

A CSE STUDY OF DEVELOPMENT OF SOCIAL NETWORK APPLICATION USING FIREBASE AND REACT NATIVE

Tran The Long, Bui Hai Phong, Nguyen Minh Ngoc*

Hanoi Architectural University, Hanoi, Vietnam

**Email address: phongbh@hau.edu.vn*

DOI: 10.51453/2354-1431/2023/967

Article info

Received: 10/12/2022

Revised: 15/03/2023

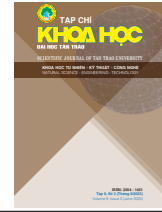
Accepted: 16/5/2023

Keywords:

*Firebase, React Native,
Social Network.*

Abstract:

In recent years, with the emergence of Information and Communications technologies, internet and social networking applications are considered to have the potential ability to access news and information. The applications support people to solve many different issues regardless of space and time. Social networking applications are a very powerful to collect and share information of many people. The application allows people to put news, thoughts, ideas, and images anywhere, at any time. React Native is a framework which is becoming increasingly popular. Thousands of applications were developed using React Native (e.g. Facebook, AirBnB, Uber). Many information technology organizations have developed their platforms by using React Native. Firebase is a Google-owned platform for developing mobile applications and websites. The database consists of simple APIs and powerful networks and without using backend or server. Firebase allows developers to save deployment time and efforts to develop applications. The paper presents the development of the social networking application using the React Native and Fire base that supports users (especially for students) to collect, share information in the study efficiently.



PHÁT TRIỂN ỨNG DỤNG MẠNG XÃ HỘI DỰA TRÊN CÁC KỸ THUẬT FIREBASE VÀ REACT NATIVE

Trần Thế Long, Bùi Hải Phong*, Nguyễn Minh Ngọc

Đại học Kiến trúc Hà Nội, Hà Nội, Việt Nam

*Địa chỉ email: phongbh@hau.edu.vn

DOI: 10.51453/2354-1431/2023/967

Thông tin bài viết	Tóm tắt
<p>Ngày nhận bài: 10/12/2022</p> <p>Ngày sửa bài: 15/03/2023</p> <p>Ngày duyệt đăng: 16/5/2023</p> <p>Từ khóa:</p> <p>Firestore, React Native, Mạng xã hội</p>	<p>Cùng với sự phát triển nhanh chóng của công nghệ thông tin và truyền thông, mạng, các trang mạng xã hội được đánh giá là có tiềm năng tiếp cận tin tức và thông tin, kết nối các mọi người trên internet với nhiều mục đích khác nhau không phân biệt không gian và thời gian. Mạng xã hội là công cụ tạo ra một “thế hệ thông tin toàn cầu” có khả năng chưa từng có để tạo lập, sản xuất, chia sẻ và tham gia vào những gì đang diễn ra của cuộc sống. Mạng lưới toàn cầu cho phép con người đưa tin tức, suy nghĩ, ý tưởng và hình ảnh đi bất cứ đâu, vào bất kỳ thời điểm nào. React Native là một framework đang dần trở nên phổ biến. Hàng nghìn ứng dụng được tạo ra có dính dáng đến React native. Những cái tên lớn như Facebook, AirBnB, Uber và nhiều công ty khác cũng đã chọn React native để xây dựng ứng dụng của họ. Firebase là một nền tảng sở hữu bởi Google để phát triển ứng dụng di động và trang web, bao gồm các API đơn giản và mạng mẽ và không cần backend hay server. Firebase còn giúp các lập trình viên rút ngắn thời gian triển khai và mở rộng quy mô của ứng dụng mà họ đang phát triển. Bài báo này trình bày ứng dụng công nghệ React Native và Firebase để phát triển ứng dụng chia sẻ thông tin cho người dùng (hướng tới người dùng là sinh viên các trường đại học) ứng dụng mạng xã hội chạy trên nền tảng thiết bị di động một cách hiệu quả.</p>

1. Introduction

Social networks have been used for long time ago. But until 2004, when Facebook was born, the Vietnamese community participated in a popular way. The survey found that 61.8% of respondents had joined at least one social network. 23.1% joined 2 social networks and 15.1% were members of at least 3 social networks. The most cases involved up to 8 online social networks. Among them, Facebook is the online social

networking site with the largest number of participants, followed by Zingme, Google Plus. 98.2% have been using Facebook, nearly 1/3 (32.0%) use Zingme and 18.2% use Google plus. Other online social networking sites such as Myspace, Yume, Tamtay, Go.. has not been used much by young people (as shown in Figure 1). This figure is quite similar to the results of several other studies related to social networks: according to Business Insider, the membership of the worldwide Facebook network increases significantly each year,

(up to 1.35 million members registered per month); In Nguyen Thi Phuong Cham’s research [2], the two Facebook and Zingme pages are used most often by young people aged 16 to 30, 76.1% use Facebook and 44.9% use Zingme; According to a survey by Cimigo Netcitizens [3], in 2010, 67% of Vietnamese users used Facebook and 19% used Zingme, which are also the two most used social networking sites.

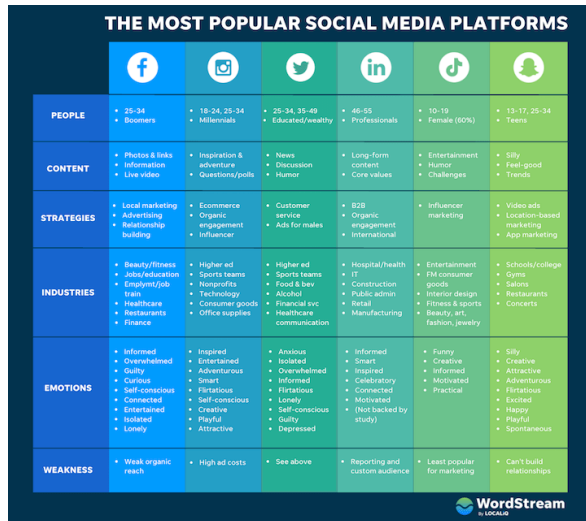


Figure 1: Survey of popular social media platforms

Table 1: Average total access time in 1 day on holidays and normal day in the last 12 months (unit:%) according to documents

Using time (minutes)	Normal days	Holidays
0-60	49,6	43,2
61-120	22,4	15,7
121-180	9,8	13,6
181-240	5,8	8,2
More than 240	12,4	19,3
Total (%)	100,0	100,0

The most frequent use of SOCIAL MEDIA is at home, with the majority of respondents (85.8%). Nowadays, as people’s economic conditions are getting better and the cost of owning equipment such as computers and phones tends to be lower and lower, getting a new means of communication integrated with the internet is not a problem. Therefore, the use of the internet in general and SOCIAL MEDIA in particular moving from an agent/internet store space to a private home space seems inevitable. Only 10.2% of young people access SOCIAL MEDIA at an internet dealer/ store (the lowest of the spaces used by young people).

With the development of information technology and new media, combined with internet applications, it is only necessary to have a medium such as a smartphone, or other small portable media such as Ipad, laptop.. plus an internet connection, one can access the online SOCIAL NETWORK anywhere at all times. And in fact, 43.2% have ever accessed SOCIAL MEDIA anywhere. The number of visits to SOCIAL MEDIA at school and at work also accounted for a significant proportion, at 19.0% and 33.2%, respectively.

Young people go to SOCIAL MEDIA regularly. Of the respondents, 76.4% visited SOCIAL MEDIA on a daily basis, and 21.2% visited a week. The remaining access SOCIAL MEDIA online for less than 1-3 times a month. For young people, not only is the frequency of accessing SOCIAL MEDIA quite frequent, but the average access time per day and duration per visit is quite large. On average on weekdays, young people spend about 129 minutes accessing SOCIAL MEDIA, this time on holidays is 148 minutes; In terms of duration, each visit is about 36 minutes on weekdays and 40 minutes on holidays. Thus, if you do not count those who have regular access, on average, young people access SOCIAL NETWORKS 3-4 times a day (there is not much difference between holidays and weekdays). On weekdays, about half of young people spend less than 1 hour accessing SOCIAL NETWORKS. The rate of spending 2 hours on social media during the weekday is 22.4%, the number of 4 hours spent using SOCIAL NETWORKS is 12.4%. On holidays, the time spent accessing SOCIAL MEDIA is also significantly greater. The number of people who spent more than 4 hours was 19.3%, significantly higher than on weekdays (as shown in table1).

Less than 15 minutes of social media accession on normal days accounted for 40.5% among young people, 31.9% on holidays. In other timeframes of 15minutes or more, the number of visits on holidays was greater than on normal days. Research data also shows that the time each time on social media is mostly less than 1 hour. 7.6% of young people spend more than 1 hour on social media every time on normal days and 9.3% use social media for more than 1 hour on holidays. The recent use of SOCIAL MEDIA is a clear indication of the level of social media access among young people today. The average time spent last time among young people was 59 minutes, commonly 30 minutes of use. Of which, 29.2% have a usage time of less than 15 minutes, 31.1%

use between 16-30 minutes, 16.6% use with a time of 1 hour or more. Compared to the average time per use in the past one year, the time of use of the most recent visit of respondents is higher. This shows that, up to now, the time spent on social NETWORKS of young people is quite high and is tending to increase. However, several social networks require to pay or the networks display advertisements. Therefore, we attempt to develop a mobile social network named the Apollo social network to support students to use more conveniently. The React Native and Firebase technologies are selected to develop the mobile social network.

React Native is pre-written code (framework) developed by technology company Facebook. React Native developers are people who use these frameworks to develop systems and application platforms on operating systems such as iOS and Android. The most used programming language is Javascript.

Firebase is a cloud-based database service, accompanied by an extremely powerful server system of Google. The main function is to help users to simplify database operations. The aim is to increase the number of users and get more profits. In particular, it is also a versatile service and extremely good security. Firebase supports both Android and IOS platforms.

In the paper, the Apollo social network aims to support students collect, share information, images in an efficient way. Students are not required to pay fee and there is no advertisements compared to other social networks.

The goals of the Apollo social network are described as follows:

- Create an Internet-based system that allows users to effectively exchange and share information, beyond the limitations of space and time.
- Create an online identity template that serves the common public needs and values of the community.
- Enhance the role of each citizen in creating relationships and self-organizing around common interests in communities to promote the alignment of social organizations.

2. Introduction of React Native and Firebase

2.1. React Native

React Native was rated as one of the most popular frameworks (stack overflow survey in 2019).

Thanks to the huge community of users around the world, you can find support if you encounter bugs.

Developed by Facebook, React Native has quite stable performance.

- React Native code simplifies data processing.
- The application development team is not too big.
- Build the least native code application for many different operating systems.
- Better user experience compared to Hybrid applications.

React Native allows developers to reuse code while developing cross-platform applications. Specially, developers can reuse almost 80-90% of code instead of having to write and create separate applications for different platforms. This advantages help users to:

- Save time and reduce the development cost of an application.
- Make better use of human resources.
- Maintain less code, less bugs.
- The features in both platforms are similar.

However, in the process of using the developer also discovered some disadvantages:

- Requires Native code.
- Poor performance compared to Native App.
- Security is not really good due to using JavaScript. Due to the use of JavaScript, users will also be affected by the characteristics of JavaScript: easy to make mistakes, making it difficult to maintain later.
- Memory management.
- Customization is not really good in some modules.
- Not suitable for apps that need high computing power (hash, crypto, etc.)

2.2. Firebase

Firebase has been around for a while, it has really gained traction over the past few years after the popularity of Google Cloud Platform grew and several other Firebase services were introduced. It's no wonder that many programmers choose Firebase as the first platform to build apps for millions of users worldwide.

Firebase is a database service that operates on a cloud-based platform. Along with that is Google's extremely powerful server system. The main function is to help users program the application by simplifying operations with the database - simple API application programming interfaces. The goal is to increase the number of users and get more profit. In particular, it is also a versatile service and extremely good security.

Firebase supports both Android and IOS platforms. After using it, along with other user reviews, we have compiled 10 outstanding advantages of Firebase:

- Create an account and use it easily
- Fast growth rate
- Multiple services in one platform
- Powered by Google
- Focus on user interface development
- Firebase no servers
- Machine Learning
- Generate traffic
- Bug tracking
- Backup

However, in the process of using the developer also discovered some disadvantages:

- Not an open source
- User does not have access to the source code
- Firebase doesn't available in many countries
- Only works with NoSQL Databases
- Slow queries
- Not all Firebase services are free
- Firebase's quite expensive and the price is unstable
- Only runs on Google Cloud
- Lack of Dedicated Servers and Enterprise Contracts

3. Design the Apollo social network
3.1. Design the system database using the Firebase

Firebase is a suitable app development option that can help developers save time and reduce app marketing time.

Normally, every developer needs to have access to a server and host to create and maintain databases and backend services. Therefore, a backend developer and a frontend developer are required to build applications. However, this can often lead to errors and issues that can cause application crashes and increase development costs.

Through the use of Firebase and Firestore (<https://firebase.google.com/>), Frontend developers can manage, reducing the time it takes to complete all the work, and we have designed database tables to manipulate the Apollo data.

List of tables listed in (table 2)

Table 2: list of tables

TT	Table list	Description
1	Conversation	Saving Conversation details
2	Message	Saving messages details
3	History	Saving Search history details
4	Profile	Saving Profile information
5	FriendRequest	Saving Friend Request details
6	FriendInfo	Saving Friends information

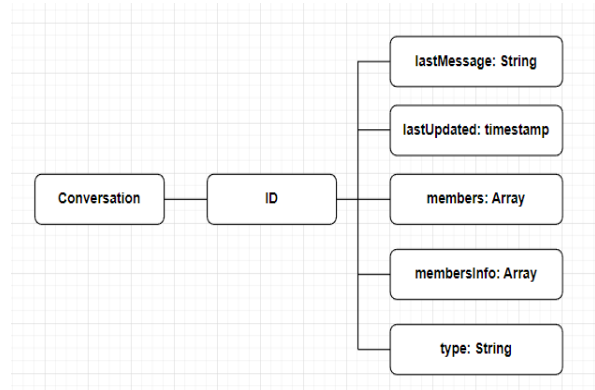


Figure 2: Conversation details

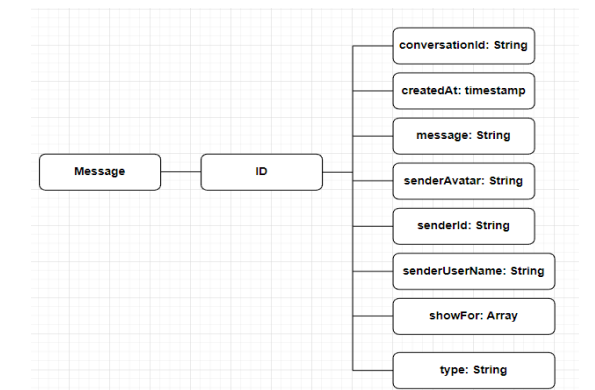


Figure 3: Message details

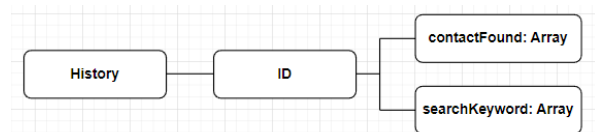


Figure 4: History details

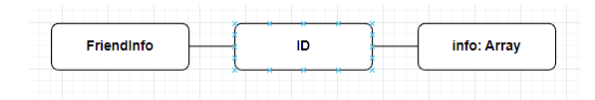


Figure 5: FriendInfo details

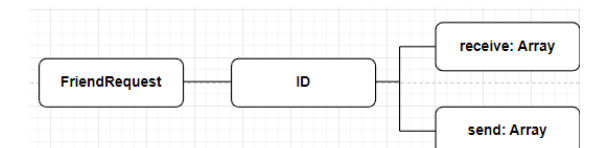


Figure 6: FriendRequest details

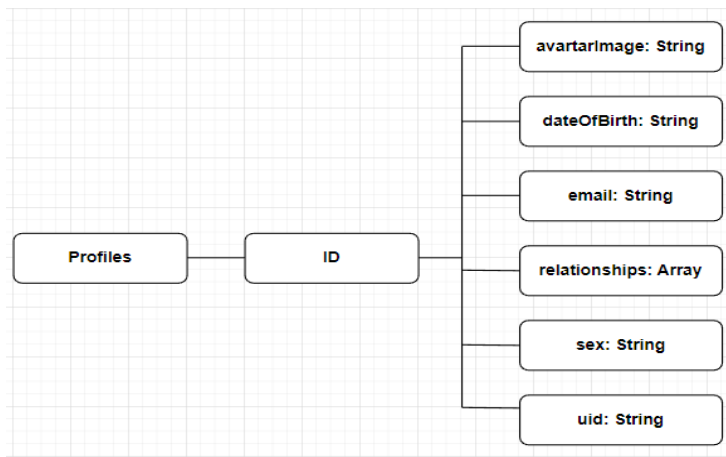


Figure 7: Profile information

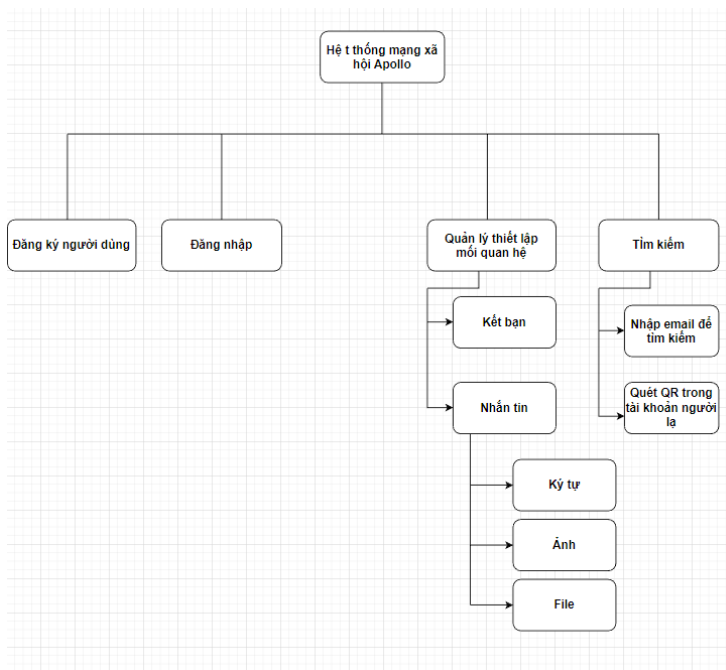
3.2. Functional design of the system

Within the scope of the article, we focus on sending messages and establishing relationships. Thus, the system will consist of two main agents, users and strangers.

When using registration and logging into the system, use the search function by email or can use

QR code scan (this is an indirect way of exchanging information of social networks

On the basis of analyzing the relationship establishment process and the functions of each stage in the relationship creation process, the proposed social network system functional model can be described by a functional hierarchy chart as follows:



List of features:

_Search feature: Makes it easy for users to find other user information to request features such as texting (in case you haven't made friends with strangers) or sending friend requests to become friends. In this function, the user can search by entering a stranger's email or scanning the QR Code in the other user's account.

_Make Friends feature: Makes it possible for users to establish relationships with other users. In this

function, after the user requests a friend (written with an accompanying message),

_Messaging feature: Allows users to send messages to strangers (if they haven't already) or send messages to friends. In this function, users can send messages to send files, send photos

To concretize the functions I would like to give some use-case diagrams of the above function decay along with some results of the app:

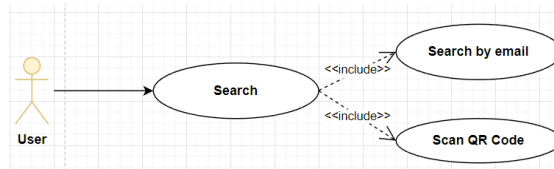


Figure 8: Use-case of Search feature

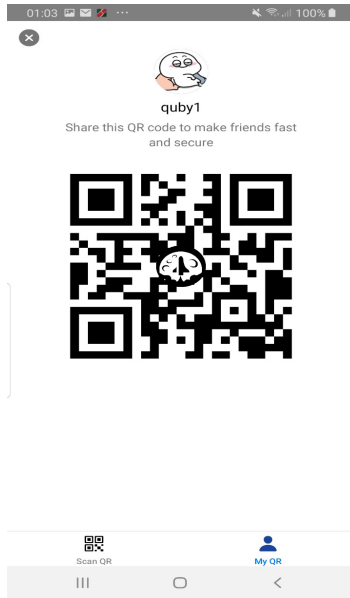


Figure 9: The screen contains User's QRCode



Figure 10: Screen use to scan QR Code

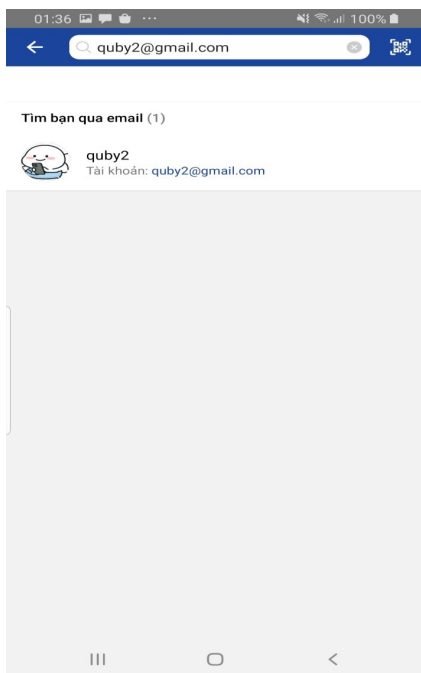


Figure 11: Screen use search by email

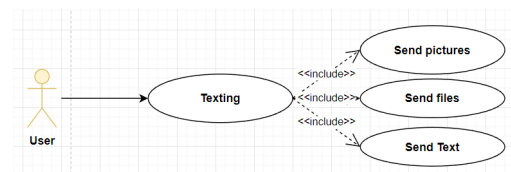


Figure 12: Use-case of Send Message feature

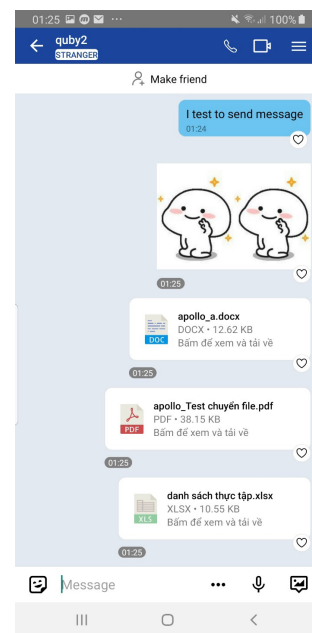


Figure 13: Screen use to send message

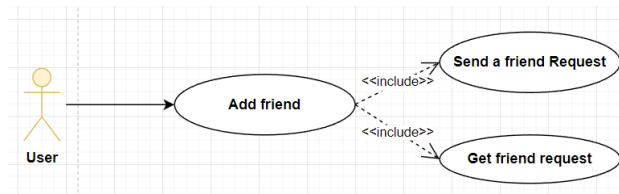


Figure 14: Use-case of Friend request feature

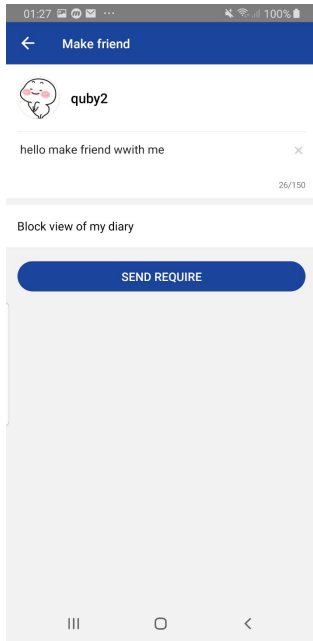


Figure 15: Screen use to send friend invitations + message

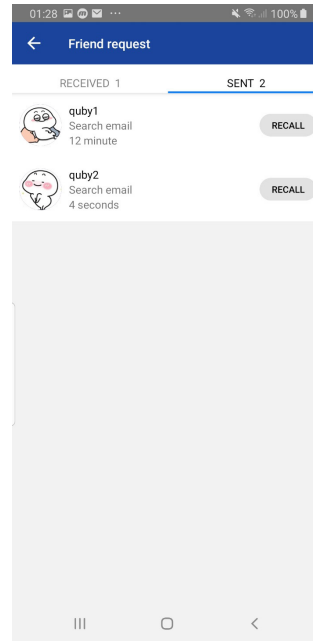


Figure 16: Screen use to show all sent friend request

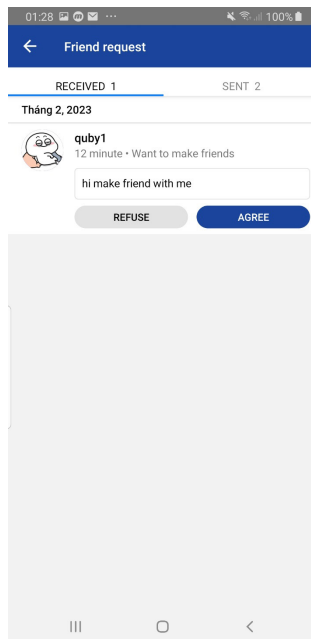


Figure 17: Screen use to show received request

4. Conclusions and future works

The results of the applications have made it possible to learn and know more about social networks and study the system processes of social networks. In addition, after learning Facebook’s React Native technology, we

can learn more about the new programming language created by Facebook and can study the social network of Vietnam ourselves. Theoretically, the study presented some basic features of the React Native framework in mobile design, which is one of the most popular

frameworks today in mobile application programming. In the future, the application will support the new functions such as: comments and blogs. Moreover, the security of the system will be improved in the future for end users.

References

[1] Trịnh Hòa Bình, Lê Thế Lĩnh (2015), “*Mạng xã hội trực tuyến của giới trẻ ở đô thị hiện nay*”, tạp chí xã hội học số 1 (129), tr52-59

[2] Boyd, D. (2007), *Why Youth (Heart) Social Network Sites: The Role of Networked Publics in Teenage Social Life*, MacArthur Foundation Series on Digital Learning -Youth, Identity, and Digital Media Volume (ed. David Buckingham), Cambridge, MA: MIT Press

[3] Hayes B (2008), “*Cloud computing*”, *Communications of the ACM*, 51(7):9–11

[4] Onur Isbulan (2012), “*A new addiction for teacher candidates: Social network*”, *The Turkish Online Journal of Educational Technology*, 11 (3), 14-19

[5] Klein, A. (2001), “*Les homepages, nouvelles écritures de soi, nouvelles lectures de l'autre*”, *Spirale Revue de Recherches en Éducation*, 28, 67-82

[6] Trần Hữu Luyến, Trần Thị Minh Đức, Bùi Thị Hồng Thái (2015), *Mạng xã hội với sinh viên*, Nxb. Đại học Quốc gia Hà Nội, Hà Nội.

[7] Kuss, DJ, Griffiths, M.D, (2011), “*Excessive online social networking: Can adolescents become addicted to Facebook?*”, *Education and Health* 29, Vol.29 No. 4, 68-71.

[8] Manago, A.A. and others (2007), *Self-Presentation and Gender Differences on the MySpace Network*, Department of Psychology, UCLA

[9] Sergerie, M-A., Lajoie, J. (2007), “*Internet: usage problématique et usage approprié*”, *Revue québécoise de psychologie*, 28(2), p.149 -159

[10] Valkenburg, P., Peters, J. (2007), “*Preadolescents' and Adolescents' Online Communication and Their Closeness to Friends*”, *Developmental Psychology* 43 (2), 267-77