

A study for the mechanism of expression of individual creativity throughout the social learning platform in cluster computing environment (focus on scenario and data collection design)

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Abstract As social network service (SNS) is set as life friendly service, the knowledge of ordinary individuals is being used in educational arena. That is, collective intelligence is built between students or between students and SNS, not between teachers and student in hierarchical educational situation, and the application plan for collective intelligence has been suggested as a new topic in cluster computing environment. This study suggests social learning platform in a specific way to realize the collective intelligence with the interaction between students, teachers and external helper (using API) in educational filed. In this study social learning platform means the aggregation of specific system that collective intelligence helps individual's creativity realize. This study is expected to help for application, expansion and creative linkage of collective intelligence which is able to use at social education in the future, also help the new relation between students and teachers in cluster computing environment.

Keywords Social education · Social learning platform · Collective intelligence · Creativity · Cluster computing and education

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1 Introduction

Recently people use the cloud network and cluster computing to do the social activity at creative educational field (especially YOUTUBE academy and Khan and so on). The cases are mounting up which is using social education platform like group function of Facebook or team project function of Naver-Band (<http://www.band.us/home>) in educational environment to use a cluster network.

However actually these services [social network service (SNS) and so on] have a limitation like short of function or combining with other services to achieve the educational goal. While, Facebook has started from the relation based sharing profile service (telephone number and so on) and centered the communicating function between friends not educational function. Because of its limited feature it's very hard to expect the intact service to use Facebook at educational field to use a cluster computing power.

A social learning or education is now developing which is able to interact with student and teacher beyond the physical space (real world). For social learning or education platform based traditional education system there should be the device to make come up the individuals' creativity by collective intelligence in cluster computing environment.

On the other hand, the academic study about a social education is getting expended from connection, sharing and linkage with SNS to reflection of the value, content and philosophy which specific education is aiming.

In this paper, 'social skills' require complex perceptual, devices, and cognitive abilities [1]. Based on this need the main purpose of this study is designing the social learning or education platform which makes come up the individuals' creativity by collective intelligence to use a cognition, coordination and co-operation.

This is an example that with a social education it is possible to share (movie, text, sound, image, location data and so on) and interact with information from remote place between mentor and mentee without interruption of moving line and eye line in the actual school (real world).

The social learning or education platform for individuals' creativity would be realized throughout below research process.

In this paper collective intelligence and creativity would be considered philologically in the second chapter (related study), and the social learning process by collective intelligence which helps individuals' creativity is in the third chapter. The social learning platform is designed in the fourth chapter.

2 Related work

2.1 Collective intelligence

As the educational circumstance and cluster computing environment is expanded to SNS (SNS; Twitter, Facebook, Youtube, Slideshare, Yelp, Flickr, Google Plus, Digg, WordPress, StumbleUpon, Netlog and so on) beyond the physical limitation, the real physical contact and interaction is possible through the various things in classroom like life-logging device (Google Glass, Internet-able desk, electronic bulletin board, electronic bookshelves and smart chair and so on).

What is the reason to design the platform for well-formed collective intelligence in this study?

It comes from the assumption that creativity could be expressed well in the platform which is designed for well-formed collective intelligence in cluster computer environment.

Therefore in this chapter the relation between platform of collective intelligence and expression of creativity would be analyzed.

This would support the theory for social learning platform which will be presented henceforth. Usually, collective intelligence would be defined as below and the detailed composition is divided to cognition, cooperation and coordination.

Figure 1 shows the general collective intelligence. Whereas what is the collective intelligence in education field especially in the classroom?

Collective intelligence is shared or group intelligence that emerges from the collaboration, collective efforts, and competition of many individuals and appears in consensus decision making (http://upload.wikimedia.org/wikipedia/commons/a/a6/CI_types.jpg).

We can say that collective intelligence in education field is the process that normal students gain wisdom and knowledge in the classroom through the interaction between them as good as their teachers.

For this, the detailed composition of collective intelligence (cognition, coordination, cooperation) need to be designed to be formed systemically in the classroom like Fig. 1. Also interaction between students and devices in the classroom (education learning system) need to be well-understood for internet-connection of the people in the classroom (students, teachers) and external mentor to use SNS.

According to Palloff and Pratt (1999), an important feature of the learning process is collaborative interaction, including interaction [3].

There are some examples of realization of collective intelligence like Wikipedia and Massive Open Online Course (MOOC; Ted, Edx, Coursera, Khan Academy, iTunes U and so on). Also definition of information and sharing process of information is made throughout these services. These suc-

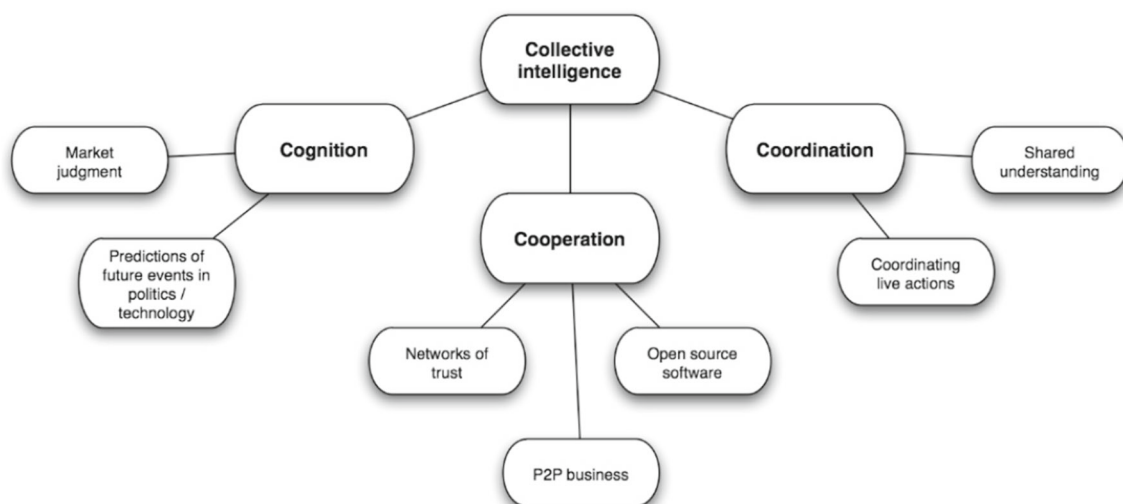


Fig. 1 Types of collective intelligence (http://upload.wikimedia.org/wikipedia/commons/a/a6/CI_types.jpg)

Table 1 Specific features of successful collective intelligence service

Features	Service
Informal learning	Wikipedia (http://ko.wikipedia.org/)
User generated content	Youtube Academy (http://www.youtube.com/academy/)
Interactive learning	Khan Academy (http://www.khanacademy.org/)
Collaborative learning	Skill share (http://www.skillshare.com/)
Participatory learning	Slide share (http://www.slideshare.net/)

Successful services of collective intelligence has specific features like Table 1.

In other words collective intelligence is suggestion of a new paradigm which makes education contents able to be produced, shared, searched and relearned the process through the cooperation among students.

2.2 Life-logging device

In this study Life-logging devices (Google Glass, internetable desk, electronic bulletin board, electronic bookshelves and smart chair) of students are spotlighted as helpful tools to make collective intelligence success.

Life logging devices are not only for text message communication but also for various atypical data like picture, video, location information, temperature, heartbeat, sound and emotion value (happy, sad, sorrow, grief).

Life logging devices mean wholeness of digital device which can record and analyses the detailed daily life of students and teachers like Fig. 2.

When students and teachers have these devices personally, they can apply the external contents like internet to current topic of education flexibly. Therefore the new process needs to be developed to contribute collective intelligence not to

lose concentration or consume the wrong contents but to have external help.

In the next chapter, detailed system configuration would be considered that collective intelligence and creativity can be expressed individually.

3 Interaction and social learning platform

3.1 Interaction and communication of individual creativity

How is interaction and communication promoted among normal individuals for expression of collective intelligence?

What interaction can make collective intelligence be expressed well in the class room? When is the good time? Who is good at this or how is this interacted or what kind of topic is working for this?

Also which media promotes the collective intelligence in cluster computing environment?

The former study was about the role of teacher to guide the direction and contents for good communication among students, on the other hand, this study is about modelling-research to decide when, why and with what social learning platform (technology) participates the class.

With this reason, various new technologies are applied to social learning or education platform field. According to the development of science technology people are seeking the new teaching and learning styles methods in the field of teaching [5].

In this study the process management has no limitation for communication protocol and the relevant data between students and teachers who are usual study subject of interaction, but rather communicative interaction between teachers and students and the process value of life-logging device are considered like Fig. 3.

Among the data from Fig. 3, one of the example to be extracted with availability context is device availability and human availability.

The cases of human availability are incoming call, outgoing call, calendar information, and BT device around.

Storica (application: <https://play.google.com/store/apps/details?id=com.storica&hl=ko>) is a managing platform. It

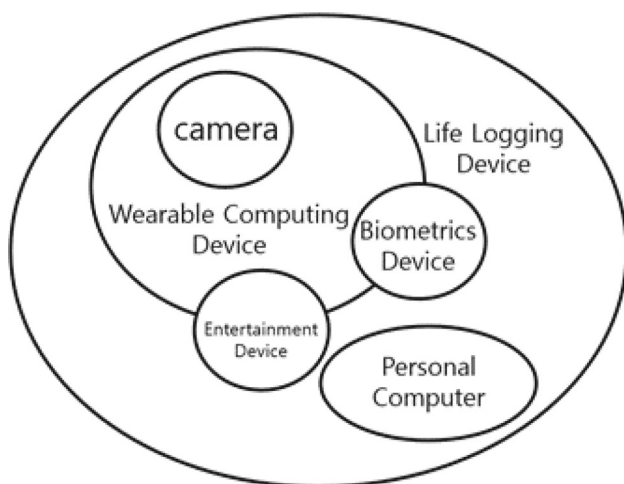


Fig. 2 Conceptual category of life logging device [8]

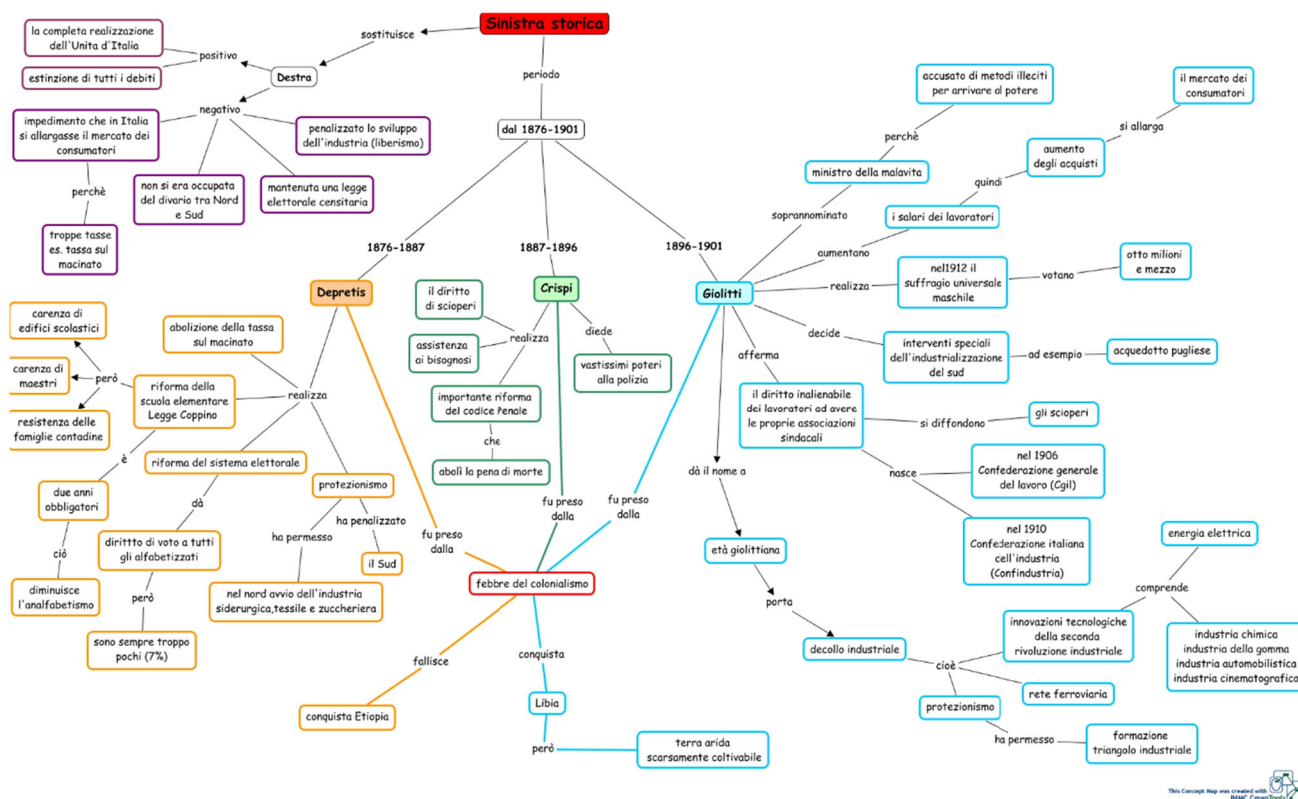


Fig. 3 Conceptual category of life-logging devices (<http://cmapspublic.ihmc.us/rid=IGX50YVMS-223KL86-19PJ/1%20BIS%20SINISTRA%20STORICA.cmap>, <http://tecvis.co.uk/>)

analyses the collected data from life-logging devices of students and teachers synthetically.

Anybody can use storica software, from end users interested in recording and experiencing various aspects of their lives to developers interested in utilizing our recording platform for creating new applications to researchers looking for means of recording and annotating user behaviors (<https://play.google.com/store/apps/details?id=com.storica>).

Therefore it is possible to record and track the daily life of students and teachers, when Storica is applied to Social Learning Platform and intend to use WordPress as the underlying platform for Storica Desktop, to allow for WordPress platform plugins to be integrated with their software platform (http://en.wikipedia.org/wiki/E-Learning_2.0).

And the main factor to emerge collective intelligence of students and teachers can be deducted with the result.

Figure 3 shows the sorts of data which is tracked and extracted by Storica (<http://www.tecvis.co.uk>).

If these data are applied to social learning platform, various data can be saved and they can be used like education diary of teachers or daily diary of student.

The next chapter is about a study for design to decide which data is applied to social learning platform among the various data for collective intelligence in cluster computing environment.

3.2 The relation between students, teachers and surroundings for stimulate of individual creativity interaction and communication of individual creativity

Creativity is the correspondence of human inside for external environment. Creation is the collision (different culture) between unfamiliar information. In this process, open-thinking and creative mind of individual can be presented.

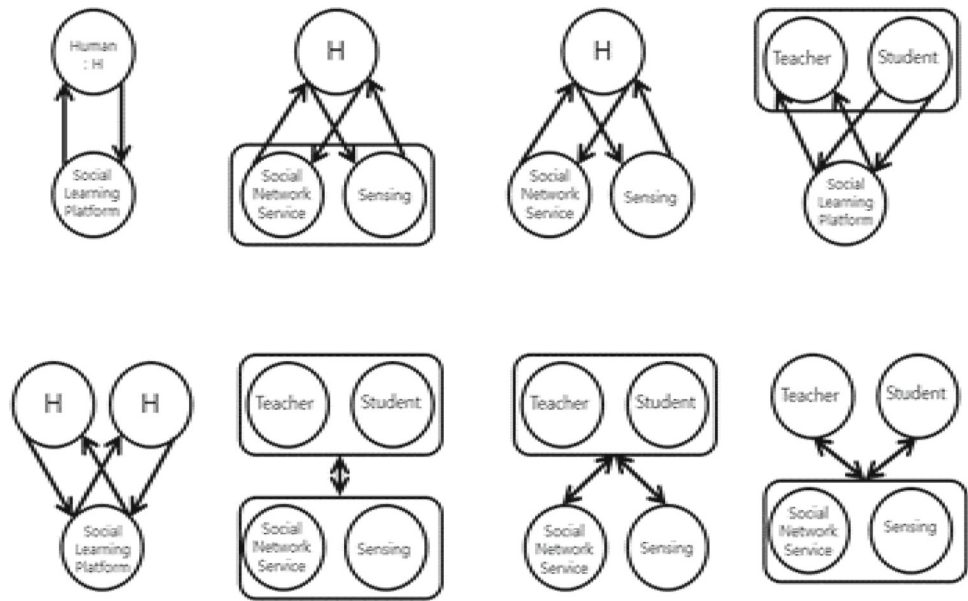
In this chapter (the relation between students, teachers and surroundings for stimulate of individual creativity interaction and communication of individual creativity), we analyze what surroundings is the creative stimulate in the student-participating classroom.

In other word, it's helping for class tool like desk, chair, lecture desk, bookshelves, book, pencil, lunchbox, inside shoes to be changed to creative stimulus.

Naturally we assume that these devices have sensing function to be connected with internet things. Therefore the relation between teachers, students and surrounding (information environment) in the classroom is presented generally as Fig. 4.

Figure 4 can be explained with scenario as follows. When it rains outside of classroom, the weather is observed or humidity is measured by hygrometer inside of classroom.

Fig. 4 A relation and communication for sensing, student and teacher in school environment



In the morning, weather information like temperature, humidity is presented to individual smart device of students and teachers for their suitable outfit. When students comes into the classroom, it notifies that plant doesn't need any water today.

Also if students come up to plants, students can get the information about the plant like how leaf, stem and fruits are changing in raining days and how they are in the future. Also this information will be shared.

This stimulus let students know the surroundings sensitively and make them react and share idea.

In the case of teachers, if teacher has the contents for the class regarding rain like historical events in raining days or sports game, they share these contents each other (Fig. 5).

The relevant teacher can modify the story board with this contents information. Also student can have chance to know the benefit of rains or accident by rain. It is connected to the safety education by each grade.

When student can be provided the optimized information of physical environment, if information is not finished at weather information but spread to humidity level of wood desk, oxidation possibility of steel chair and emotional change possibility of teachers, student can be stimulated creatively by various information.

4 Social learning platform design for collective intelligence

4.1 Social data extract for collective intelligence

One of the method is to promote the suitable environments that stimulates students to observe phenomenon that is actu-

ally happening and let students have free discussion about this, for the collective intelligence to be formed well in the physical space.

For example, in the past teachers have told the stories about rains to students on a raining day.

Whenever they heard the stories, each student could imagine the various things related rain naturally. However this approaching method had a limitation to be changed easily by each teacher's emotion, and it was impossible to record every situation.

On the other hand, it is possible to design system to interact on real-time external environment in social learning platform. It is possible to participate the changing situation on real time and share the relevant information. Especially in the social learning platform it stimulate students to be able to describe the changes of things in the classroom which is related to the detailed situation like raining weather, also students can be stimulated to share and check the specific feature directly.

Figure 6 shows the presentation process of education contents and internet things in classroom with cloud network.

In cloud network, education contents and information of internet of things in classroom are saved.

First, among them, internet things has the information of desk, plants, chair, pencil-case and so on in the classroom. All of them have their original sensing values, and these values are connected to internet. In other word, the information like definition, features and properties of personal items and common equipment in the classroom are saved in the library through Personal education manger in the classroom with internet of thing.

Secondly, the education contents from cloud network is collected by heterogeneous service aggregator. This collection process is connected to open stack and it's corresponded

Fig. 5 A relation and communication for Internet of things and collective intelligence, revised by [7]

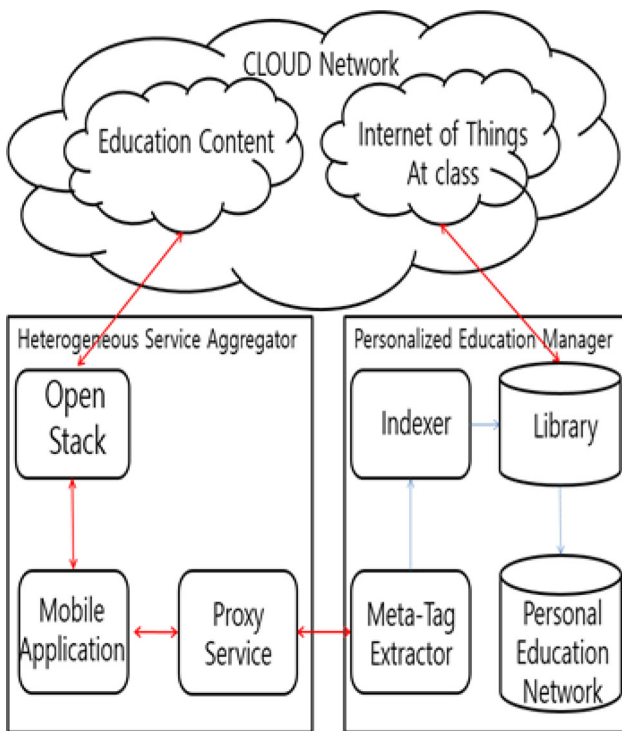
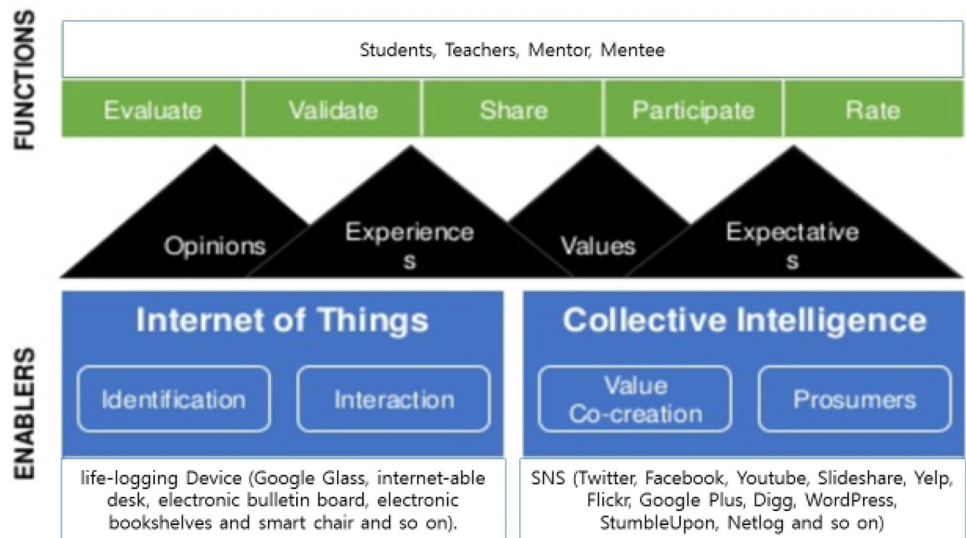


Fig. 6 Personal education manager who correspond with classroom environment and data collection design

with the application in personal mobile device of teachers and students.

Mobile application is connected to meta-tag extractor through proxy service. In other words, its system has the organization that the huge internet information is extracted and arranged through meta-tag extractor when external internet information is combined with the library of things of internet.

Herein meta-tag extractor is the correspond value with things of internet in the classroom. It is the core module in social learning platform to modify the way to communicate

and exchange the information between things of internet and people in the classroom.

In the next chapter, weighting algorithm and process of meta-tag value is researched (Fig. 7).

4.2 Meta-tag for deduction of collective intelligence

Computer-supported collaborative learning (CSCL) is a pedagogical approach wherein learning takes place via social interaction using a computer or through the Internet (http://en.wikipedia.org/wiki/Collective_intelligence#mediaviewer/File:CI_types1s.jpg).

To deduct the collective intelligence, it needs to be decided how to compose the various sensing value in classroom, SNS information and information between teachers and students.

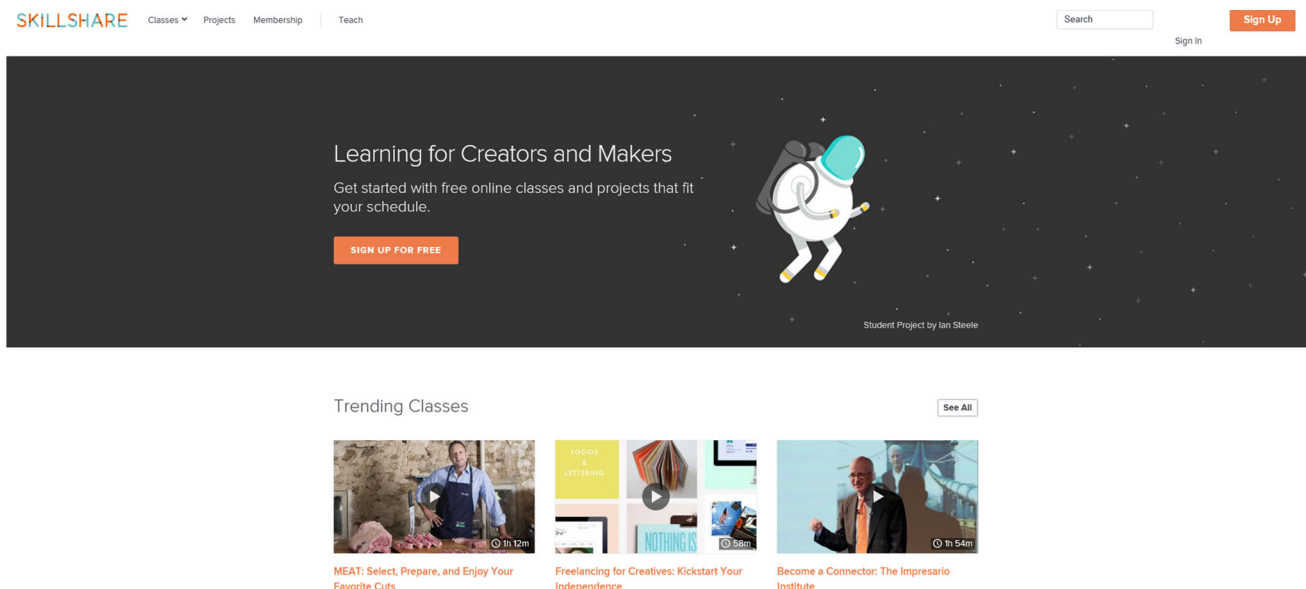
For example, we can get the weather information from the internet. At the same time, the birthday information of teachers and students also can be checked from SNS (Facebook). If so, do we process today’s educational contents like History, Mathematics, English, Korean, Art, and the information from sensing separately or do we combine them with other information and apply to social learning platform service?

Also we need to decide the priority degree for other information except for educational contents. Experimental designs can continue to compare interventions, but the comparisons would be made in terms of the features identified in micro-analyses of how information technology influences and is appropriated for members’ methods of joint meaning (http://en.wikipedia.org/wiki/Collective_intelligence#mediaviewer/File:CI_types1s.jpg).

This kind of learning is characterized by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common resource [6]

Table 2 Module of social learning platform and its detailed feature

Module of social learning platform	Service	Timing	Feature
Informal learning	Wikipedia	Concept explanation in the first paragraph	Definition of concept not by expert but by ordinary people
User generated content	Youtube	When students lose the concentration	Producing and sharing video by students themselves
Interactive learning	Khan Academy	Additional video education	Free education video service
Collaborative learning	Skill share	After-school activity or group activity	Acquisition of daily life technology
Participatory learning	Slide share	Preparing the presentation	Presentation capability improvement

**Fig. 7** SkillShare (<http://www.khanacademy.org/>)

At this time, we need the algorithm how to extract and apply the meta-tag from Fig. 6. Table 2 is about which service has suitable weighting from Table 1. Specific features of successful collective intelligence service.

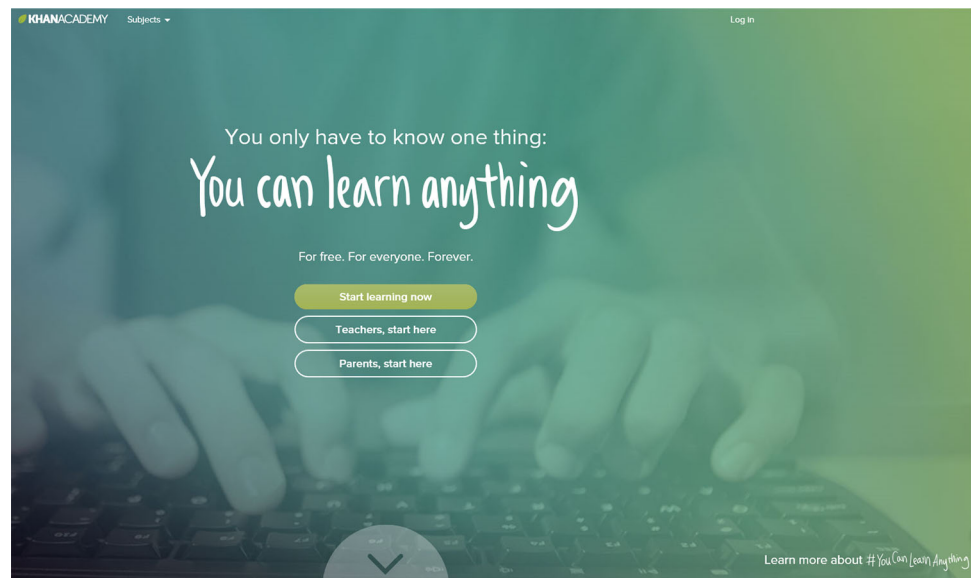
As Table 2 Slideshare (www.slideshare.net) helps student have better ability and participate with their presentation.

Also Skillshare (<http://www.skillshare.com>) is an operating service and it is suitable for afterschool activity to let users share the personal professional skill each other.

Therefore time value has high weighting for Skillshare in API of students schedule after 6 pm and get started with free online classes and projects that fit your schedule. In

the same manner over 20,000 classes in USA already use Khan Academy (Khan Academy) as an educational contents, the additional video learning is possible with the relevant the contents and take control of your learning by working on the skills you choose at your own pace (Fig. 8).

Youtube manages the Academy (<http://www.youtube.com/academy>) and help students have self-directed learn. Besides Wikipedia is useful at redefinition of concept. These contents are SNS (linked in Facebook and so on) and at the same time they are able to be applied in the classroom fore-handed.

Fig. 8 Khan Academy

5 Discussion and conclusions

In the social learning or education platform for collectives intelligence, the information are converged from internet of things, sensing value and SNS.

In this study social learning or education platform is designed to realize the collective intelligence by different weighting of meta-tag in cluster computing environment.

However as social learning or education platform has so many variables as much as SNS, it is hard to have the process to experiment directly, in contrast with other studies that have a narrow scope relatively.

In particular, Cakir et al. have discussed how these patterns can be used for making assessments about the organization of interaction in terms of each participant's level of participation, the conversational structure of discussion as well as the problem solving activities performed by the group [2].

This study is not only to purpose models to realize social learning or education platform but also to describe the relations between SNS and the classroom devices in cluster computing environment (like Fig. 9).

Besides it describes the features of detailed module of social learning or education platform according to the external SNS to use an application program interface (API).

This study deals with the timing and the reason of the students' response and teachers' interaction according to the students in the aspect of how to use the SNS information as the collective intelligence in cluster computing environment.

This study is expected to contribute to the various wearable device and things of internet for near future. We are not discuss about privacy problem. But next research need talk about that. Privacy advocates are concerned that people wearing such eyewear may be able to identify strangers in public using facial recognition, or surreptitiously record and broadcast private conversations [4].

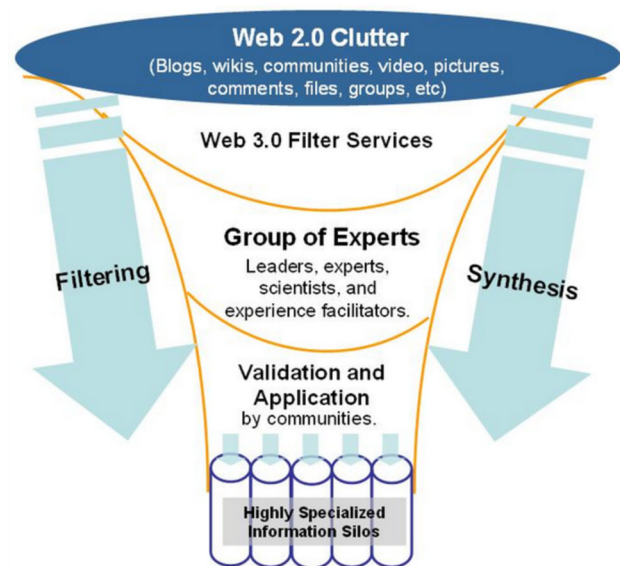


Fig. 9 Collective intelligence; new technologies, new knowledge, new philosophy (<http://www.skillshare.com>)

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broadcasting communication.

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