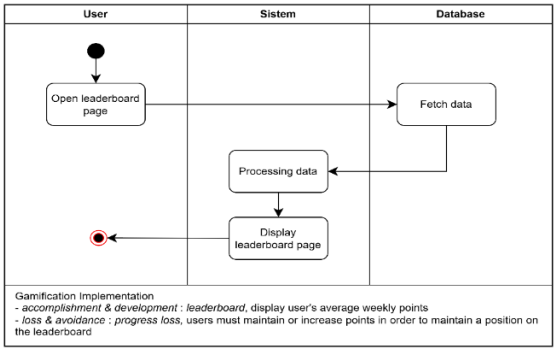

FIG 7. Leaderboard Page Activity Diagram

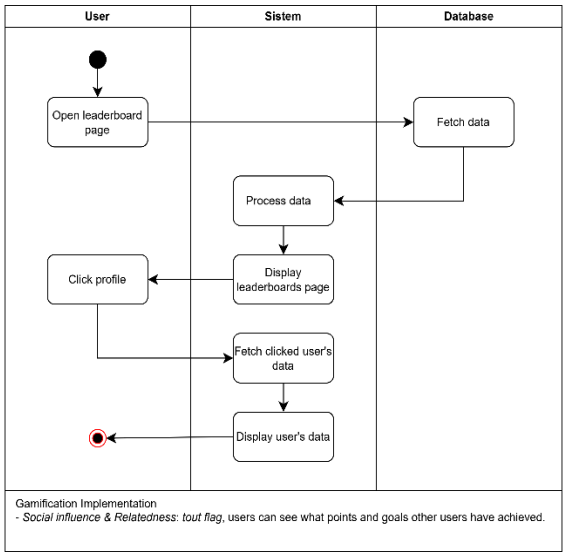

FIG 8. Profile Detail Page Activity Diagram

7. Profile Detail Page Activity Diagram
   In the leaderboard page, users can see other users who are on the leaderboard. Users can also view the user's profile data if the user clicks on the name of that user. Gamification elements of the octalysis framework applied on this page is, social influence & relatedness with the tout flag, because users can see achievements other users. Figure 8 is an internal activity diagram view profile details.
8. Achievement Page Activity Diagram
   Users can see the achievements they have achieved on the page achievements. Implementation of octalysis implemented in this feature is empowerment & creativity. Where, the user must do specific things if you want to get this achievement. Figure 9 is an activity diagram looking at achievements.

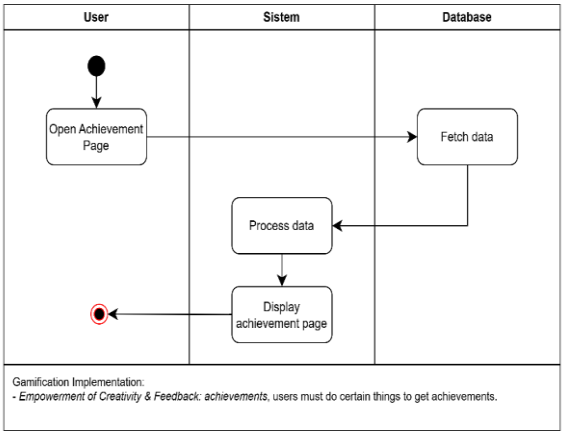

FIG 9. Achievement Page Activity Diagram

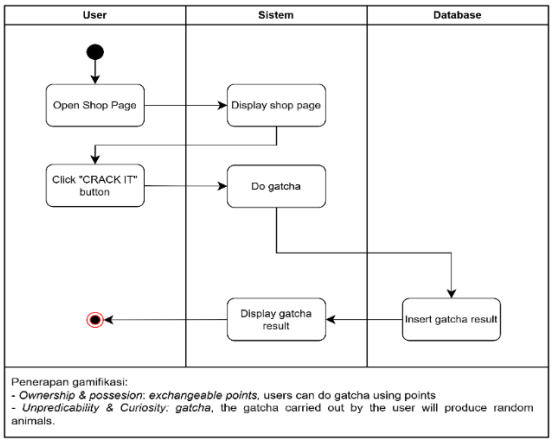

FIG 10. Shop Page Activity Diagram

9. Shop Page Activity Diagram
   On the shop page, users can do gatcha. To do a gatcha, the user uses the points they have earned by doing activities. In this feature, implementation the octalysis applied is ownership & possession as it is exchangeable points, which means users must use points to do the gatcha. Apart from that, other applications of octalysis are unpredicability & curiosity, where, the user does not know what the outcome will be from the gatcha that the user has done, because the gatcha results are randomized. The shop activity diagram can be seen in Figure 10.
10. Statistic Page Activity Diagram
    In the statistics page, users can see statistics per week user. Octalysis elements applied in the page, this is accomplishment & development with a bar diagram which shows an increase if there is an increase in activity done by the user. Apart from that, loss & avoidance is also applied on this page with progress loss if the user experiencing a decrease in activities. Statistics page activity diagrams can be seen in Figure 11.

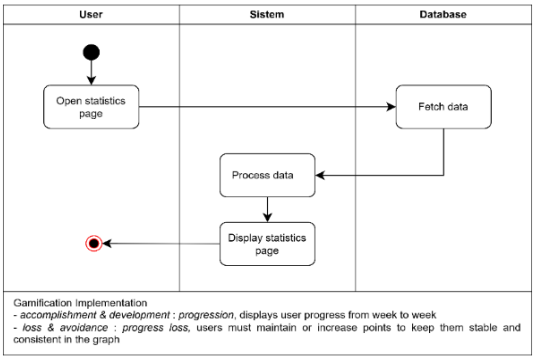

FIG 11. Statistics page activity diagram

3. RESULTS AND DISCUSSION

1. The Creating Website

Website was built using ReactJS and NodeJS for frontend and backend, and use MySQL for storing data. the first thing a user sees is a login page, as seen in Fig 12. Users need to log in by entering their username and password to be able to enter the feature pages.

FIG 12. Log In Screen

FIG 13. Home Screen

After logging in, the website will appear first is the home page, which can be seen in Figure 13. In page. In this case, users can see the pets they already own user. If the animal image is still gray, this is a sign that the user still

hasn't gotten the animal. Apart from that, users can also see weekly activity progress to see whether the activity points are correct achieved by users this week has reached the target, that is 1000 points.

On the activity page shown in Figure 14, users can add to the activities carried out today as in Figure 15. Activities that have been added are recorded in the database. Besides that, This data influences the weekly points achieved by users. The gamification used on this page is status points and progress bar.

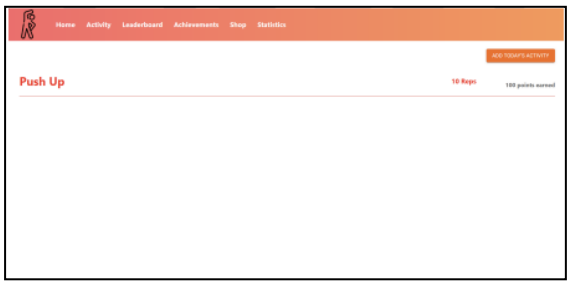

FIG 14. Activity Page

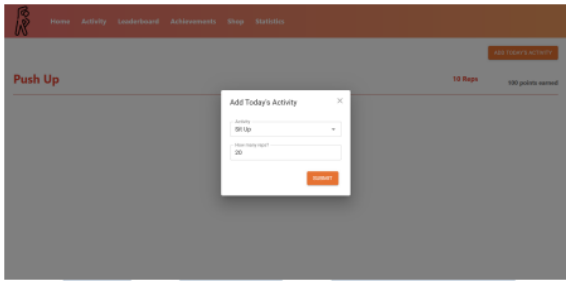

FIG 15. Activity Page when Adding Activity

Users can also view the leader board, the view of this page can be seen on Figure 16. On this page, users can see other users who have average weekly points highest. Apart from that, users can also view user profile details other. The leaderboard displays all users and ranks them in order each. The gamification used on this page is tout flag, leaderboard, and progress loss.

Furthermore, on the achievements page, that shown in Figure 17, this page contains achievements that have been achieved by users while using the website. If the achievement is still not achieved by the user, the achievement has a gray color to indicate that the user still has not have this achievement. In this page, the gamification elements are used is achievement.

FIG 16. Leaderboard Page

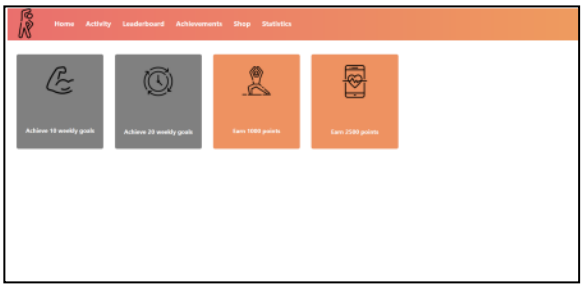

FIG 17. Achievement Page

On the shop page in Figure 18, users can do gatcha to get pets. With conditions, users have at least 500 points to get 1 animal. Animals that The result from opening the egg is random. After getting animals, users can see the animals they have found on the home page. The gatcha results page can be seen in Figure 19. In this shop page The gamification elements applied are exchangeable points, beginner's luck, and gatcha.

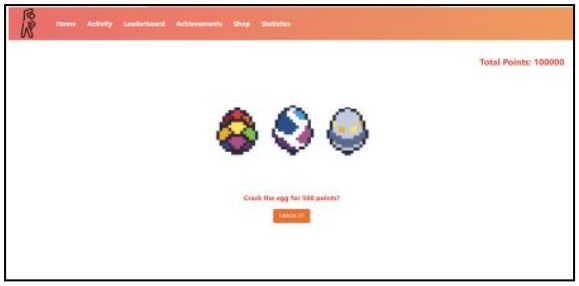

FIG 18. Shop Page

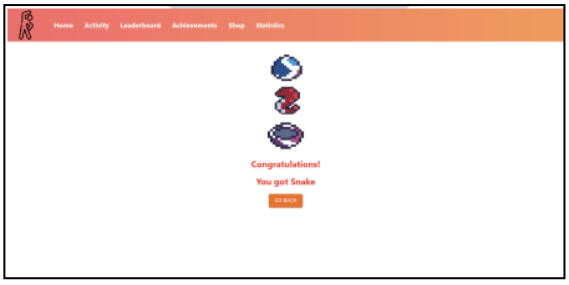

FIG 19. Shop Page After Gatcha

The last page on this website is the statistics page. This page functions to track users' weekly activities. This tracking is represented using a bar chart. The statistics page can be seen in Figure 20.

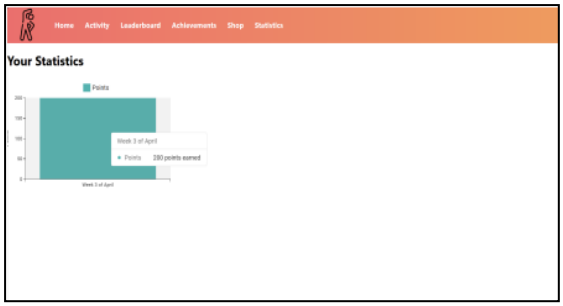

FIG 20. Statistics Page

Below is the list of questions on the questionnaire:

A. Perceived Ease-of-Use

1. I feel that the interactions on the calisthenics gamification website are clear and easy to understand
2. I feel that the appearance of the calisthenics gamification website is easy to understand and easy to understand don't get confused
3. I can easily do what I want on a gamification website calisthenics
4. I didn't experience any problems when using the calisthenics gamification website
5. I found the calisthenic gamification website difficult to understand

B. Perceived Usefullness

1. Calisthenics gamification website motivates me to exercise
2. Calisthenics gamification website gave me awareness about exercising
3. Calisthenics gamification website made me aware of a healthy lifestyle
4. I didn't get anything from calisthenics gamification website
5. Calisthenics gamification website makes exercising regularly

C. Curiosity

1. The calisthenics gamification website made me curious
2. I am curious about the achievements I can get

D. Joy

1. I enjoy using calisthenics gamification website
2. I find using calisthenics gamification website fun
3. I feel bored using calisthenics gamification website
4. I am in control of my interactions on calisthenics gamification website

E. Behavioral Intention to Use

1. I will reuse the calisthenics gamification website
2. I will continue using the calisthenics gamification website

F. Focused Immersion

1. I feel like I can use the calisthenics gamification website without ignored by things that bother me
2. I feel I can focus on using the calisthenics gamification website
3. I am easily distracted by other things when using calisthenics gamification website
4. I can use the calisthenics gamification website without care about other things

As for the preliminary question, to see how often respondents exercise, and the age of the respondent. Preliminary questions can be seen below:

1. How old are you?
2. How often do you exercise?

The total number of respondents was 33 respondents. Based on questions preliminary, there was 1 respondent who was under 15 years of age, 8 respondents were aged between 15 and 20 years, 16 respondents were aged between 15 and 20 years between 21 and 25 years, and 8 respondents were over 25 years old. Based on preliminary questions, 16 respondents exercised regularly less than 1 time a week, 13 respondents exercised 1 to 3 times a week, 3 respondents exercise 4 to 5 times a week, 1 respondent exercises more than 5 times a week. Percentage results (PS) assessment of questionnaire answers is calculated using the formula PS = (STS*1)+(TS*2)+(N*3)+(S*4)+(SS*5)/5*number of respondents. For questions that is a negative, the formula used is PS =(STS*5)+(TS*4)+(N*3)+(S*2)+(SS*1)/5*number of respondents. Questionaire results can be seen in Table 1.

2. Testing And Evaluation

Website testing is carried out by distributing questionnaires use the Google form along with the website link for testing. Through the website link, users can access the calisthenics gamification website and carry out testing. The calisthenics gamification website questionnaire was conducted using Google form. The questionnaire was created using the Hedonic Motivation System Adoption model Model (HMSAM). This model is used to test behavioral intention to use and immersion of the user when using the website.

TABLE 1. Questionnaire Result

Code	Question	Very Disagree	Disagree	Neutral	Agree	Very Agree
PEU1	I feel that the interactions on the calisthenics gamification website are clear and easy to understand	1	2	3	14	13
PEU2	I feel that the appearance of the calisthenics gamification website is easy to understand and easy to understand don't get confused	1	2	2	7	21
PEU3	I feel that the appearance of the calisthenics gamification website is easy to understand and easy to understand don't get confused	1	2	5	8	17
PEU4	I didn't experience any problems when using the calisthenics gamification website	2	5	3	12	11
*PEU5	I found the calisthenic gamification website difficult to understand	10	9	4	4	6
PU1	Calisthenics gamification website motivates me to exercise	1	1	2	17	12
PU2	Calisthenics gamification website gave me awareness about exercising	1	1	5	16	10
PU3	Calisthenics gamification website made me aware of a healthy lifestyle	1	1	2	15	14
*PU4	I didn't get anything from calisthenics gamification website	12	9	2	4	6
PU5	Calisthenics gamification website makes exercising regularly	1	1	2	17	12
CUR1	The calisthenics gamification website made me curious	1	1	4	15	12
CUR2	I am curious about the achievements I can get	2	1	2	10	18
JOY1	I enjoy using calisthenics gamification website	1	2	3	13	14
JOY2	I find using calisthenics gamification website fun	1	2	3	13	14
*JOY3	I feel bored using calisthenics gamification website	9	12	3	4	5
JOY4	I am in control of my interactions on calisthenics gamification website	1	1	2	9	20
BIU1	I will reuse the calisthenics gamification website	2	1	5	10	15
BIU2	I will reuse the calisthenics gamification website	1	2	3	11	16
IME1	I feel like I can use the calisthenics gamification website without ignored by things that bother me	1	2	4	11	15
IME2	I feel I can focus on using the calisthenics gamification website	1	3	4	11	14
*IME3	I am easily distracted by other things when using calisthenics gamification website	9	13	3	4	4
IME4	I can use the calisthenics gamification website without care about other things	1	1	4	10	17

From the calculation of test results carried out with a questionnaire, the results obtained can be seen in table 2.

TABLE 2. Likert Scale Result

Aspect	Result (Percentage)	Interpretation
Perceived ease of use	79%	Good
Perceived Usefullness	80.28%	Very Good
Curiosity	83.32%	Very Good
Joy	80.6%	Very Good
Behavioral Intention to Use	83.03%	Very Good
Focused Immersion	80.53%	Very Good

The aspect with the highest percentage is curiosity aspect, with value reached 83.32%. Meanwhile, the aspect that gets the lowest score is perceived ease of use , with a value of 79%. Average results achieved from all aspect percentage (79% + 80.28% + 83.32% + 80.6% + 83.03% + 80.53%)/6 is 81.12%.

4. CONCLUSIONS

Calisthenic workout gamification website using the gamification method using the octalysis framework was successfully designed and built. This website was built using JavaScript with the ExpressJS framework for the backend and ReactJS for the frontend. The calisthenic gamification website has been evaluated by 33 respondents. The model used for the questionnaire is the Hedonic Motivation System Adoption Model (HMSAM). The average percentage obtained from the questionnaire results was 83.32% in the curiosity aspect, 79% in the perceived ease of use aspect, 80.28% in the perceived usefulness aspect, 83.03% in the behavioural intention to use aspect, 80.6% in the joy aspect, and focused immersion amounting to 80.53%.

Based on the research that has been carried out, there are suggestions that can be made given in developing a calisthenics website using the gamification method using the octalysis framework in the future, like developing website designs on smartphones to make them more attractive lots of people and more accessible and Add other gamification ideas to be more motivating users, such as friends feature or challenge feature.

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