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DNS FILTERING: A CLEAN AND POSITIVE INTERNET ENVIRONMENT IN UIN AR-RANIRY BANDA ACEH

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Abstract

The rapid IT development has brought us to the different level of an era; information openness. The information is now easily accessed through the internet. It is believed that the internet comes with many things that benefited human life. Despite its advantages, the internet also will bring problems if it is improperly used. To cope with the problems, it is important to create a safe, clean, and positive internet environment. A positive internet program, initiated by Kemkominfo Indonesia, is actively distributed to achieve this goal. We observed whether this program is feasible to be applied in a university. Our experiment object is students in UIN Ar-Raniry Banda Aceh. We found that most of the students, about more than 90%, believe that a positive internet environment is important to be implemented. Moreover, a positive internet environment also will give positive impact to their personality and behavior. To realize the implementation, we have compared DNS filtering products which are able to block negative-content websites. Form our experiments, we recommend that the university apply DNS Nawala because it performs better by blocking more than 40% tested negative websites, compared to the other tested DNS products. So regarding the opinion of the students, DNS Nawala is feasible to be implemented to realize a clean, safe, and positive internet environment.

Keywords: *DNS Filtering, Positive Internet, web filtering.*

1. Introduction

Nowadays, the internet has changed the paradigm of our life. The advancement of this kind of technology development which is accessed by a broad range of users (young to adults) has affected the way of our life; such as the way we live and the way we work. Moreover, internet, which contains positive and negative contents, can be accessed easily without limit. This negative contents such as porn, gambling, fraud, fake news, etc. will bring negative impacts to the users Meena Kumari Rajani and M. S. Chandio, "Use of Internet and its effects on our Society", National Conference on Emerging Technologies, 2004.

To prevent the negative effects of those negative contents, it is important to understand the basic principle of the use of the internet; cyber ethics. It is also supported by the government of Indonesia by initiating some positive internet programs; such as INSAN (Internet Sehat dan Aman) and TRUST Positif (regulations to maintain internet contents). Based on the traffic filtering data using DNS Nawala network, it is about 1 million access to negative-content websites which is blocked in Indonesia daily [12]. This phenomenon has led the government of Indonesia, represented by Ministry of Communication and Information Technology Indonesia (Kemkominfo), to manage the website content through "Peraturan Menteri Komunikasi dan Informatika Republik Indonesia Nomor 19 Tahun 2014 Pasal 8 Ayat (1)". Hence, this regulation can prevent the negative impact of the internet [13].

To realize the Positive Internet Program in Indonesia, Kemkominfo actively keeps blocking negative contents by applying DNS filtering. DNS filtering also can be applied by

internet users to block unwanted websites so that hopefully it can reduce the negative impacts of negative contents of the internet. Finally, the aim of Kemkominfo to achieve the positive internet in Indonesia can be realized.

Based on the mentioned problem, we will observe and provide some information about the positive internet. In addition, we try to propose some solutions to cope with this problem. Our research was conducted in UIN Ar-Raniry Banda Aceh. University students are one of the biggest internet users. Commonly, the students actively use internet for some activities; browsing course materials, social networking, finding other information, etc. Beside those positive benefits for students, it is also essential to prevent the negative influences of the internet. Hence, the goal of our research is to provide information and solution about how to access the internet safely and positively for students of UIN Ar-Raniry Banda Aceh.

The subject of our research is the student of Fakultas Tarbiyah dan Keguruan UIN Ar-Raniry Banda Aceh. We use a questionnaire to collect student's opinion about the positive internet, compare some DNS filtering products, and finally propose solution how to choose the suitable DNS filtering.

Based on our explanation above, the problem statements include:

1. Which negative-content website that cannot be filtered by DNS filtering?
2. The readiness of the students to apply DNS filtering?
3. The problem which may be faced in accessing the internet using DNS filtering?

Based on above problem statements, the purposes of our research are:

1. To find out which websites are categorized as a negative-content website.
2. To find out the comparison among DNS filtering products.
3. To understand whether it is important or not to apply DNS filtering for university students.
4. To discover the problem may appear in using DNS filtering.

The contributions of this research are:

1. Help to reduce negative-content websites access.
2. Compare the most benefited DNS filtering product.
3. Recommend the use of DNS filtering to achieve positive internet environment.

2. Related Work

Many research has been conducted to find out the impact of the advancement of the technology development. Besides its positive advantages, we must consider and prevent the negative impacts may occur. Haryani M. [4] in his research found that the children who easily access porn tend to repeatedly access it. This negative content may affect the concentration of the student, and it may affect their grade. Moreover, porn-addicted also may affect student behavior.

On another research, Syed Shah Alam [2] is more focus on internet addiction in young adults. He has identified that adults who excessively use internet tend to have some problems. Meanwhile, young adults believe that internet can improve themselves to help their academic and work life. However, the internet addiction on young adults will lead to serious problems for their mental and physical health.

Meanwhile, Kumari M [1], in his research he observed the effects of the use of internet in more general perspective. He considers both positive and negative influences of the internet. He stated that it is important to understand the basic impact of IT development to gather benefit that will yield a healthy society. It is cannot be avoided that the development largely affects our life. His research is more focus the effect of the use of the internet to our society.

3. Basic Theory

Internet Definition

In general, the internet means a group of computers connected by a wired or wireless connection to transmit and receive information using TCP/IP protocol. According to the experts, Onno W. Purbo [8] explained that the internet including its applications is basically a medium to make communication process more efficient.

The positive internet is a program initiated by ICT Watch in 2002. It is a term of not to access negative content from the internet. The goal is how to use the internet without violating cyber regulation according to user's necessity; based on age, profession, and interest. It is also can be said that the positive internet program does not only block negative contents but it also enhances positive contents [13].

DNS Definition

DNS (Domain Name System) is a distributed database system to store the information of hostname and domain name in the network. DNS functions to identify each computer as a node in the computer network using internet protocol (IP) address to translate hostname domain to IP address, and vice versa [14]. The mechanism of DNS system is explained in Figure 1 below.

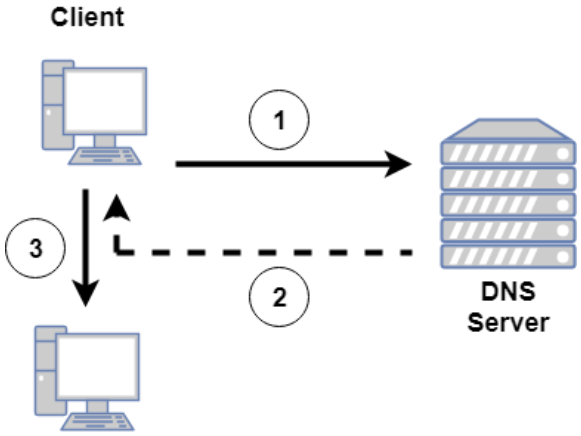

Figure 1. DNS Mechanism

The mechanism of DNS system can be explained as follows [14]:

1. DNS resolver/client sends a request to Name Servers in queries.
2. Name Servers processes the request in following: check requested domain if the IP address host is found in the DNS local database, and also communicate with other Name Servers to search the request initiated by resolver before.

3. If no Name Servers found, Name Servers responds an error message to the resolver. But if it is found, the resolver can communicate with destination host using IP address which has been translated by Name Servers

In addition, DNS filtering is a DNS to filter addresses from a host. *Whitelist* system, a web filtering developed by the Government of Indonesia (Kemkominfo), stores the information of host or domain name in a database. Until June 2016, containing *positive list* data in the *whitelist* system is not less than 189.900 domain names. In a research paper by Suryaningrum [10], she implemented a blocking system which blocks porn using DNS Nawala and *Squid*. DNS Nawala is used as Name Server. Using this configuration, if a client attempts to access porn websites, they will be blocked by DNS Nawala. On the other hand, *squid* is used to block the websites which contain unwanted words specified by the administrator. If a website contains those words, the website will be automatically blocked [9].

Based on those explanations, the advantages of using DNS filtering are:

1. To reduce accessing negative-content websites
2. To exploit the internet wisely and positively
3. To reduce negative impacts of using internet
4. To provide positive internet environment

4. Research Method

In this research, we applied both questionnaire and comparison methods. We compared some DNS filtering products; DNS Nawala, Open DNS, and Norton DNS to find out the filtering accuracy among them. Prior to this, we observed some students from both of the Department of Mathematics Education and the Department of Electrical Engineering Education of UIN Ar-raniry Banda Aceh. The goal is to find out their understanding of a positive internet and the way to achieve it by using DNS filtering. The research was conducted in Fakultas Tarbiyah dan Keguruan UIN Ar-Raniry Banda Aceh from 6 to 14 June 2017.

Sample and Population

The population of this research is the students from both of the Department of Mathematics Education and the Department of Electrical Engineering Education. This questionnaire is used to find out their idea about the importance of using DNS filtering to realize positive internet environment. The sample of this research is 25 students each from both departments.

Data Collection Method

We distributed the questionnaire to our sample to gather their opinion related to positive internet, and we also collected several negative-content websites and negative contents which can be accessed using Google search engine. These negative contents are then used to test the filtering accuracy of DNS filtering products.

Research Instrument

a. The questionnaire will cover:
    1. The knowledge about the positive internet.

2. The experience of using the positive internet.
3. The benefits of accessing the positive internet.
4. The implementation of the positive internet.

b. DNS filtering products comparison: positive internet and filtering negative-content websites.

5. Evaluation and Discussion

Student opinions on Positive Internet Programs

The evaluation of our research was done by using two methods mentioned before. The questionnaire is used to find out the opinion of our sample. The comparison of DNS filtering products is used to choose which DNS filtering is the most suitable to be applied in a university.

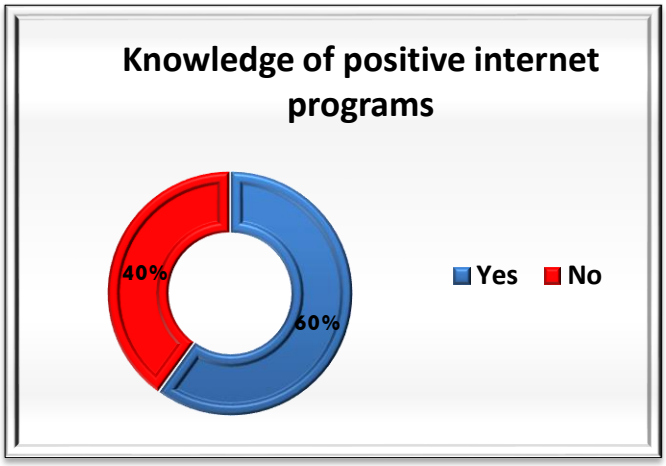

Figure 2. Knowledge of positive internet programs

Figure **2** shows that 30 students or 60% of the sample are familiar with positive internet programs launched by Kemkominfo. We can see that the majority of the sample students have known about internet positive. Although the result is considerably good, it still needs more effort to spread the message of the positive internet, especially in the university.

Afterward, we observed their opinion about the implementation of the positive internet. In this experiment, we asked them the importance of implementing positive internet programs whether it is beneficial or not. The result shows that 82% or 41 students agree that the programs will give benefits, meanwhile the rest of the sample still do not know the benefits of the programs. The result can be seen in Figure 3 below.

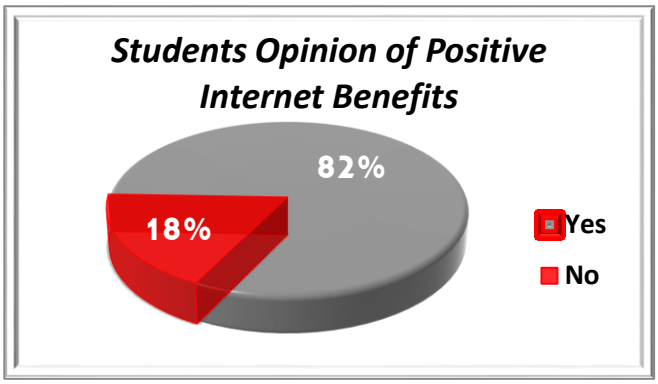

Figure 3. Student Opinion of Positive Internet Benefits

Our next experiment tries to find out the number of students who use internet positively and safely. The result shows that about 41 students or 82% of the sample access internet positively, meanwhile 14% or 7 students 2 of the sample students rarely apply positive internet, and 2 students never apply positive internet. Form this result we can conclude that most of the students understand the importance of the positive internet. Accessing internet positively will bring positive impacts for their personal. The result can be seen from Figure 4 below.

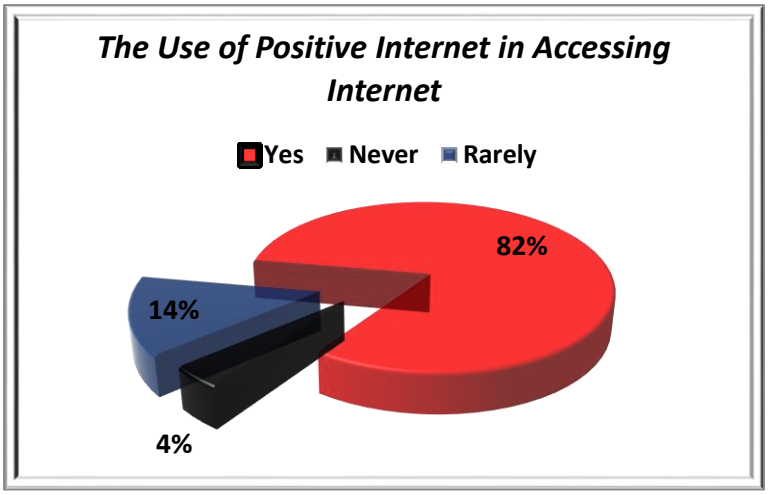

Figure 4. The Use of Positive Internet in Accessing Internet

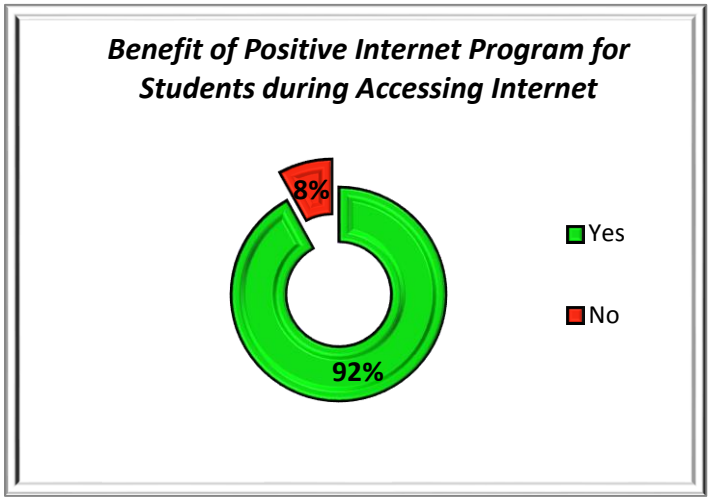

Figure 5. Benefits of Positive Internet Program for Students

Figure 5 above depicts the student's opinion on the implementation of positive internet programs, especially for university students. 46 students or 92% of the sample the students agree that the implementation of positive internet programs will benefit themselves, while 8% of the sample students still do not agree or doubt that the programs will give positive feedback. Although a small number of students respond negatively, the majority of the students still believe that the programs are positive and beneficial for internet users especially for them as a student.

Finally, the final observation sums up their opinions about the implementation of positive internet programs whether they agree or not. the result is shown in Figure 6 below.

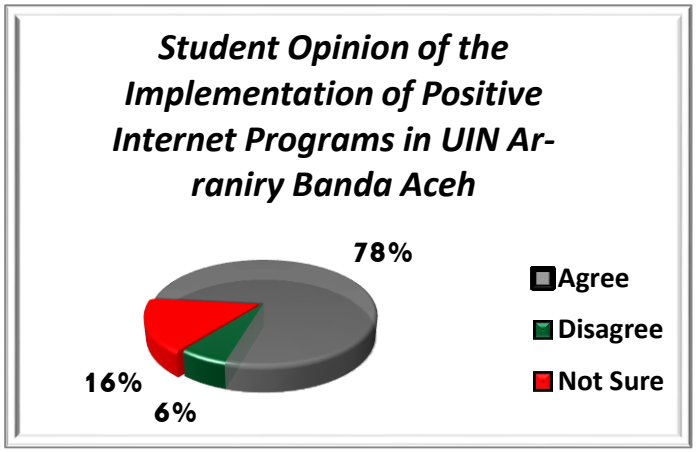

Figure 6. Student Opinion of the Implementation of Positive Internet Programs in UIN Ar-raniry Banda Aceh

From Figure 6 we can conclude that the majority of the students fully support the implementation of positive internet programs in the university. About 39 students or 78% agree the programs be applied. Although some students are still unsure and disagree about the programs, we think that the programs are worth to be applied because it will realize a clean and positive internet environment.

DNS Filtering Products Comparison

We chose 3 DNS filtering products to be compared: DNS Nawala, OpenDNS, and NortonDNS. These DNS filtering products are able to block unwanted contents and websites depend on our requirements. To test our experiment, we have collected 50 negative-content websites. We have 3 experiments: each for every tested DNS filtering products. Then we accessed those 50 negative websites to find out the most accurate DNS filtering. The result of our experiments is represented in Figure 7 below.

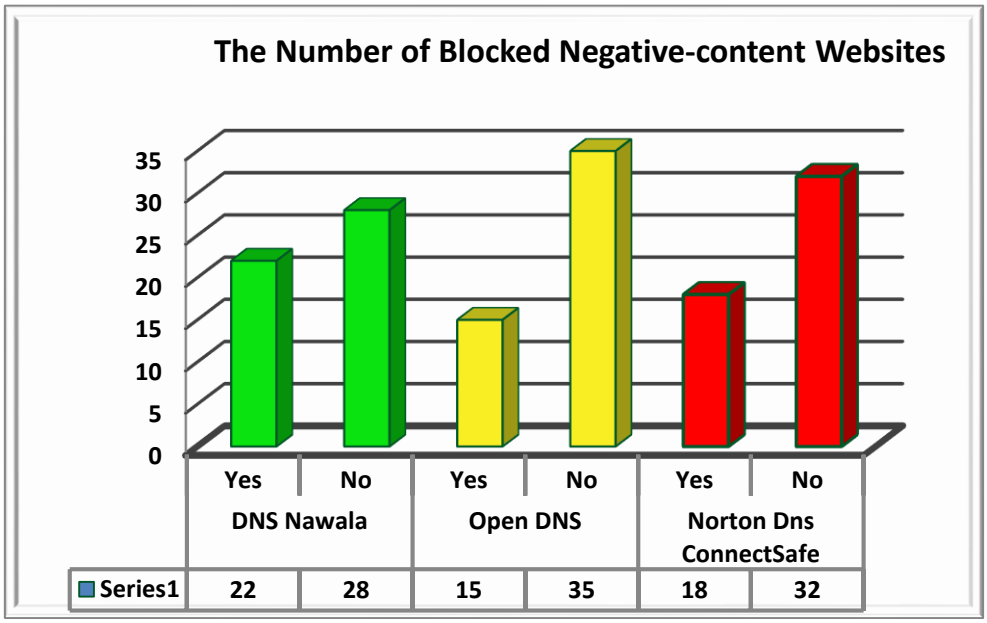

Figure 7. The Number of Blocked Negative-content Websites

Figure 7 depicts the ability of each DNS filtering products to block unwanted websites. As we predicted before, it shows that DNS Nawala performed better than two other products. DNS Nawala is able to filter more than 40% unwanted websites, while the others are below than 40% tested websites. So we can conclude that DNS Nawala is the most suitable DNS filtering product to be used especially in Indonesia. It can be understood because DNS Nawala is developed in Indonesia and contains more accurate data list definition than the other two.

Based on the results of both questionnaire and experiments, we conclude that it is essential the positive internet programs be applied in the university especially in Universitas Islam Negeri Ar-raniry Banda Aceh. We recommend using DNS Nawala

developed and initiated by Kemkominfo to realize safe, clean, and positive internet environment in Indonesia.

6. Conclusion and Future Work

Conclusion

The internet has become one of the most important things in our life. We can hardly do our activity without internet. Internet now is also easy to be reached by many people, in a broad range of age, from young to adult. Besides its positive impacts on our life, we also must be aware that internet also may bring disadvantages if we do not use it properly. Many negative contents can be found easily on the internet. So it is our duty to create a clean and positive internet environment. This concern has led Kemkominfo to build and launch positive internet programs.

In consequence, we try to observe whether positive internet programs is important or not to be applied in a university. Based on our observation, we found that the majority of the sample students in UIN Ar-Raniry Banda Aceh, about more than 90%, believe that positive internet program will give them benefit to support their internet activity. Further, a clean and positive internet program will positively contribute to their personality. In addition, we compared some DNS filtering products and recommend to apply DNS Nawala to block negative-content websites. DNS Nawala contains more accurate data list definition to block unwanted websites, so we think that DNS Nawala is feasible to be applied to support the realization of a clean, safe, and positive internet environment in Indonesia.

Future Works

This research still can be improved, the sample can be added to confirm the validation. In addition, comparing more DNS filtering products also can be done to choose the most appropriate and feasible one to be applied.

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