

# A Study on the Adoption of SNS for Smart Learning in the 'Creative Activity'

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## Abstract

*'Creative Activity,' has the purpose of learner-centered, self-directed and interaction-based learning. As an education centered on various experiences and autonomous attitude, it is newly established in 'Revised Educational Curriculum 2009' and has been applied to elementary, middle and high school classes since 2011. The class goes through stages that learners themselves investigate a certain activity, participate in it, and carefully record the contents of the activity to submit or produce portfolio. This system, therefore, is designed for the characteristics of smart learning, in which learner-centered, self-directed, interaction-oriented and informal learning is possible. Also, it enables students to easily access learning information by using smart information technology, and constructs social network service in order to effectively support interaction between learners and learners, or learners and instructors. The system applies not only to 'Creative Activity' classes but also to various smart learning programs such as collaborative learning by providing with self-directed learning environment. Learners can boost their self-directed study plan and creativity through the 'Creative Activity' class, and we hope that they will increase academic achievement and become creative talents as they use the system.*

**Keywords:** Creative Activity, Smart Learning, SNS, Collaborative Learning

## 1. Introduction

Social changes amid the development of information and communication technology have brought about many changes to the education environment. To focus on diverse experience-centered education, 'the 2009 Revised Curriculum' has introduced 'Creative Activity' for the first time. The revised curriculum, therefore, seeks national unity and the polymorphism of regions, schools and individuals and increase the autonomy and creativity of students [1, 2]. The curriculum also helps students find what is the focus of a given question by themselves, make a decision by means of doing research on related fields, and sharpen their problem-solving skills and judgement [3, 4]. In particular, the 'Creative Activity' is designed for schools to develop well organized activities so that students can perform tasks of 'creative activity' in a self-directed manner [5, 6].

With the help of the development of information communication technology, Apps(applications) are available, which allows for collaborative learning online without constraints of time and space outside the classroom. Although we attempted to use various features of web like board and blog for education[7-8], the participation of students remained sluggish over time and there was no big influence on academic performance of students, as they were used in a one-way communication means to check teaching materials and submit

assignments[9, 10]. Afterwards, a variety of ways have been attempted to use Smartphones for education, but problems remain in terms of data building and interactivity due to the separate operation of Apps from web [11, 12].

After that, social network service (SNS) appears, and it can have interaction anytime and anywhere; by installing necessary application in smart phones, when users post something, then it can be recognized immediately without any connection to website, and its feedback is possible in real time. Allowing learners to solve problems through this real-time access, the system greatly contributes to students' interests and their academic achievement. In collaborative learning, particularly, SNS application was the most effective, and web boards or blogs do not work properly in the collaborative learning [13].

Therefore, In this paper has a smooth interaction with the characteristic of the smart learning by implementing the SNS. In addition, by using smart devices can perform anytime, anywhere activity.

The system has the following advantages for learning;

First, since the system is SNS-based (Social Network Service-based), students can exchange their opinions real-time, interact with the teacher more easily, and solve problems through immediate feedback and interaction, which results in improved problem-solving skills and advantages for group learning.

Second, SNS as one of the most popular services is widely used today. Accordingly, students can more easily adapt themselves to the system, which leads to enhanced interest in learning and academic performance.

Third, in an SNS-based system, all students become students and teachers at the same time, which helps reduce a sense of inferiority among students and ensures a higher level of academic performance.

Fourth, by integrating the SNS in the school system, this system allows for cooperative learning and suggests the effective model for interactive learning environment.

## 2. Related Studies

### 2.1. Creative Activity

As an extracurricular activity, 'creative activity' complements subjects and is designed to help students become a future-oriented creative and decent talent who puts into practice what they have learned, share things with and be kind to others. 'Creative activity' is in nature the autonomous group activity and reflects educational efforts to enhance individuality and creativity of group members. The 'creative activity' curriculum consists of four areas; voluntary activities, club activities, volunteer works and career development activities as in <Table 1> [1].

**Table 1. Overview of 'Creative Activities'**

Category	Characteristics	Activity
Voluntary Activities	The school promotes student-centered voluntary activities, and students actively participate in various educational activities.	<ul style="list-style-type: none"> <li>- Adaptation activity</li> <li>- Autonomous activity</li> <li>- Events</li> <li>- Creative special activity</li> </ul>

Club Activities	Students participate in group activities voluntarily to sharpen a cooperative mindset and develop their hobby and specialty.	<ul style="list-style-type: none"> <li>- Academic activity</li> <li>- Culture and art activity</li> <li>- Sports activity</li> <li>- Practice and elaboration activity</li> <li>- Youth club activity etc.</li> </ul>
Volunteer Works	Students do sharing and kindness activities for neighbors and the community and preserve natural environment.	<ul style="list-style-type: none"> <li>- On-campus volunteer work</li> <li>- Community volunteer work</li> <li>- Nature preservation work</li> <li>- Campaign work, etc.</li> </ul>
Career Development Activities	Students find and design their career path via self-development activities fit to their interest, specialty, and aptitude.	<ul style="list-style-type: none"> <li>- Self-understanding activity</li> <li>- Career Info search activity</li> <li>- Career planning activity, etc</li> <li>- Career experience activity etc.</li> </ul>

Activities by category may vary depending on characteristics of individual students, classes, grades, schools, and communities. Activity categories and specific activities presented above are for recommendation purposes only, and schools may choose more creative intensive curriculum than this. Therefore, schools are allowed to develop well-organized activities so as to help students do each 'creative activity' in a self-directed manner[14]. The developed SNS system aims to help this activity become student-oriented.

'Creative activity' does not make students increase grades as in academic subjects, but the activity is to grow their creativity and self-directed learning ability. By recording the contents of activities, it will play a large role in college entrance preparations and enhancing their aptitudes or hobbies. The comparison between the existing student record and 'Creative Activity' is demonstrated in <Table 2>.

**Table 2. Comparison between Student Record and 'Creative Activities'**

Category	Student Record	Creative Activities
Record the Subject	Teacher	Student
Record information	Coursework for students living in the center recorded results.	Records result of 'creative activities' outside of coursework.
Records management	Records of teacher-led and school unit administrative.	In the records management of students themselves record and teacher's supplement and approve their recording

The student record contains a student's school life mainly focused on coursework, whereas the 'Creative Activity' contains the results of creative activities beside coursework. In the record management of 'Creative Activity', students themselves record and teachers complement and approve their records, so it has characteristics of learner-centered and self-directed learning.

## 2.2. SNS(Social Network Service)

SNS has played a role in forming the concept of community in a virtual space beyond constraints of time and space as the Internet began to affect interactions of people in the concept of community, not individuals. People interact with others via email, real-time chats, board, online games and thereby build diverse human networks. As real communities such as local communities, workplace, family, friends, and clubs and virtual communities like Minihompy, clubs, blog, and cafe exist together, real communities began to be formed in a virtual space to communicate without constraints of time and space [15-16].

In web 2.0 services, the key word is ‘share’ with a focus on showing data, and SNS is designed to focus easier and more convenient sharing of data through relationships among people, and data is a media for communications among people[17]. Accordingly, if used for education, SNS is expected to create a collaborative environment that helps students relate themselves to others more intimately, exchange ideas, and give feedback, and thereby strengthen their knowledge base and interact with each other more actively by means of data sharing. In addition, ‘creative activity’ can be used variously.

## 2.3. Smart Learning

The concept of smart learning has not been clearly defined yet. But recently, the Ministry of Public Administration and Security defines smart learning service as ‘a new type of educational service integrating smart devices such as SmartPhone or tablet PCs and brand new e-learning technology’. And related discussion or research has been actively conducted. Based on such research, Gyu-seong Rho[18] defines the concept of smart learning as a learner-directed and human-oriented learning method which lets learners be easily accessed to source information for learning by integrating smart IT technology with learning activities, supports interaction among learners or learners and teachers effectively, and designs self-directed learning environment. A summary of research on e-learning concept is shown in <Table 3> [19].

**Table 3. Sums up the Researches on the Concept of Electronic Learning**

Division	Concept & Characteristics
e-learning	<ul style="list-style-type: none"> <li>• Electronic means, learning that uses IT and radio &amp; broadcasting technology</li> </ul>
m-learning	<ul style="list-style-type: none"> <li>• Learning that uses a notebook or mobile device, a type of learning that is not restricted by time or place but uses the wireless internet, a form of e-learning inducing mobile technology to e-learning</li> </ul>
u-learning	<ul style="list-style-type: none"> <li>• A mode of learning integrated with ubiquitous computing technology, learning that can be conducted anytime, anywhere even without a PC only by connection to the internet</li> <li>• No time or space limitation, using various multimedia materials</li> <li>• Customized education considering each individual's level</li> <li>• Providing self-direction learning environment</li> </ul>
Smart learning	<ul style="list-style-type: none"> <li>• Student-centered, self-directed, interaction, intelligent, informal learning, and a sense of reality, etc.</li> </ul>

The followings sum up advanced researches:

First, smart learning uses state-of-the-art IT technology, so-called smart technology actively. Second, it realizes cooperative learning practically and maximizes learning effects through cooperative learning as freed from unilateral knowledge transmission. In particular, the concept of social learning utilizing social network computing is very crucial in smart learning. It is expected to play roles in complementing cooperative function which was regarded as the limitation of previous e-learning. Third, it can contribute to forming environment for designing self-directed learning. Fourth, it realizes informal learning practically which tears down the walls between everyday life, work, leisure, and learning. It is also characterized by the fact that the integration of IT technology such as virtual reality technology and augmented reality technology and constructivistic learning design models sublate formal or objective, unilateral learning methods and realizes more learner-centered and human-centered learning methods.

Synthesizing advanced researches as written above, this author think now is the time that we need exploratory research on the conditions to realize smart learning.

## **2.4. Collaborative Learning**

Collaborative learning is accomplished by interaction between a learner and a learner, and a learner and an instructor; here the interaction between learners and learning equipment should also be considered.

Basic interaction devices include non-real-time communication such as web board, Q&A, e-mail, and text messages, real-time communication methods such as messenger chat, real-time debate room and whiteboard, and multilateral collaborative learning which uses learning community. Also, social network services (SNS), which come into wide use recently, such as Facebook and Twitter, enable student to have collaborative learning without boundary of non-real-time and real-time communications.

Especially, smart phones support collaborative learning by using tethering, in which other wireless communication device can use the internet through one connecting line, and ad-hoc network, which connects each wireless communication device without AP (access point). These functions, however, have a disadvantage that the implementation of the functions depends on the types and models of each device[20].

## **3. Design of System**

### **3.1 Analysis of student**

Prior to the design of the study, we carried out a questionnaire survey of 132 first-grade students of two classes of a high school, who learned the Information/Computer subject. In this study, we used a questionnaire consisting of questions to understand the present situation of the participants of a liberal arts high school who learned Information/Computer subject. The survey area consist of computer literacy, use of homepage, use of smart phones, need for studies. The question for the analysis of students are described in <Figure 4>.

**Table 4. Question for the Analysis of Students**

Category	Question	Question No	Number of Questions
Use of Computer	<ul style="list-style-type: none"> <li>◆ Do have a computer and use the Internet at home?</li> <li>◆ Do you have a computer-related license?</li> </ul>	1~2	2
Use of Homepage	<ul style="list-style-type: none"> <li>◆ Do you utilize your class homepage?</li> <li>◆ Do you use a personal blog and cafe (board)?</li> </ul>	3~4	2
Use of Smart phones	<ul style="list-style-type: none"> <li>◆ Do you have a Smartphone?</li> <li>◆ (If you have a Smartphone,) do you use an SNS?</li> </ul>	5~6	2
Need for Studies	<ul style="list-style-type: none"> <li>◆ How do you exchange and receive opinions in case of collaborative learning tasks?</li> <li>◆ (If you have a Smartphone,) do you want to use an SNS which can be used for a collaborative learning task, if any?</li> <li>◆ (If you have a Smartphone,) if you want to use an SNS for a collaborative learning task as above</li> </ul>	7~9	3

Based on the survey area, the survey result is as shown in <Table 5>.

**Table 5. Survey Results**

Category		Class	Class A(64)		Class B(68)	
			Person	Rate(%)	Person	Rate(%)
Personal Computer	Have		64	100.0	68	100.0
	Non-have		0	0.0	0	0.0
Computer Certification			20	31.3	26	38.2
			44	68.8	42	61.8
School Homepage			0	0.0	0	0.0
			64	100.0	68	100.0
Personal Blog			60	93.8	66	97.1
			4	6.3	2	2.9
Smart Phone			44	68.8	42	61.8
			20	31.3	26	38.2
SNS			38	59.4	30	44.1
			6	9.4	38	55.9
Exchange Methods of	School		36	56.3	42	61.8

Opinions for Cooperative Learning	Homepage	0	0.0	0	0.0
	Messenger	24	37.5	20	29.4
	Blog	0	0.0	0	0.0
	SNS	4	6.3	6	8.8
Intention to use SNS for Cooperative Learning		30	46,9	34	50.0
		6	9.4	26	38.2
		8	12.5	8	11.8

We found that every participant had a computer, which indicates that the participants had good access to web in general. 35% of them were found to have a computer-related license, which shows that there is a wide gap in background knowledge on and use of computer of students.

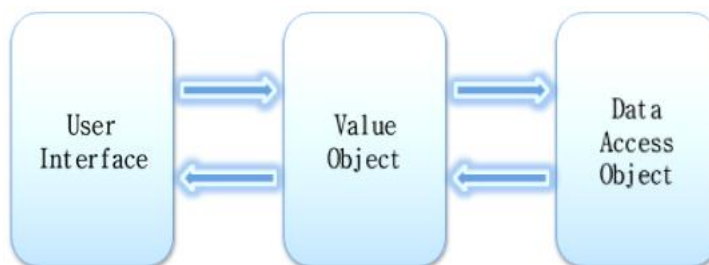
Regarding the use of class homepage, it was found that few students used the class homepage, although there was one. Personal blog and cafe (board) was found to be used by around 95% of them, indicating that they thought of making friends at a personal blog and cafe more important than at the school homepage.

Smartphones were found to be owned by 62% or so, and more than 50% of them responded that they use SNS, which means that they frequently used Smartphones. When it comes to exchanging and receiving opinions about collaborative learning tasks, 62% of the participants were found to exchange and receives opinions on campus, 0% of them was found to use the class homepage for this purpose, 30% to use messengers, 0% to use blog, and 9% to use SNS network services, which indicates that most of them exchanged and received opinions on campus or used messengers after school.

When asked whether to use an SNS for collaborative learning, if any, more than 50% of the participants who had a Smartphone gave a positive answer. They added that currently available SNS has them talk about news and hobbies shared by many users, distracting them from learning. Some of the participants said, 'SNS saves them time and money,' while others responded, 'SNS seems like fun.' These results support the need of this study.

### 3.2 System Design Model

System design model consists of a server and a client, send and receive data through a socket to each other. If the server is running, the server opens a socket waits to allow clients to access, and if the client connect in the server through a socket, the server provides the information to client. <Figure 1> shows an object model for design of the sever.

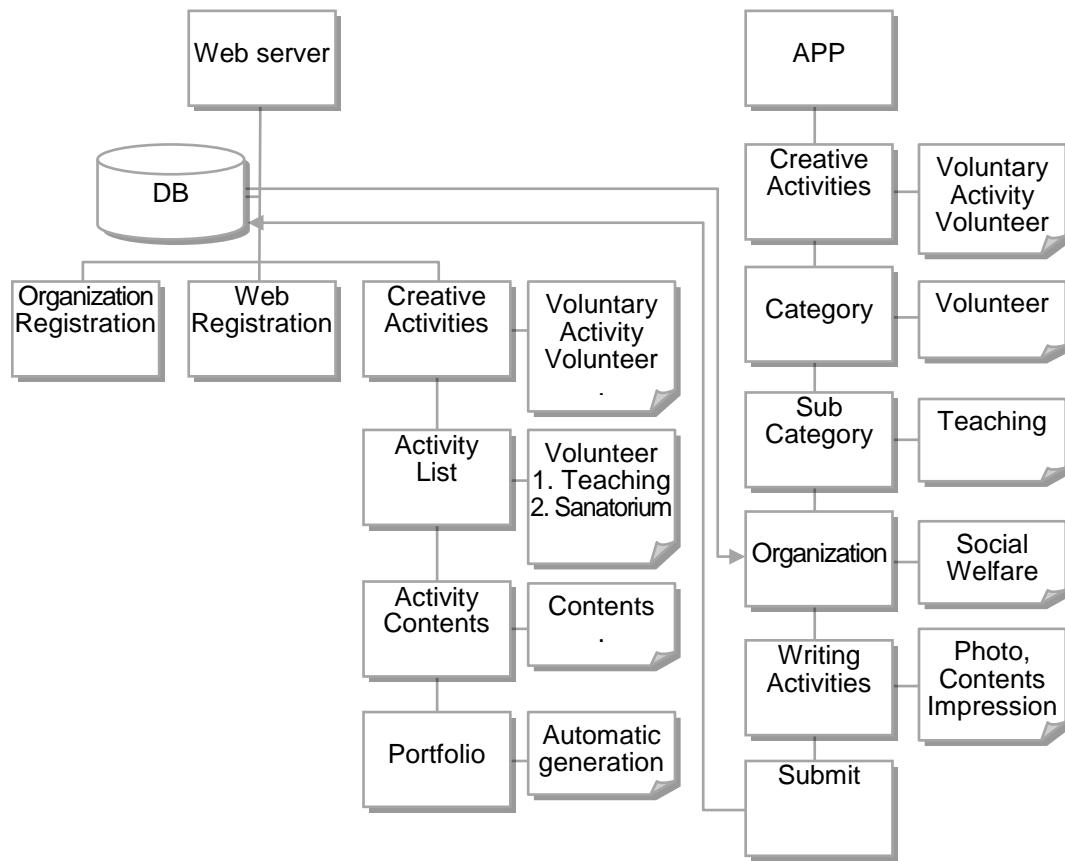


**Figure 1. Object Model for Design of the Server**

The server is divided into objects such as User Interface, Value Object, Data Access Object. User Interface has information on the screen that the user to view, and Value Object is responsible for the data transfer between User Interface and Data Access Object. Data Access Object is responsible for processing the data with data stored in the Value Object. Looking at data movement paths, if user occurs the input in the User Interface, data is stored in the Value Object and passed to Data Access Object. Data Access Object access in the database and can be processed the data based on the data stored in the Value Object. Processed data is stored in the Value Object and it will be displayed on your screen is processed by processing the value stored in the Value Object.

### 3.3 Data Flowchart of System

Overall, the system consists of Web-server and App Client. Main of the server is composed of User Management and Group Management, and data flows in the entire system as depicted in <Figure 2>.



**Figure 2. Flowchart of System Data**

App Client is an android-based app which is activated at a Smartphone and allows for real-time interactions through web communication. For group learning, SNS allows for real-time problem solving in a group only, and for ‘creative activity,’ students can save their activity



outcome, photos, and videos in a DB. Here, without a web login, users can add data to the DB with a click. Those students who do not have a Smartphone also can save data in the web, and all the students can create a portfolio in the web.

### 3.4 Class Diagram

Class diagram of server is as shown in <Figure 3>.

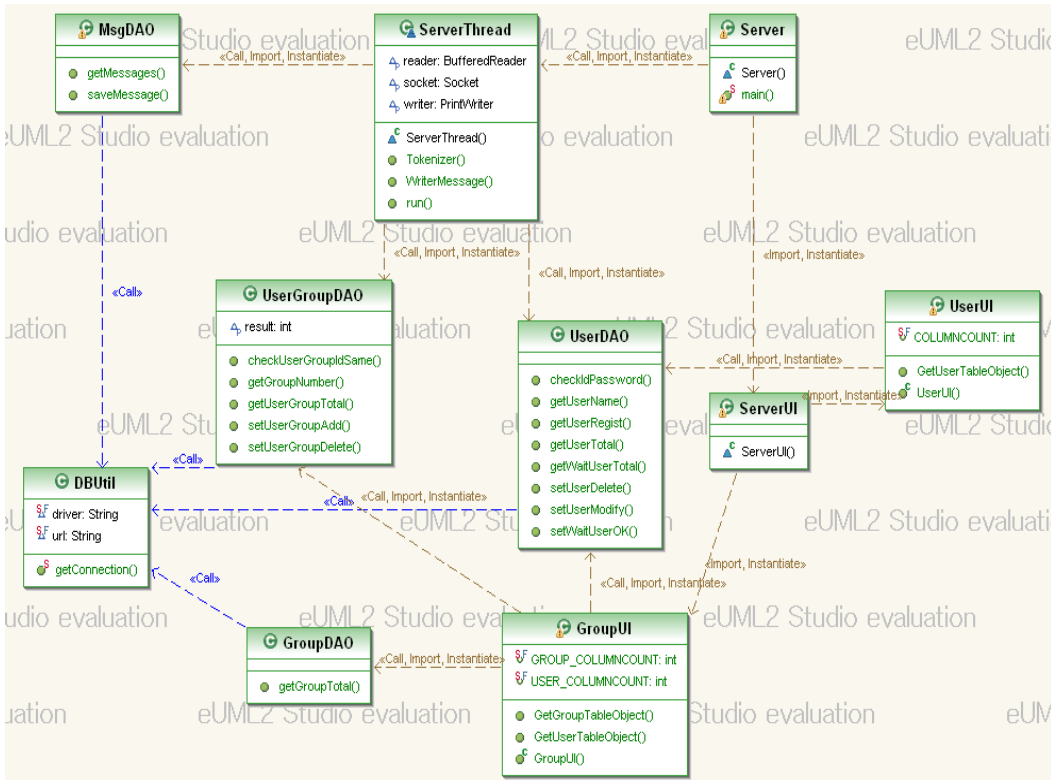
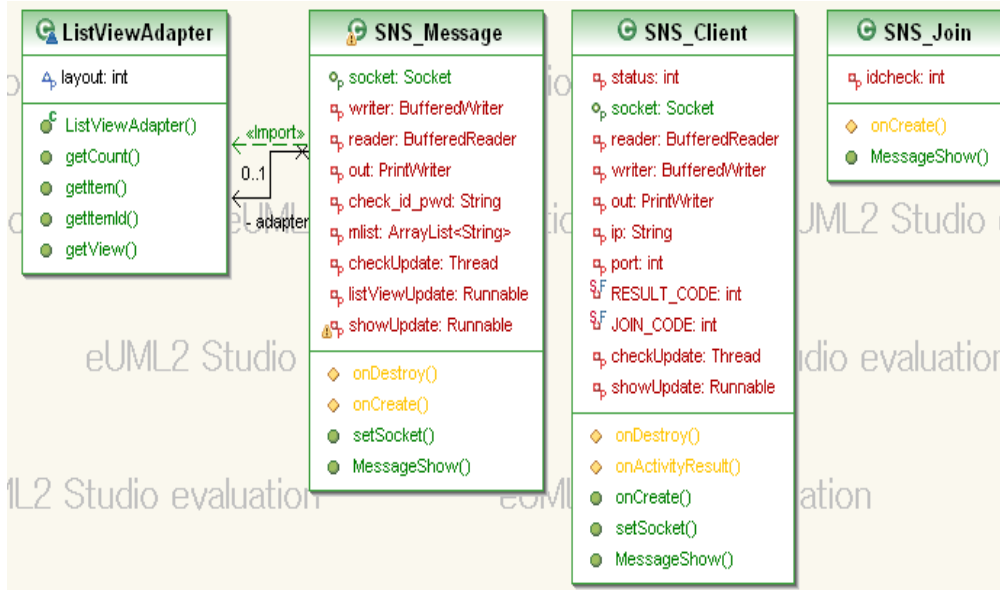


Figure 3. Class Diagram(server)

Server class is a class that main() function operates and DBUtil class is the class that loads the drivers in order to access the database. UI classes is a class that represents to screen interface, DAO classes are classes that control the database. Figure 3. shows the VO classes that is responsible for passing data between UI class on the server and DAO class. when information is passed through the VO class, DAO class connect to the database through DBUtil class and send a query about information passed and delivery information put the value returned into the VO class.

Class diagram of client shown in <Figure 4>.

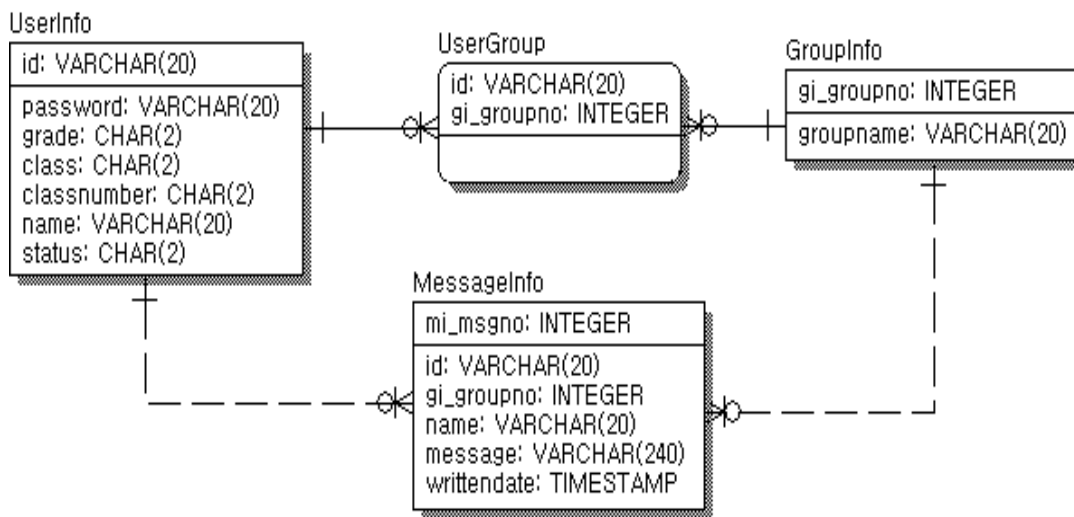


**Figure 4. Class Diagram(client)**

SNS\_Client class displays the main screen and SNS-Join class is class that handles membership. SNS\_Message class imports ListViewAdapter class and displays user's screen, in addition, it is the class that implemented the ability to send and receive message.

### 3.5 ER Diagram

As <Figure 5> shows the physical mode, the relationship between information and information that you want to manage and indicate property about each information and form for each property.



**Figure 5. Physical Model**

The table has the User Information, User Group, Group Information, Message Information tables and User Information table has the basic information of the user. Users Group tables has the information about users belong to any group. Group tables has the information about group number, group name. Message Information table has the information about user's information and message information.

## 4. System Implementation and Evaluation

### 4.1 Implementation Environment

This system was developed as a server and a client. Both the server and the client has been developed on Microsoft Windows XP operating system. The server was based on JAVA, MYSQL database was used. The client was developed to Android 2.1 in JAVA environment. Detailed summary of the implementation environment is shown in <Table 6>.

**Table 6. System Development Environment**

	Classification	Specifications
Server	CPU	Intel Core2Duo SU7300
	RAM, VGA	2.00G, Intel GMA 4500MHD
	OS	Microsoft Windows XP
	Development Tools	Eclipse
	Development of language	JAVA
	Database	MySQL5
Client	CPU	Intel Core2Duo SU7300
	RAM, VGA	2.00G, Intel GMA 4500MHD
	OS	Microsoft Windows XP, Android 2.1 Platform
	Development Tools	Eclipse
	Development of language	JAVA

### 4.2 Server – Activity Registration Screen

This system was able to register the data on the App as well as web server. Therefore, Lerner's did not own a Smartphone or easy to use web server can easily do all the works using a web server. The activity registration screen of the web server is shown in <Figure 6>.



Figure 6. Screen for the Activity Registration

The main screen for the overall management of the ‘Create Activity’. Create activity program menu can be registered through the activities. The main screen is shown in <Figure 7>.



Figure 7. Main Screen

### 4.3 App Client

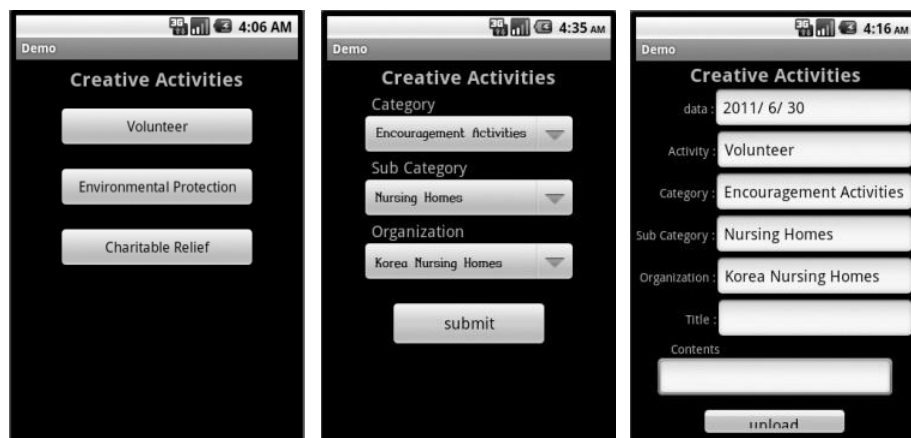
App-Client program is SNS\_Client, which is activated only when the SNS\_Client.apk file is installed on the Smartphone first. To install the apk file, file management application for android called Astro is needed, and App-Client program is activated as in <Figure 8>.



**Figure 8. Install the Program and Opinions Exchanged and Feedback**

Exchange Opinions and Feedback menu displays opinions exchanged among students and feedback from the teacher. With a Smartphones, users can check messages anytime and anywhere using SNS\_Client to interact for problem solving.

The teacher can check messages from students anytime and anywhere using a Smartphone and give feedback to those students who are having trouble solving problems depending on what kinds of problems they are struggling with. In short, the teacher can check how much students understand what they learn without constraints of time and space via SNS. <Figure 9> shows the window of the app for ‘creative activity’.



**Figure 9. ‘Creative Activity’ App Screen**

#### 4.4 Program Evaluation

The study conducted experiment on students who attended information and computer class in academic D high school located in Daegu, to evaluate social network service programs. First of all, utilization of the systems and their performance were examined. The objects of the study were the students who had learned computer application unit in information and computer textbook, and those who had smart phones were divided into groups of 6 and they are groups A, B and C; those who didn't have smart phones were also divided into groups of 6 and they are groups of D, E and F in each classroom, to make presentations which were assignments for accomplishment evaluation. So, there were 6 groups with smart phones, and another 6 groups without the phones. The system was applied to those six groups with smart phones, and another six used blog and web board in school website to conduct collaborative learning. The results were analyzed through each database. The result applied to the system shows in <Table 7>.

**Table 7. System Development Environment**

Item \ Class	A Class <A,B,C Group>		B Class <D,E,F Group>	
	possession	Non-possession	possession	Non-possession
Interaction number	589	228	476	182
Problem-solving number	87	2	58	35
Teacher feedback number	33	12	35	18
Accomplishment evaluation rank	C group (score 97) A group (score 92) B group (score 87)	E group (score 90) F group (score 86) D group (score 84)	A group (score 98) B group (score 95) C group (score 92)	E group (score 93) D group (score 90) F group (score 86)

For the result of the analysis, as in Table 6, the number of times interaction took place was much higher in groups using social network service than in those without social network service; the number of times for problem-solving was higher in the groups using social network service programs, in which interaction naturally took place. Also, when they faced a certain problem, an instructor helped them solve the problem by directly giving them feedback, the aid appeared to be high in the groups using social network service program for they had a lot of idea exchanges in brisk interactions.

In the experiment, the effects can be analyzed as follows:

First, the groups A, B and C presented enhancement in selecting subjects, exchanging ideas and problem-solving ability than the groups D, E and F, as they were possible to give and take ideas each other in real time so that they could address the problem with immediate feedback when problem occurred.

Second, the groups using social network services had quick feedback due to natural interaction. Since SNS is the service which is getting the spotlight these days, learners showed a lot of interests in it. Therefore, the groups A, B and C revealed significant improvement in learning interest and academic achievement than the groups D, E and F.

Third, all students could resolve their complex between learners as they all became instructors or learners.

Fourth, as all the groups A, B and C, and D, E and F interacted with each other, and accumulated data became one database, they would contribute to learning of students afterward; they would continue to realize how the previous learners solve the problem by looking at the accumulated material. Because of various pictures, videos and nice postings in blogs and web board the groups D, E and F used, these groups showed preponderance in data accumulation for database.

Finally, each group had presentation with material for performance achievement. In class B, although one of the groups without smart phones, which used the class website, took the first place, the groups using social network service programs are generally ranged in the upper rank. Therefore it can be said that SNS actually had positive effect on achieving academic goals.

## 5. Conclusion

Collaborative learning to sharpen socializing skills and boost seamless interaction is common in web-based board or blog today. This web-based environment requires a computer, and if accessing via a Smartphone, users need to visit the website and log in to see information and up and download data. Although web-based blogs and boards are widely used to download teaching materials or submit assignments, limited environment and inconvenience of accessing the website discourages active communication between the teacher and students.

This paper developed the system which can be used in 'Creative Activities' and collaborative learning. For the 'Creative Activities', the system made students record their activities in fields using smart phones or smart devices. The 'Creative Activity' is the learning learners themselves do; the problem-solving process should be conducted through SNS functions. They increase creativity by solving the problem themselves through feedback of other learners or instructors. The biggest problems of general SNS are the fact that there is so much useless information, and students can easily expose to commercials or the information unnecessary for learning. This could be settled by implementing a separate SNS which only can be applied to learning. Also, in collaborative learning, because interaction is available anytime and anywhere, the learning was much better achieved than the previous methods. In addition, when applications are once run, students do not have to connect to websites, and they can see other users' posting immediately and give feedback in real time.

An application installed in a Smartphone that helps interaction anytime and anywhere allows for interaction between users via SNS and real-time feedback from the teacher. So, problem-solving via real-time access was found to help increase the interest in learning and academic performance. Moreover, diverse data of 'creative activity' can be saved anytime and anywhere using Smartphones to send photos, videos, and other data real-time to the web-server, leading to easier building-up of data and thereby ensuring self-directed learning.

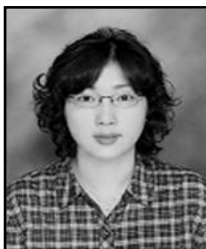
The further task of this study is as follows: It's actively used in 'Creative Activity' class. The task is to analyze learners and systems based on the accumulated data, to complement the system that can be applied to all schools.

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