

Bio-Maister: Free online virtual learning system for engineering experimental training

技術実験学習用の無料のオンライン仮想学習システム：バイオマスター

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Summary



Background: The exercise with hands-on training are indispensable for engineering education. However, training course includes time, costs and safety issues.

工学教育には手を動かす実習が欠かせませんが、時間・コスト・安全性の問題があります。

Results: We developed an online virtual learning system named Bio Meister and PCR experiment content to run on it. We used it in an actual class of 60 students and received high grades from the students.

私たちはオンライン仮想学習システム「バイオマイスター」とその上で動作するPCR実験コンテンツを開発し、実際に60人の生徒のクラスで実施し、生徒から高い評価を得ました。

Conclusion: Our remote tool is most effective for repeated rehearsal before real training. Developing a remote device that allows everyone to learn advanced techniques safely contributes to engineering education.

このリモート ツールは、実地トレーニング前の繰り返しリハーサルに最も効果的です。高度な技術を誰もが安全に学べる遠隔装置の開発は、工学教育に貢献します。

1) Features 特徴

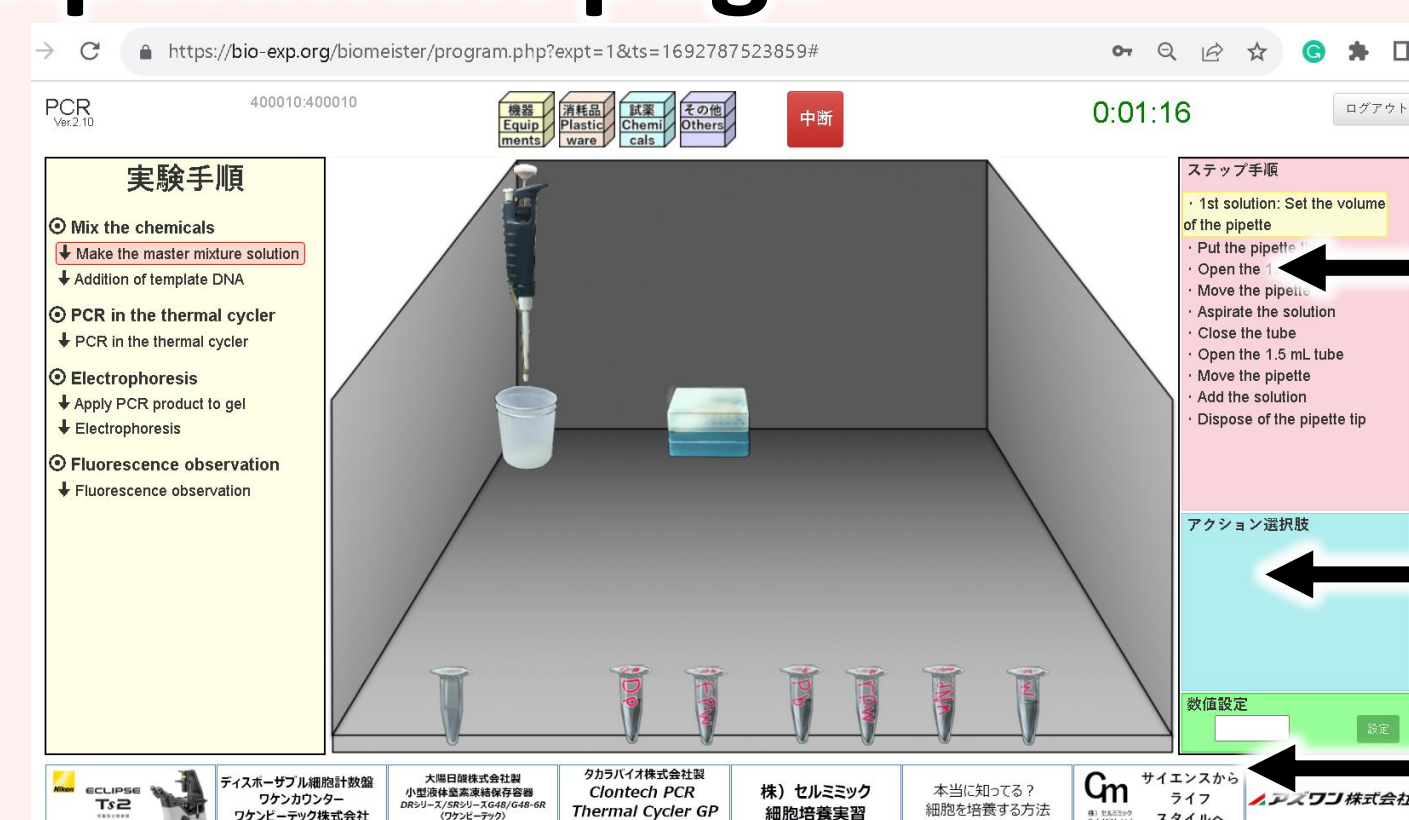
- 1) Online
- 2) Multi organizations
- 3) Multi users (>100 users/organization)
- 4) Multi contents
- 5) Free
- 6) On way (no branch)
- 7) Time attack (evaluate only by "time")

2) Overview 概要

Front page



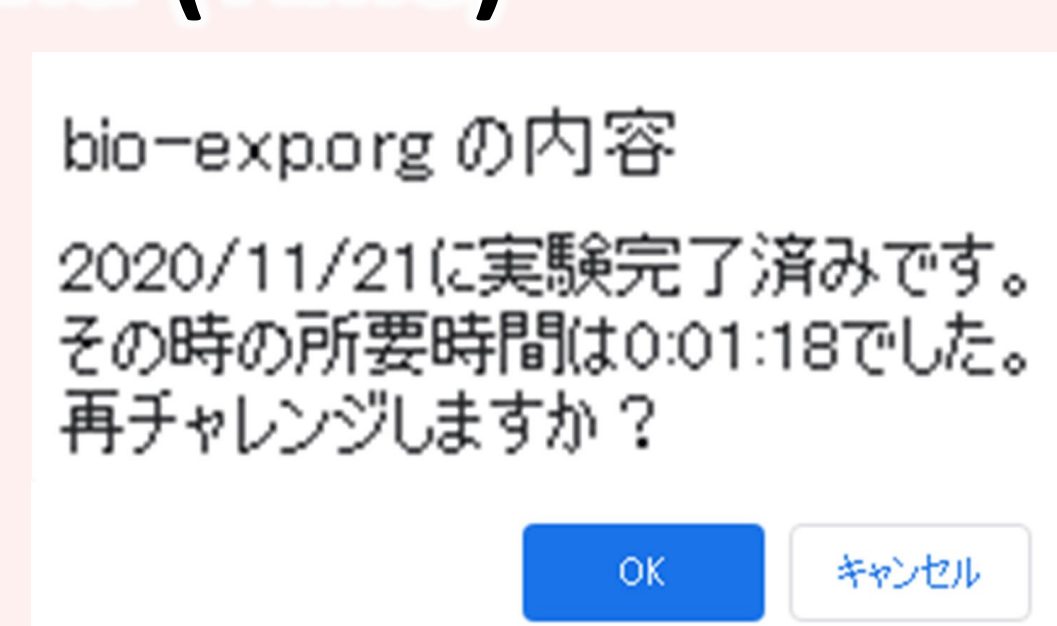
Experiment page



Choose tools & materials



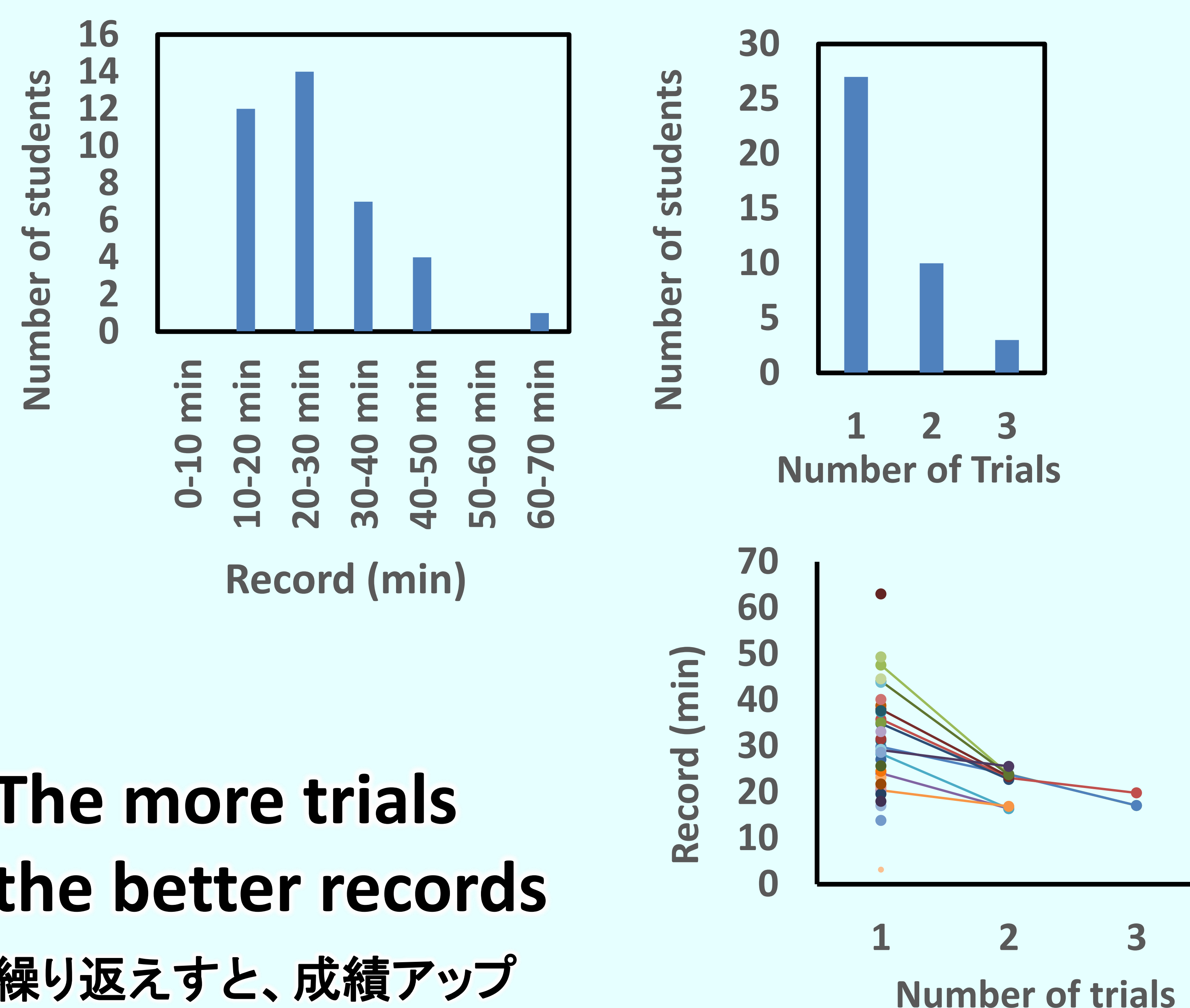
End (Time)



Control window



3) Result of class 2023 結果



The more trials the better records

繰り返えすと、成績アップ

4) Voice of students 学生の声

Good

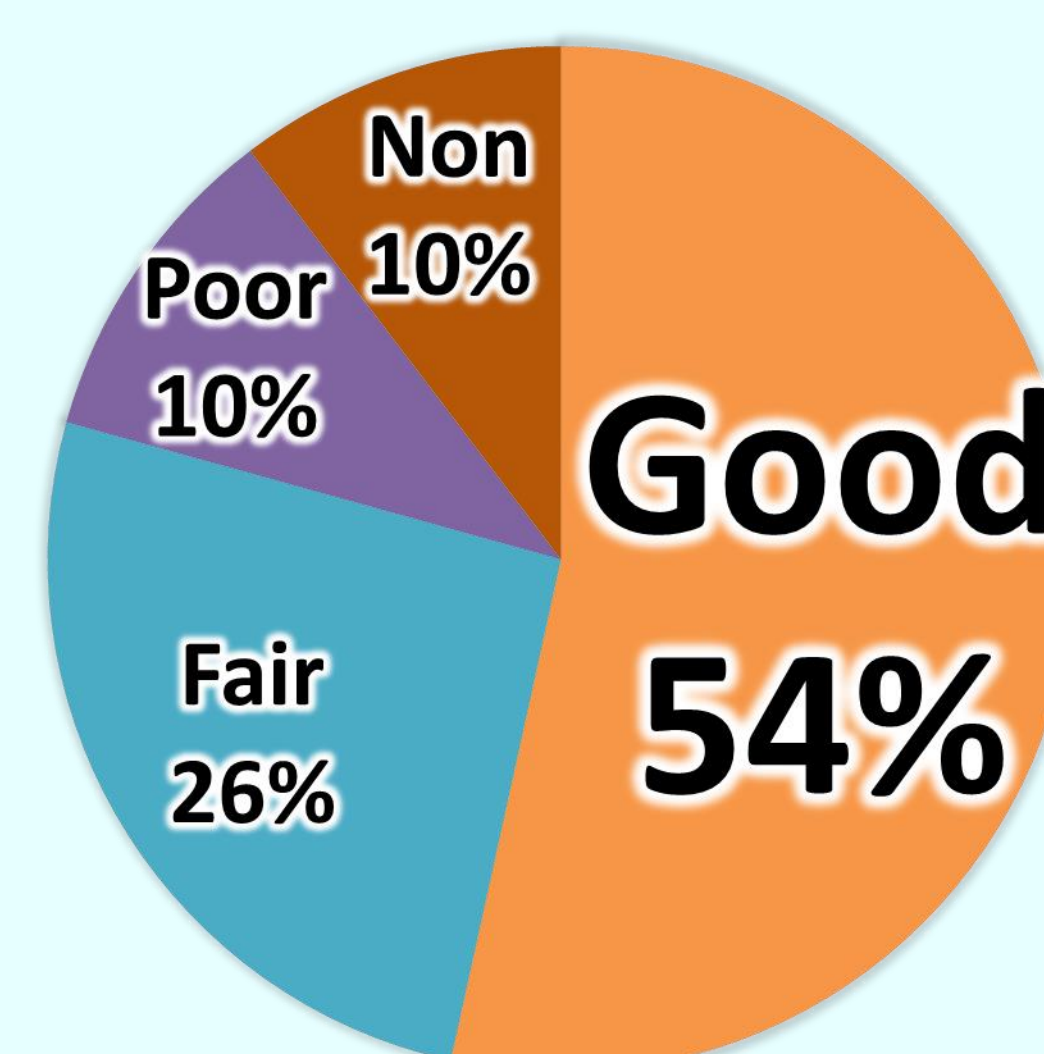
- I was impressed that almost the same operation was reproduced (ほぼ同じ操作が再現) in this app.
- Performing PCR operations on a PC is fresh, and it is a good app for checking the operation (操作の確認に良い).
- Although I couldn't learn experiments by just watching videos (ビデオ見では学べない), I got an effect close to actually operating (実際の操作に近い) PCR by using this app.

Fair

- I wanted to try a real experiment next (実際の実験がしたい).
- I felt the procedure of the pseudo-experiment operation was somewhat complicated (やや煩雑).

Poor

- It was difficult to understand PCR operation because I was conscious of the operation and bugs (操作とバグが気になり) of the application.
- Since I wasn't used to online experiments (オンライン実験に慣れてなく), it was tough.



Voice of 58 students in bioengineering course in 1st semester of 2020.