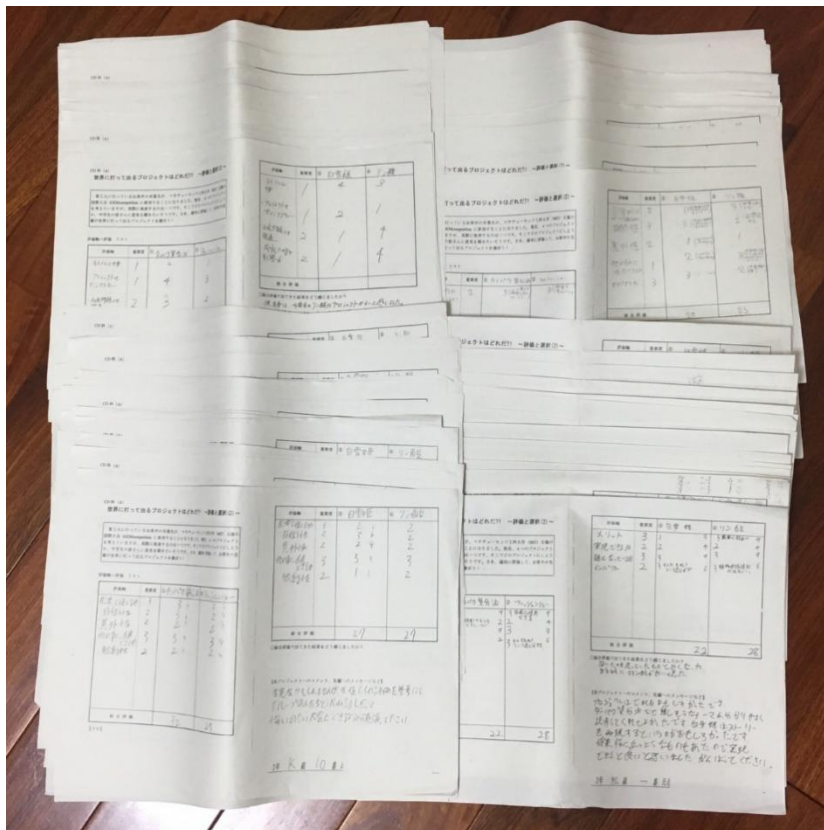


“delivery” course

Junior students in Junior High School of Ochanomizu University  
curriculum: communication • design

● abstract

On 11th and 13th July, 2016, we participated in the communication • design course as guest teachers at Junior High School of Ochanomizu University.  
Target: 4 classes of junior students (about 120 students )



● goal

In order to choose the project which is going to be presented at iGEM Jamboree, we introduce 4 projects about *E. coli* to the students, and get suggestions and comments.

● about the course of communication•design

Because conditions are different, when people want to choose only one from various options, it is difficult to judge which one is better. At that moment, somehow inappropriate decisions are easily made. Through this course, we are aiming to make many-sided judgment of options and also make rational selection.

## ● specific process of the course

·Self-introduction



·Explaining the aim of the course



Explain the aim that we introduce 4 projects about *E. coli* to the students, and get suggestions and comments to choose the project which is going to be presented at iGEM Jamboree.

·Explanation of projects



four projects( secretion of protein, fashion show, Snow White and phosphoric acid) were made into four-frame comics and introduced.

·Students show their own evaluation axes



·Handing in the evaluation sheet



·Summary

## ● specific methods of evaluation

All the project were introduced to the students, and a question period was set up. Afterwards students designed their own evaluation axes. Some examples are shown below.

·fun

·perspicuity

·socially contribution

·identity of Japanese

·freshness

·concern about E.coli

·necessity etc.

They also considered the importance of every axis, and gave point to them. After giving point, they evaluated every project with the evaluation axes. Eventually, for every project, the sum of the product of evaluation axis point and evaluation point itself was calculated.

For example, let's see an evaluation sheet of one student.

評価軸	重要度	③白雪姫	④
実現性	2	2	4
有用さ	3	2	6
科学の発展への貢献	3	2	6
ユニークさ	1	3	3
独創性	2	2	4
タイトルと中身	2	1	2
実用性	1	2	2
総合評価		27	

He or She sets up the highest point for each evaluation axis as three point. Therefore, the highest point of evaluation using each evaluation axis is the same, three point. By this way, comprehensive evaluation can be made.

## ● comments on project Snow White

ストーリーを再現するのが面白い
劇でやる分にはわかりやすいが、現実での応用がない
単純に面白いと思ったが、実用性を考えると評価が低くなった
理系を専門にする人中心ではなく、私たち(中学生)やご老人の方でもわかりやすい方がいいと思う
復活させるアイデアが面白い
実現しても人間にどうメリットがあるかわからない
海外での大会のため、外国人がいかに興味を持ってくれるかが大切だと思う。アメリカに住んでいて思ったのが、アメリカ人はいつもcoolとinterestingを求めている
身近な例に沿って説明するとどんな人にも理解しやすく説得力があると感じました
アイデアが独創性に溢れていて話を聞くのが面白かった
特定の分野の人には貢献できるかもしれないが一般の人にはあまり技術的な部分の貢献はなさそう
タイトルと中身が少しかみ合っていない
ストーリー性があって面白い
例えがわかりやすくどちらかというと文系の私にも理解することができた
興味はわけどちょっと難しそう
タイトルに引き付けられると中身も理解しやすくなる気がする
細かいことはよくわからないけど、コミュニケーションみたいで興味深い
タイトルが興味を引く
名前がユニークで審査員にものけそう
目的がよくわからない
タイトルのインパクトはあるが、少し内容があっていないユニークだと思う
画期的か、というところに重点をおくとファッションやリン酸のほうが評価が高かった
名前のインパクトがあり、さらに内容も分かりやすかったから評価が一番高くなった
タイトルがピンポイント過ぎた
私は帰国性でアメリカと日本のお話が違うのを知っているのでもあまりよくないかなと思いました
ストーリーがあるからよかった、もう少し実用性があつたらいいな
誰もが知っているストーリーなのでイメージして聞くと面白い
この技術は一般の人には必要ない
インパクトと活用性がそろうと興味を惹かれる
毒リンゴがよくわからない
日本人っぽさを出せるとよいと思う
少し名前がちがう
白雪姫は様々なストーリーがあるが世界で通用するかが疑問
大開演間でコミュニケーションして、それがどこまで役に立つかわからなかった
プロジェクトの最終目的が分からない
題名の印象が先行するのか、理解しづらい
子ども受け悪そう
テーマと中身があていない
自分にとってのメリットがわからなかった

In other words

advantages

・It is intelligible and interesting to represent the story.

- This idea is creative.
  - The title is attractive.
- and disadvantages
- It is hard to apply this project in reality and to contribute the society.
  - This version of Snow White is different with his or her own version.
- are summarized.

Actually, when we summarized the part of evaluation axis data shown at 120 evaluation paper, we can get the graph below.

インパクト	0.866	impact
わかりやすさ	0.865	perspicuity
面白さ	0.908	fun
ユニークさ	0.958	uniqueness
社会貢献	0.591	Socially contribution
国際的に通用するか	0.668	Internationally acceptable

However, every student has given different point to the importance of evaluation axis and evaluation itself, we modified those data into the range which is from 0 to 1. In the final, we considered that the reason why the point of 'internationally acceptable' is low is that there are some differences between Japanese version Snow White and other countries'.

### ●improving the project

Based on the evaluation and comments from students, the project were start to be improved.

·project before being improved

Story:

Snow White, prince and step mother coexist.



Because step mother gives AHL to Snow White, Snow White is in a state of apparent death.



Prince defeats step mother and saves Snow White



Story ends happily

Before being improved, the project presented Snow White in the way shown above. Moreover, to increase the possibilities of representation, we assumed that except these three characters, there is no other character coming on stage.

★improvement--the change of characters coming onstage

We newly make *E. coli* representing the dwarf come onstage, and it will be the key person(key *E. coli*??) who hold the key of this story.

The dwarf is controlling the ending of this story. Depended on the function of the dwarf, the ending changes.

By increasing the character, the story which is closer to original can be represented. This may also be the solution of disadvantages mentioned above that this version is different with own version.

In addition, because the dwarf controls the ending, one gene circuit can represent various endings of story, which can deal with the problem that Japanese version of Snow White is different with the others'.

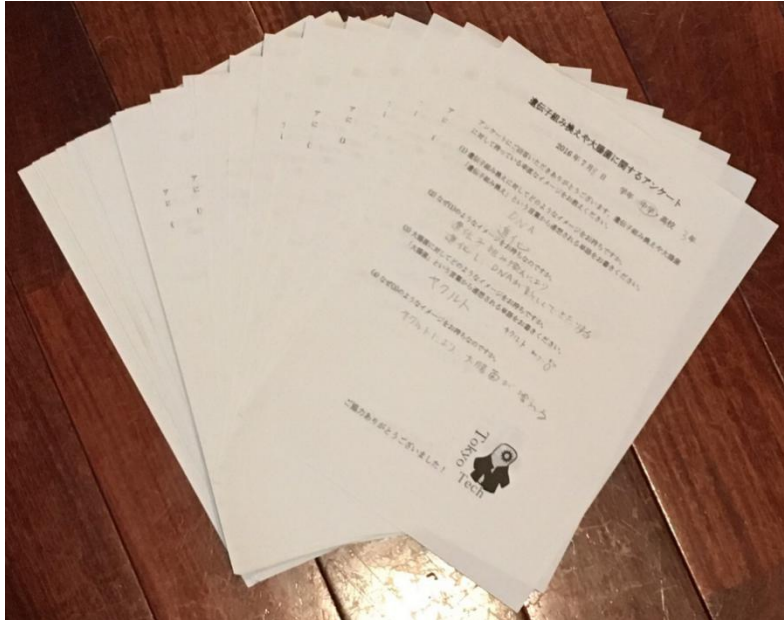
As the change of characters, some parts of circuit are also changed.

In a word, what we want to say is that

**After gaining advice from junior high school students, our project has developed well!**

●investigation about the impression of *E. coli*

Moreover, before this course, we asked students to complete a questionnaire about the impression of *E. coli*.



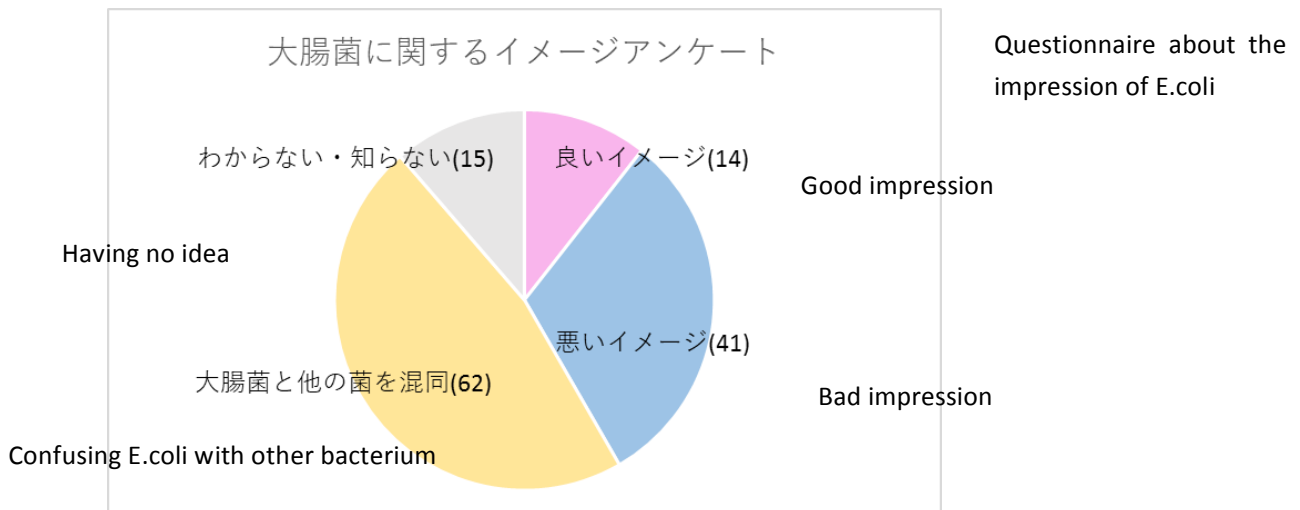
We got feedback from students about the words coming into their mind when they think about *E. coli*. We classified those words into 4 groups.

- good impression
- bad impression
- confusing *E. coli* with other bacterium
- having no idea

Because there are students who gave more than one word, total amount of data over 120.

For example

We made a fan chart using the words shown below



·good impression

Assisting bowel movement

Assisting digestion

Active in bowel

·bad impression

Bacteria

O-157

Food poisoning

Pathogen

Bad for health

Having loose bowels

·confusing E.coli with other bacterium

Dairy products

Yogurt

yakult

Yeast

R-1

Bifidobacterium

Lactic acid bacterium

Lactobacillus gasseri

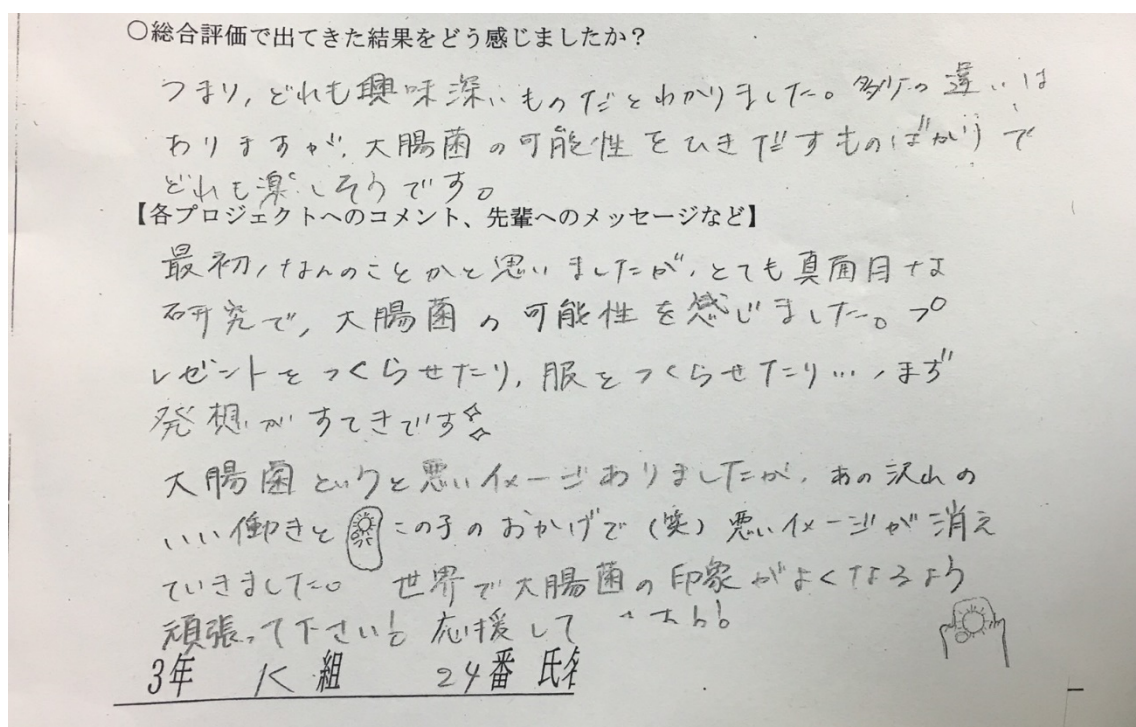
Cholera


According to the chart, about 50 percent students confused *E. coli* with other bacterium. We were shocked at that 39 in 120 students considered *E. coli* as bacterium in yogurt. We asked about the reason why they had impression like that, and the reason came to be “television commercial” and “yogurt package”. We find out that when students hear about bacterium, the first stuff they come into mind is yogurt, and they confused *E. coli* with other bacterium.

Additionally, there are many students whose impression of *E. coli* is “dirty” and “food poisoning”. Actually *E. coli* almost has no poison to people, but there is no

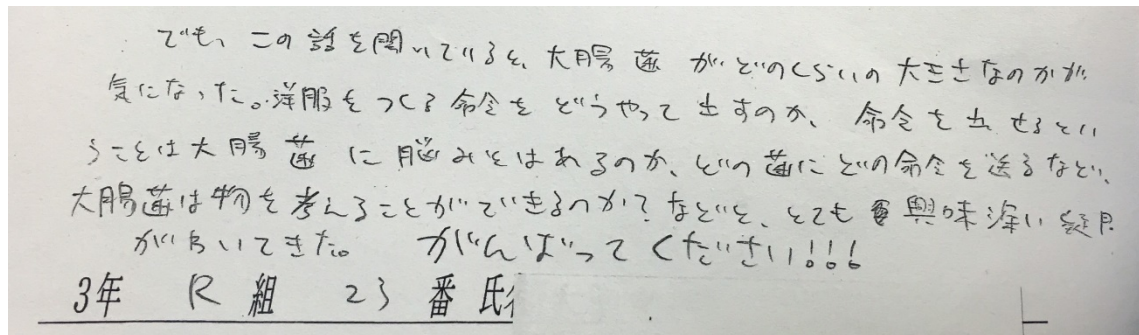
chance hearing about the word "E. coli" in daily life. Therefore they had strong image that E.coli is related to the food poisoning in TV news.

Two comments from students in this course are shown below



I originally had bad impression of E.coli, but they had so many good functions, and also because of this character , my bad impression disappeared. I wish that more people would have good impression of E. coli in the world!





After this course, I am interested in the size of *E. coli*. How can *E. coli* give the order making clothes? Is the reason why they can send order is because they have brain tissue? Can *E. coli* think about things for example, giving which order to which *E. coli*? I have many questions and I am really interested in it.

Things we can say

- 1, it is likely to let people have good impression of *E. coli*
- 2, making people have more interests in *E. coli*

- there are many students who confuse *E. coli* with other bacterium
- they don't know almost the basic information about *E. coli*, for example size, shape, etc.

To deal with problems above, we are going to take two actions

- holding "delivery" course about *E. coli* in junior high school
- making series of VCR to introduce *E. coli*

continue.....