



Name of Researcher, Faculty, Department, Telephone & Email:

Principal Researcher:

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This consent form, a copy of which has been given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The University of Calgary Conjoint Faculties Research Ethics Board has approved this research study.

Participation is completely voluntary. You are free to discontinue participation at any time during the study prior to the submission of your homework.

Background

Many higher level STEM courses perceived as difficult by undergraduate students rely on abstract concept learning. This is in particular the case in physics-based courses where students are required to perform complex problem-solving. How humans learn concepts can be described using exemplar models and abstraction models. In the exemplar models, learners tend toward rote concept learning, recalling specific problems that they have previously solved and features of these problems. On the other hand, in the abstraction models, learners extract underlying principles that are common to similar problems. A recent study in chemistry has shown that abstraction learners consistently outperform exemplar learners in various aspects of their degree.

As an undergraduate student enrolled in CHEM 373 or ENEL 476, you will have the opportunity to practice a different approach to concept-learning. The tool that is used is the LEGO® Serious Play® (LSP) methodology. The LSP method uses LEGO® building blocks to build representations of abstract concepts. The LSP method is well-established as a business technique, however is beginning to be implemented in education. We are interested in whether using small bricks to build concrete models that represent abstract concepts will help students to extract underlying information. To better understand the effectiveness of the LSP method in STEM classes, we would like to collect and analyze LSP-related assignments.

Purpose of the Study?

The aim of this project is to investigate the usefulness of the Lego® Serious Play methodology® in helping undergraduate students enrolled in CHEM 373 and ENEL 476 conceptualize and connect abstract physical theories.

What Will I Be Asked to Do?

As a participant in this study, you will be asked to consent to release a Lego® based homework (one during the term) which includes a picture of the Lego® model you have created, a written description of the metaphor it represents and a reflective piece on how the methodology has helped your understanding of the course material. ***Your identity will be protected at all times as all the data (pictures and written pieces) will be de-identified.***

The data collected will be part of a study involving both Chem 373 and ENEL 476 courses, where the benefits of the Lego® Serious Play methodology® will be assessed in different classes related to the STEM program.

Participation in this study is completely voluntary. You are free to discontinue participation at any time prior to the submission of your homework. Your participation will in no way affect your grade in this course. Neither your TAs nor your instructors, Dr. Heyne or Dr. Fear, will know of any individual's participation in this study until after the final grades appeal period.

What Type of Personal Information Will Be Collected?

Should you choose to participate, upon posting your homework on D2L, your name will be visible to an independent faculty member who is not involved in teaching the courses Chem 373 and/or ENEL 476 in any capacity. For the research purpose, this independent faculty member will de-identify and encrypt your homework if you chose to participate to the study or destroy your homework if you opt for a non-participation. ***Therefore, your identity will remain confidential and anonymous in all reported findings and uses of the data collected.***

Are there Risks or Benefits if I Participate?

There are no reasonably foreseeable risks, harms, or inconveniences to you as a participant in this study. If you agree to participate there may or may not be a direct benefit to you. If you are in the study, you will have the opportunity to discuss your learning experience in CHEM 373 and ENEL 476 and to contribute to further development of the courses. The information we get from this study may help us further improve the program. Results of this research will be disseminated in conference presentations and journal publications.

What Happens to the Information I Provide?

Your participation, non-participation or withdrawal will in no way affect your relationship with the University of Calgary, the Faculty of Science, or the Schulich School of Engineering. Your participation in this research will in no way affect your grade in this course. In order to protect your confidentiality and minimize pressure to participate in this study, an independent faculty member not involved in teaching these courses (Chem 373 or ENEL 476) in any capacity is going to be responsible for recruitment and, data collection and analysis. Your involvement in the study and the information collected will not be released to the teaching team until the end of the course and the final grades appeal period.

The material you provide to the team will be combined with information from other people taking part in the study. When we write about the study, we will write about the combined information we have gathered and report in in aggregate. If specific examples are used, they will remain anonymous. You will not be identified in these written materials. You can withdraw from this study at any time prior to the submission of your homework on D2L.

All identifiable data will be encrypted and kept secure on a password-protected and encrypted hard drive. We will retain the information for at least five years. Only the researchers will have access to the data.

Consent to participate

Your signature on this form indicates that 1) you understand to your satisfaction the information provided to you about your participation in this research project, and 2) you agree to participate in the research project.

In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this research project at any time prior to submitting your homework on D2L. You should feel free to ask for clarification or new information throughout your participation.

Participant's Name

Signature and Date

Investigator/Delegate's Name

Signature and Date

Questions/Concerns

If you have any further questions or want clarification regarding this research and/or your participation, please contact:

Principal Investigator:

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Co-investigator:

Dr. Elise Fear

Department of Electrical and Computer Engineering, Schulich School of Engineering Office:

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If you have any concerns about the way you've been treated as a participant, please contact the Research Ethics Analyst, Research Services Office, University of Calgary at (403) 220-6289/220-4283; email cfreb@ucalgary.ca. A copy of this consent form has been given to you to keep for your records and reference. The investigator has kept a copy of the consent form.