

# PROCEEDING

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**ISREM 2015**  
University of Wijaya Kusuma  
Surabaya

**INTERNATIONAL  
SEMINAR**

## Resources, Environment, And Marine In The Global Challenge

**"The Role Of Science and Technology  
In The Basis Of Environment  
To Support Sustainable  
Resource Development"**

DITERBITKAN OLEH:  
Pusat Pengkajian Hukum dan Pembangunan (PPHP)  
Fakultas Hukum Universitas Wijaya Kusuma Surabaya  
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## **WELCOME ADDRESS**

### **Foreword of The Chair of Organizing Committee the 1<sup>st</sup> ISREM 2015**

Assalamualaikum Warrahmatullahi Wabarakatuh  
Good Morning.

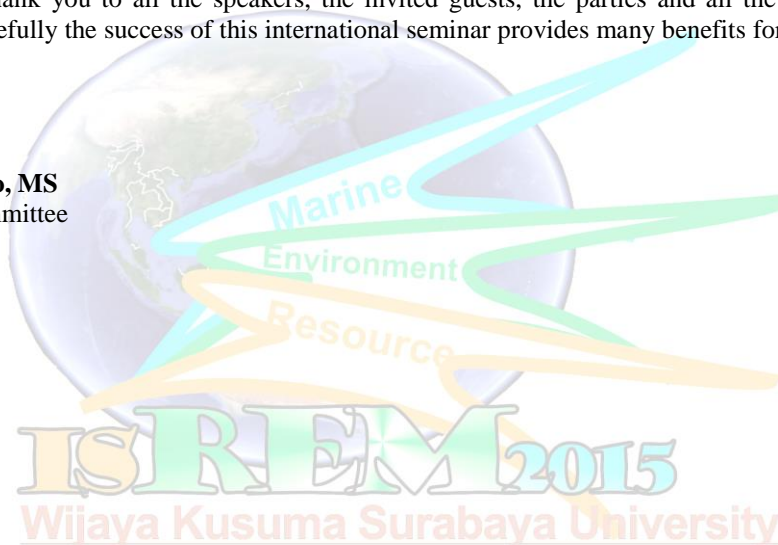
On behalf of the Organizing Committee, we congratulate dating to the speakers, the invited guests and all participants of the first International Seminar Resource, Environment and Marine (ISREM) held by Wijaya Kusuma Surabaya University.

Through the International Seminar, it is expected that there is intertwined interaction, communication and exchange of current research information so as to generate concepts and new thoughts on the role of science and technology in the basis of environment to support sustainable resource development. In addition to publication in the form of proceedings, the best papers presented at this international seminar, to be published in the international journal. The total in the first ISREM is 200 participants consisting of speakers, participants and invited guests.

Finally, we would like to thank you to all the speakers, the invited guests, the parties and all the donors who have supported this event and hopefully the success of this international seminar provides many benefits for us all.

Thank you  
Wassalamualaikum Wr Wb

**Dr. Ir. Hary Sastrya Wanto, MS**  
Chair of the Organizing Committee





*Wijaya Kusuma Surabaya University, 29-30 September 2015*

**Rector of Wijaya Kusuma Surabaya**

To honorable Ministry of Marine Affairs and Fisheries Indonesia.  
To honorable Governor of East Java  
To honorable Coordinator of Kopertis  
To honorable Kapolda  
To honorable Invited Speakers  
To honorable Rectors  
Ladies and Gentlemen

Assalamualaikum Warrahmatullahi Wabarakatuh  
Good Morning.

Praised be to Allah SWT for His love and compassion that today we all gather for the first International Seminar Resource, Environment and Marine (ISREM) held by Wijaya Kusuma Surabaya University.

I would like to thank you for coming to this scholarly forum especially I would like to express my deepest gratitude to the Keynote speaker Ibu Susi Puji Astuti, Ministry of Marine Affairs and Fisheries who has spent time to attend and support this event. I wish to extend sincere gratitude to all respected delegates, invited speakers, presenters and participants for attending this seminar and for becoming our esteemed guests on this occasion. It is indeed a great honor for us to have you all at the seminar.

As we know, the theme "The Role of Science and Technology in the Basis of Environment to Support Sustainable Resource Development" is timely in order to address the issues and concerns about Resource, Environment and Marine in the Global Challenge. Indonesia includes one of the countries which own the biggest natural wealth in the world. If natural resource of Indonesia in mainland is combined with in the sea, so it is only Indonesia which has the biggest natural resources in the world. The utilization of the natural resources in Indonesia tend to economical aspect, while the aspects of ecology, biology, technology, and humanity is still limited. Whereas they have the very high economical value. For that reason, the International Seminar is the event of discussion on ideas, problems and solutions about resources, environment and marine as well as the information result of current research for scientists, observers, entrepreneurs, industrialists and policy makers. Thus, it will create the harmony the research activities with the problems and the real needs. This International Seminar is the 1<sup>st</sup> ISREM and it is hoped that the next year will be held again the 2<sup>nd</sup> ISREM and so forth with the specific target.

Ladies and gentlemen

In the same time of this event, it is also held directly MoU among all Higher Education supporting the First ISREM 2015 and it will be established ISREM network. We will cooperate about seminar/ conference, student and lecturer exchange, research together.

Finally, on behalf of Wijaya Kusuma Surabaya University, I would like to take the opportunity to extend my appreciation to the committee, all participants and all sponsors, that have generously assisted us to host this seminar. I hope that we all could gain benefits and insights through this seminar.

Thank you,  
Have a wonderful and insightful seminar  
Wassalamualaikum Warrahmatullahi Wabarakatuh.

Prof. H. Sri Harmadji., dr., Sp.THT-KL (K)

Rector of Wijaya Kusuma Surabaya University





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Member : Staf of SATPAM





## **SCHEDULE OF AGENDA**

<b>TIME</b>	<b>ACTIVITY</b>	<b>PIC</b>
07.30-08.00	Registration	Sections of Secretariat and Registration
08.00-08.20	- Opening Ceremony - The National Anthem of Republic of Indonesia	Sections of Receptionist and Protocol
08.20-08.30	Speech By Chair of The Organizing Committee	Sections of Receptionist and Protocol
08.30-08.45	Speech and Official Opening by Rector of Wijaya Kusuma Surabaya University, Indonesia	Sections of Receptionist and Protocol
08.45-09.45	KEYNOTE SPEAKER The Fishery and Marine Ministry of Indonesia: SUSI PUDJI ASTUTI	Sections of programs, formulator, and taking minute Coordinator
09.45-10.00	MOU (All Higher Education supporting the 1 <sup>st</sup> ISREM 2015)	Sections of Receptionist and Protocol
10.00-10.15	COFFEE BREAK	Section of Beverages and Meals
10.15-12.30	Invited Speaker	Sections of programs, formulator, and taking minute Coordinator
	Professor Dr. M. Dileep Kumar	
	Rexton F. Chakas, PhD	
	Professor Dr. Basri Rashid	
	Prof. Dr Ruswiati Surya Saputra, SE, MS	
	Prof. Dr. Ir. Achmadi Susilo, MS	
12.30-13.00	LUNCH	Section of Beverages and Meals
13.00-16.00	PARALLEL SESSION	Sections of programs, formulator, and taking minute Coordinator
16.00-Finished	COFFEE BREAK	Section of Beverages and Meals

**ISREM 2015**  
Wijaya Kusuma Surabaya University





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## **INTRODUCTION ENERGY MECHANICAL THROUGH EDUCATIONAL GAMES TO CALCULATE CALORIES SO THAT CHILDREN COULD AVOID DIARRHOEA**

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**Abstract.** Diarrhoea is a disease which still became problem in public health for developing countries, including Indonesia. East Java province have got 1st ranked who have quite high in diarrhoea's prevalence. In 2013 in East Java profile, children in 6-12 years aged got 3,301 children which get diarrhoea.

Purpose of this research is to create media learning base on multimedia in the form of Game Education for children in particular Primary School. Through this game, children can get visualization the energy mechanical needed in their activity. Children can know relationship about speed, time and distance to produce energy mechanical. The activity are given in this game are cycled.

Results of this research is to give lesson to children that cycling with a maximum speed of 20 km / hour by pressing the keypad continuously. Every 60 seconds, game has shown bring a good choice of food and drink hygienic and unhealthy. The child can choose food and drink, and game will calculate the calories of healthy foods chosen by the child of 2.5 cal / kg / hr. The longer a child cycling, the greater the required health level. If the child does not take health foods and drinks, game will automatically display the child with diarrhoea. Conversely, if the child choose healthy foods and beverages that children can complete the game properly.

**Keywords:** educational game, children, calories, diarrhoea.

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### **Introduction**

Diarrhoea, including that of parasitic origin, remains one of the most common illnesses among children and, as reported by the World Health Organization, is one of the major causes of infant and childhood mortality in developing countries (Boschi-Pinto:2008). Diarrhoea is a major cause of childhood morbidity and mortality in socio-economically developing countries. More than one million episodes of Diarrhoea occur every year among children under five years of age causing approximately 2.5million deaths (Kosek M:2003) Various microbial agents have been incriminated in Diarrhoea among which are enteric bacteria, parasites and viruses. Candida, Trichosporon and Geotrichum are fungi that have been reported to cause Diarrhoea. Different groups of viruses have been showed to be responsible for the high incidence of acute viral Diarrhoea among children during their first years of life (Giordano M.O:1990). These viruses include rotavirus, norovirus, adenovirus and astrovirus. The contribution of the various pathogens to Diarrhoea may differ substantially between regions depending on local meteorological, geographic and socio-economic conditions. Underlying reasons for the spread of diarrheal diseases are found in poor hygiene and sanitation, limited access to safe drinking water as well as inadequate education of health care providers and recipients.

In children, intestinal parasitic infections, particularly soil-transmitted helminthiasis is the cause of common health problems in tropical countries. Younger children are predisposed to heavy infections with intestinal parasites since their immune systems are not yet fully developed (O'Ryan M:2005), and they also habitually play in faecal contaminated soil. In addition to considerable mortality and morbidity, infection with intestinal helminths has been found to profoundly affect a child's mental development, growth and physical fitness while also predisposing children to other infectious agents. Several factors like climatic conditions, poor sanitation, unsafe drinking water, and lack of toilet facilities are the main contributors to the high prevalence of intestinal parasites in the tropical and sub-tropical countries (Giordano M.O:1990). Further, lack of awareness about mode of transmission of parasitic infections increases the risk of infection. Hence, a better understanding of the above factors, as well as how social, cultural, behavioural and community awareness affect the epidemiology and control of intestinal parasites may help to design effective control strategies of these diseases.

Diarrheal diseases are leading cause of preventable death, especially among children under five in developing countries. Diarrheal is defined as a child with loose or watery stool for three or more times during a 24-hour's period. The frequency and severity of diarrhoea is aggravated by lack of access to sufficient clean water and sanitary disposal of human waste, inadequate feeding practices and hand washing; poor housing conditions and lack of access to adequate and affordable health care (Kosek M:2000). Studies have been conducted in the past to establish risk factors of diarrhoea. Study conducted in Egypt showed that some socio-demographic characteristics like maternal age and child's age are some determinant factors for the occurrence of episode of diarrheal disease (O'Ryan M:2005) Similarly, study in Ghana showed that water availability, sanitary facilities, hygienic practices, flies infestations and regular consumption of street food are also some predicting factors for the occurrence of diarrheal disease (Henry



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F.G:2004). In Ethiopia, Yohannes and his colleagues found the incidence of diarrhoea to be higher in the second half of the infant's life when inborn immunity is weak and exposure to contaminated weaning foods increases (Babaniyi O.A:1991). Diarrheal diseases account for 1 in 9 child deaths worldwide, making diarrhoea the second leading cause of death among children under the age of 5. For children with HIV, diarrhoea is even more deadly; the death rate for these children is 11 times higher than the rate for children without HIV. Despite these sobering statistics, strides made over the last 20 years have shown that, in addition to rotavirus vaccination and breastfeeding, diarrhoea prevention focused on safe water and improved hygiene and sanitation is not only possible, but cost effective: every \$1 invested yields an average return of \$25.50 (Boschi-Pinto:2008).

One of the biggest causes of child mortality in Indonesia is diarrhoea, which can be prevented with lifestyle clean and healthy as washing hands with soap and brush your teeth. Based on Profile Healthiness in Province of East Java on 2012 shows that 64% of Indonesia children under 12<sup>th</sup> years get diarrhoea, this condition made Indonesia got 13<sup>th</sup> level cause of death in the world (Talwar O:1990).

Educational games are developed for many domains, such as social sciences, math, language arts, physics, biology, and logic (Wilhelm I:1990). The question of how effective educational games (including electronic educational games) are has led to many discussions regarding whether and how these games can assist traditional classroom instruction in order to help kids learn while they play in their leisure time. However, only few educational game designers claim that their games are really effective in education, and even fewer support these claims with results from formal empirical studies [10]. Children like learning with fun. Educational game is one of the way to give education to children. However their no study to made educational games to give visualization for children how to prevent children have healthy lifestyle so they are spared from diarrhoea. This research is to made educational game and focused to give knowledge about calorie's needed in the form of educational game.

### Literature Review

#### 2.1 Diarrheal

Diarrhoea and malnutrition are known to have a bi-directional relationship, that is, they are potentially causing each other. Diarrhoea may lead to malnutrition due to reduced dietary intake, mal-absorption and mal-digestion. On the other hand, malnutrition may cause and worsen diarrhoea and other infections due to a weakened immune system (Nel, 2010). It has been suggested that poor nutritional status is a risk factor of diarrhoea (Chowdhury et al., 1990; Chen et al., 1981; Schorling et al., 1990). A pooled analysis of nine cohort studies from different countries also indicated that a higher cumulative burden of diarrhoea prior to 24 months of life was associated with an increased prevalence of stunting at 24 months of age (Checkley et al. 2008).

The data suggest that malnutrition is associated with an increased risk of death from diarrhoea and that the risk varies by type of diarrhoea (Table 1). All of the community-based studies reported an increased risk of mortality from diarrhoea among children who had low weight for their age (10–15). A dose–response relation was reported in the studies from India (10, 11), the Philippines (15), and Sudan (13), where the child's weight for age was stratified into multiple categories. The study in the Philippines also included age-stratified data and reported that the highest risks of mortality from diarrhoea associated with malnutrition occurred among children aged 6–11 months. In the study in Sudan, the risk of mortality was inversely related to children's height for age and weight for height. A similar trend between malnutrition and an increased risk of mortality was observed in some, but not all, of the hospital-based studies (16–31). These studies examined a range of outcomes, including deaths from isolated diarrhoea, from non-bloody diarrhoea, and from dysentery. Eleven of the 16 studies were conducted in Bangladesh, India, or Pakistan. Most reported malnutrition using a dichotomous classification of the percentage of the median weight for age or weight for height. Estimates of risk varied with one of the highest point estimates (an odds ratio of 8.9) reported in the case–control study of deaths from dysentery in Bangladesh (26).

Table 1. Effectiveness of specific interventions against risks of diarrheic diseases (Curtis & Cairncross 2003)

Intervention	Reduction in diarrhoeal risk (%)
Hand washing with soap	47
Sanitation	36
Hygiene promotion	35
Improve water quantity	20
Improve water quality	16

#### 2.1 Calories Needed For Children

Children aged 7-10 years old need lots of energy and nutrients because they're still growing. The amount of energy that food and drink contains is measured in both kilojoules (kJ) and kilocalories (kcal) and is commonly referred to as calories.

A healthy balanced diet for children aged 7-10 should include:

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- at least five portions of a variety of fruit and vegetables every day
- meals based on starchy foods, such as potatoes, bread, pasta and rice (choose wholegrain varieties when possible)
- some milk and dairy products (choose low-fat options where you can)
- some foods that are good sources of protein, such as meat, fish, eggs, beans and lentils

School-age children need about 1,600 to 2,500 calories per day. Children between the ages of 5 and 6 need 41 calories per pound of body weight, and those between 7 and 11 need 32 calories per pound. Don't worry too much about your child not eating enough, since children this age usually eat when they are hungry. Serve healthy foods and encourage your child not to eat too many calories if they start to gain extra weight.

Table 2. Calories Needed Each Day for Boys and Man (Curtis & Cairncross 2003)

Age	Not Active	Somewhat Active	Very Active
2–3 years	1,000–1,200 calories	1,000–1,400 calories	1,000–1,400 calories
4–8 years	1,200–1,400 calories	1,400–1,600 calories	1,600–2,000 calories
9–13 years	1,600–2,000 calories	1,800–2,200 calories	2,000–2,600 calories
14–18 years	2,000–2,400 calories	2,400–2,800 calories	2,800–3,200 calories
19–30 years	2,400–2,600 calories	2,600–2,800 calories	3,000 calories
31–50 years	2,200–2,400 calories	2,400–2,600 calories	2,800–3,000 calories
51 years and older	2,000–2,200 calories	2,200–2,400 calories	2,400–2,800 calories

Table 3. Calories Needed Each Day for Girls and Women (Curtis & Cairncross 2003)

Age	Not Active	Somewhat Active	Very Active
2–3 years	1,000 calories	1,000–1,200 calories	1,000–1,400 calories
4–8 years	1,200–1,400 calories	1,400–1,600 calories	1,400–1,800 calories
9–13 years	1,400–1,600 calories	1,600–2,000 calories	1,800–2,200 calories
14–18 years	1,800 calories	2,000 calories	2,400 calories
19–30 years	1,800–2,000 calories	2,000–2,200 calories	2,400 calories
31–50 years	1,800 calories	2,000 calories	2,200 calories
51 years and older	1,600 calories	1,800 calories	2,000–2,200 calories

### 2.2 Educational Game (eduGame)

Contemporary approaches to game-based learning consider the matching of learning content and game genres, the learning principles that games incorporate, the design of educational games and simulations, the effectiveness, sources, and institutional usage of games, and the design of meaningful play in games. However, these approaches have predominantly focused on the schools, higher education, corporate, and military sectors. The design and pedagogy of games for early childhood presents unique challenges not relevant to other sectors. The predominant and overarching challenge being the developmental level of learners in this age group. The developmental level of learners impacts both the pedagogical approaches that can be used as well as the learning tasks that can reasonably be presented. When considering developmental levels it is important to consider both the innate variability of development between individuals, and also the multiple types of development including cognitive, psychomotor, emotional/social, and psychosexual. To further compound this challenge the types of development can have strong interdependencies such as where psychomotor development can impact social and cognitive development, e.g. muscle development affecting speech and consequent social engagement.

The distinction between play and games is indicated below in Figure 2 whereby games are a form of play with rules. Of the many definitions of what a game is, that offered by below covers the key constituents of conflict, rules, and goals. “A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.”

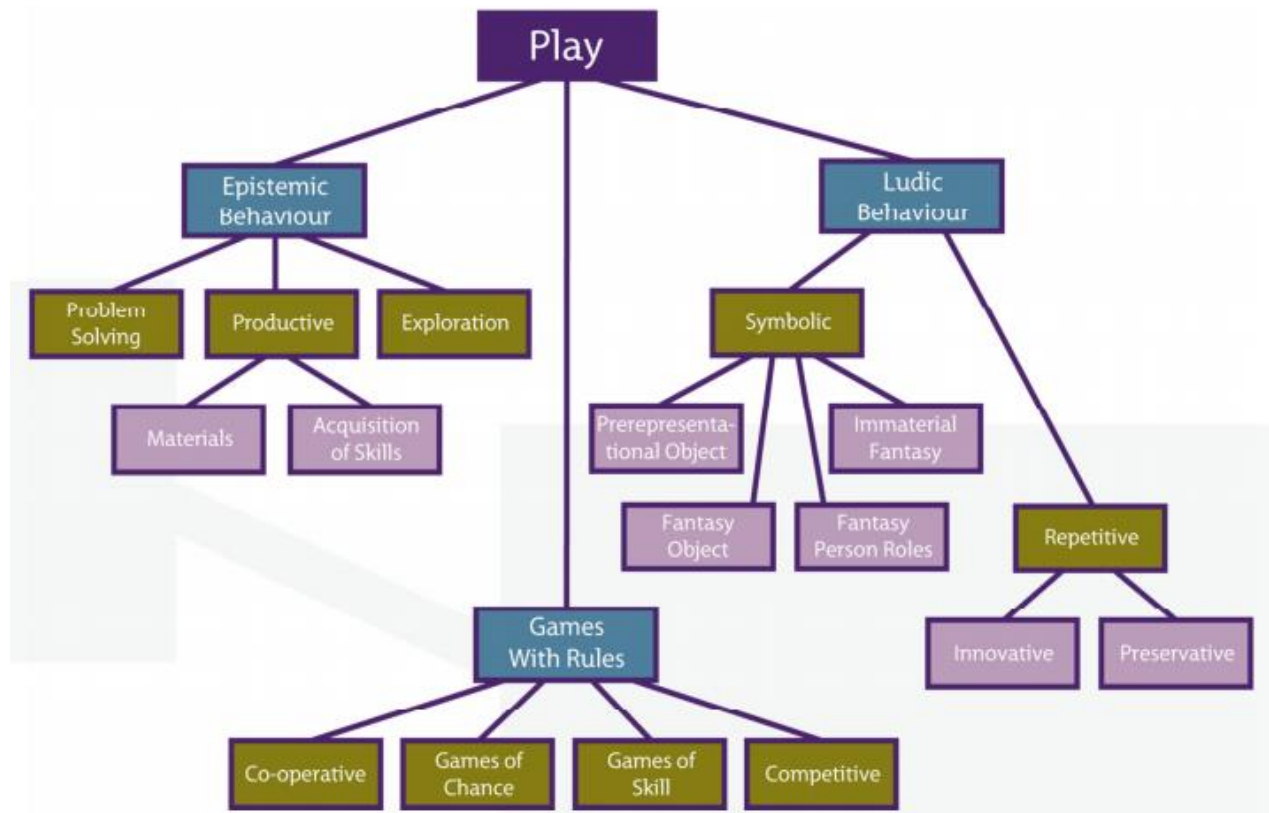


Figure 1. Proposed Taxonomy of Children's Play (Salen, 2003)

Although the definition of a game is clear, how the conflict, rules, and goals are manifested to leverage the benefits of play, are not. Play in early childhood is known to perform an important role in learning. It is significant in cognitive, psychomotor, emotional, social, and psychosexual development, as is considered in the following sections. However, the transition of these play benefits to digital game-based learning presents questions as to the content areas addressed, appropriate gaming strategies employed, and the underpinning pedagogies applied. In the following sections these questions are addressed with particular reference to the impact of developmental level on the pedagogy and design of educational games.

### 3. Research Method

Most foods and drinks contain calories. Some foods, such as lettuce, contain few calories (1 cup of shredded lettuce Consuming a healthy diet throughout the life course helps prevent malnutrition in all its forms as well as a range of no communicable diseases and conditions. But the increased production of processed food, rapid urbanization and changing lifestyles have led to a shift in dietary patterns. People are now consuming more foods high in energy, fats, free sugars or salt/sodium, and many do not eat enough fruit, vegetables and dietary fibre such as whole grains has less than 10 calories). Other foods, like peanuts, contain a lot of calories (½ cup of peanuts has 427 calories). Estimated amounts of calories needed to maintain energy balance for various gender and age groups at three different levels of physical activity. The estimates are rounded to the nearest 200 calories and were determined using the Institute of Medicine equation, as seen in Table 3.

Table 3. Calories Needed For Children

Age	Weight (kg)	Height (cm)	Calories Need (gr)
0-6 months	6,0	60	10
7-11 months	8,5	71	16
1-3 years	12,0	90	25
4-6 years	17,0	110	39
7-9 years	25,0	120	45

Cycling is the third most popular recreational activity in the world. An estimated 3.1 million people ride a bicycle each month. As a form of exercise, cycling has broad appeal. Toddlers, pensioners, the able-bodied or people with disabilities can all enjoy cycling if they have the right equipment. Read our guide to cycling for beginners, which includes tips on staying motivated. Cycling is one of the easiest ways to fit exercise into your daily routine because it's also a form of transport. It saves you money, gets you fit and is good for the environment. It's a low-impact type of exercise, so it's easier on your joints than running or other high-impact aerobic activities. But it still helps you get into shape. For example, someone who weighs 80kg (12st 9lb) will burn more than 650 calories with an hour's riding, and tone their legs and bottom. If you ride up hills or off-road, you'll also work your upper body. The best way to build your cardiovascular fitness on the bike is to ride for at least 150 minutes every week. This research choose cycling to give visualization about calories needed for children as seen in Figure 2.

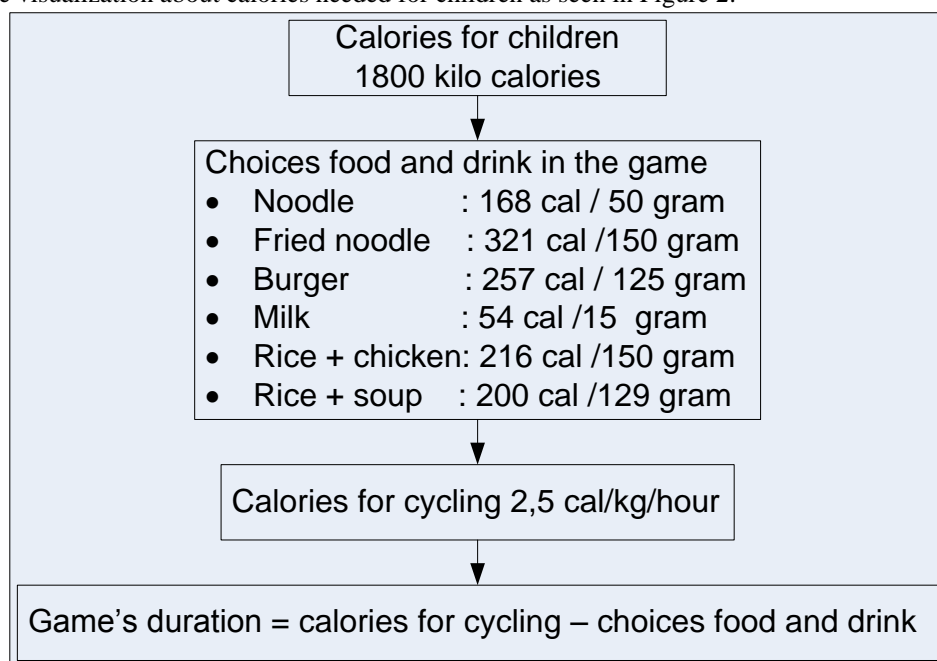


Figure 2. Research Method

### Discussion

This section discuss the implementation of educational game. Figure 3 shows the child as players can choose foods and drinks that appear on the screen monitori when they play. The child can press the space bar to move the characters begin play. Food and beverage options that exist in the game is noodles, rice, fried chicken, vegetables. If children choose healthy foods that children get a high-calorie protein. But if children choose unhealthy foods or fast then the game will not last long, this is because the fast food choices have a low protein.



Figure 3. Cycling Game

Figure 4 shows the child can finish the game well. This can happen if players choose nutritious foods and beverages or high protein. The duration of the game adjusted to the maximum distance that can be performed by children aged 7-8 years, which is 5 kilometres and visualized in this game as the length of the game is 10 minutes, with 2 minutes long game equivalent to 2 kilometres distance of cycling.



Figure 4. Finish the Game

## **Conclusion**

This research has conclusion:

- The number of calories needed for cycling children was 2.5 calories / kg / hour.
- Mileage maximum of 7-8 years old children riding a bike is a maximum of 5 kilometers, and in this game is visualized with an old game for 10 minutes indicating 2 minutes to 1 kilometer.
- The game can provide visualization on calorie needs required for children, where children can choose a selection of food and drinks provided. Every food and beverages provided always adds to the needs of calories needed by children to continue cycling.

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