

EDUCATIONAL COLLABORATION BETWEEN CHEMISTRY AND BUSINESS DEPARTMENTS - PARTICIPATION IN A NEW DRUG DELIVERY DRUG PLANNING CONTEST-

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Abstract

This research aims to share a case study and the knowledge of how a single objective can be achieved through collaboration between students of the Department of Chemical and Biological Engineering and the Department of Business Administration by using and complementing each other's expertise. The students participated in the academic conference's student research contest. All of them are awarded there and in the National Institute of Technology in 2022.

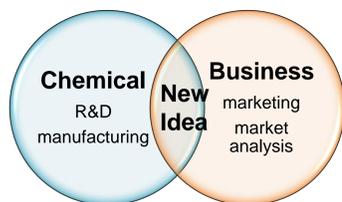
This form of collaborative education demonstrates a high degree of originality. The joint research by faculty members and students from different fields and of both genders, ideas that each of them could not have generated singly became possible to generate and with success. To accomplish this, communication and mutual respect fields and division of work must be clearly defined.

1. Background

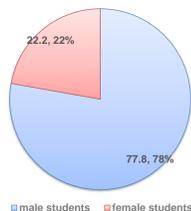
Markets in developed countries are becoming saturated, and consumer preferences are diversifying. Companies, therefore, attempt to shorten product life cycles in response to these consumers. To speed up product development, engaging in multifaceted communication with the market from technology development and marketing has become necessary. Cross-cultural integration in product development plays an essential role in this process.

Innovations can emerge by shifting development from a male-centered perspective to one including female perspectives. Companies too have expressed a desire for female engineers (Yanagisawa, 2022), signifying the importance of the perspectives of female researchers sought by the industry.

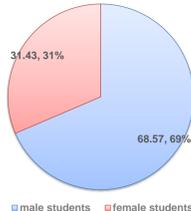
Two rare faculties at Ube College



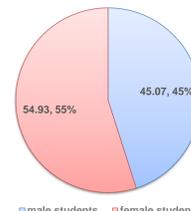
Ratio of male to female students in National Institute of Technology



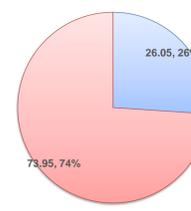
Ratio of male to female students in Ube National Institute of Technology



Ratio of male to female students in Ube National Institute of Technology Chemical and Biological



Ratio of male to female students in Ube National Institute of Technology Business



Low rate of female students in the National Institute of Technology. But a Relatively high percentage of female students in the Chemical and Business faculties in Ube college

2. Contest and Project

The Japan Society of Drug Delivery System (DDS)

An organization for presenting ideas utilizing DDS technology under the theme of medicine and pharmaceutical sciences. (DDS enables drugs to work in targeted places and at targeted times in the body).

This project: "Create Your Laboratory, Create Your Pharmaceutical Company"

to cure unresolved diseases and to improve human health.

First selection: for college students and one for high school students. In the college student section, students first make an audio/video presentation and submit it. High school students submit an essay on "Learn about DDS Technology and Propose Your Idea," and if selected, they present their idea in the same contest.

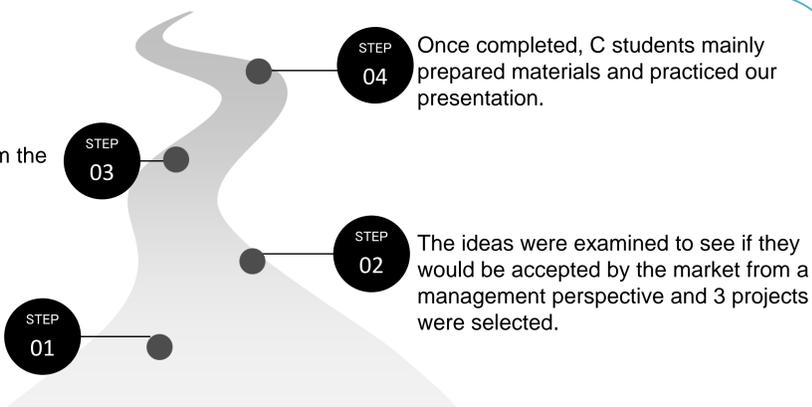
Second selection: Selected students present their ideas for solving current medical issues.

3. Work Process and Methods

For each project, develop ideas from the perspective of each field.

C students took the lead in proposing product development ideas based on existing technologies and presented B students

Communication by Teams. Respect each expertise



5. Results, Conclusion, and Limitation

The two teams: the Grand and Third prizes in the high school division. The other team: was conferred with the President's Award in the university student division, and was also awarded a prize at the National Institute of Technology in 2022.

First, owing to the different timetables of the two departments, there were instances when more than one communication between students was required. This could be resolved by facilitating interactions between the two departments, such as organizing an icebreaker activity, before the event.

Second, despite the majority of participants being female students, there were no groups of male students; therefore, it was not possible to clearly identify the presence or absence of original ideas from female students. From the following year onward, it may be necessary to devise ways to organize the groups in order to evaluate potential differences in "product development" between male and female students.

6. Acknowledgments

This study was supported by "GEAR 5.0," a research project of the National Institute of Technology (KOSEN), which focuses on enhancing the social implementation education of future technology.

4. Three Projects

Huff Huff Protect

- Hand cream with sunscreen
- Frequent hand washing during the pandemic
- Although hand creams contain moisturizing ingredients, their ingredients make the hands more susceptible to sunburn. Sunscreen creams, on the other hand, contain ultraviolet absorbents and ultraviolet triphosphates, which have a low moisturizing capacity. Solve this technically.

Kprope-ta

- The gargling time to remove the virus varies from 15 to 60 seconds, making it difficult to know when the virus can be removed entirely.
- Tell the user when to gargle and the timing to remove viruses by producing a chemical sensation in the mouth.
- The "Koroppe-tai" has two functions: to signal the end of gargling immediately after use and to signal the time for the next gargle; hence, the capsules to be mixed are a soft type (ingredient: gelatin) that breaks easily, and a hard type that breaks after 6 hours

Colorful Pee

- Against the backdrop of the need for early detection of cancer, ColorfulPee proposes the development of a supplement to detect cancer in urine.
- If there is no cancer, the micelles (cancer test drug) contained in Colorful Pea are discharged from the body as is, but if cancer is present, the micelles disintegrate in the cancer cells, and the fluorodeoxyglucose-linked dye in the micelles is contained in the urine, resulting in red fluorescent urine. Currently used cancer test self-kits are expensive and time-consuming to test.
- This product is a low-cost, easy-to-use cancer test against the backdrop of growing interest in dietary supplements

