UPM — UNIVERSITI PUTRA MALAYSIA BERILMU BERBAKTI

SUSTAINABLE DEVELOPMENT GOALS

4 QUALITY EDUCATION

FUMO3D 5D Printing Services

msu management & science university

3D-PRINTING RAT MODEL EMBEDDED WIT AUGUMENTED REALITY AS TEACHING TOOL OF BLOOD WITHDRAWAL TECHNIQUE

ABSTRACT

Background: Three dimensional (3D) visualization technologies are one of the innovative methods in enhancing student's thinking skills and increasing realism. In sequential systems learning , students may feel that some systems are more or less complicated than others for different reasons that will enable them to learn about each system effectively. 3D-printed model and augmented reality (AR) has been introduced in the teaching and learning process to increase understanding and interests in a specific topic. Application of 3D-printing model embedded with AR will help to improve student spatial visualization skill and enhanced their interests in a difficult problem or subject specifically in the science-based subject. Objective: This study aims to evaluate the effectiveness of using 3D-printing rat model embedded with AR (with mobile apps)for teaching blood withdrawal technique and rat's anatomy among undergraduate students at private institute. Method: A questionnaire was given to students before and after the usage of 3D- printed rat model. The students were given proper instruction and briefing on classical way (normal teaching method) before practising blood withdrawal using the 3D rats model. Data collected using a questionnaire consisting of socio-demographic, pre-test, and post-test question. Total of 117 students was tested with this 3D-printed rat model embedded with AR as part of paired sample t-test to check the effectivness. Results: Students has been respondent to prove the hypothesis that usage of the 3D- printed rat model embedded in teaching blood withdrawal techniques and rat's anatomy are more effective compared to using classical teaching method (p<0.05). A positive attitude and interests in the 3D-printed model embedded with AR have been observed among all participated. Conclusion: Usage of the 3D-printed model embedded with AR was more effective among undergraduate students rather than using the classical method in classroom.

OBJECTIVE

1. To learn the appropriate veins for blood withdraw by using 3D printing rat with AR model as a learning/teaching aid in classroom.
2. To assess the effectiveness of using 3D printing rat models with AR on the teaching and learning process.
3. To minimize the usage of animal for teaching purpose as part of supporting the 3Rs rules. (Replace, reduce, refine)

INTRODUCTION

3D PRINTER — process of making a three-dimensional solid object of virtually any shape from a digital model (Mpofu, T. P et.al, 2014)

the use of 3D results in improved outcomes in terms of understanding spatially demanding anatomical knowledge

METHODOLOGY
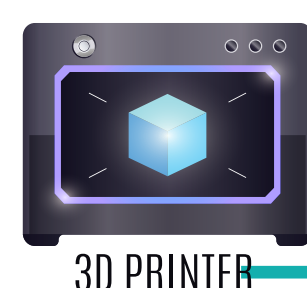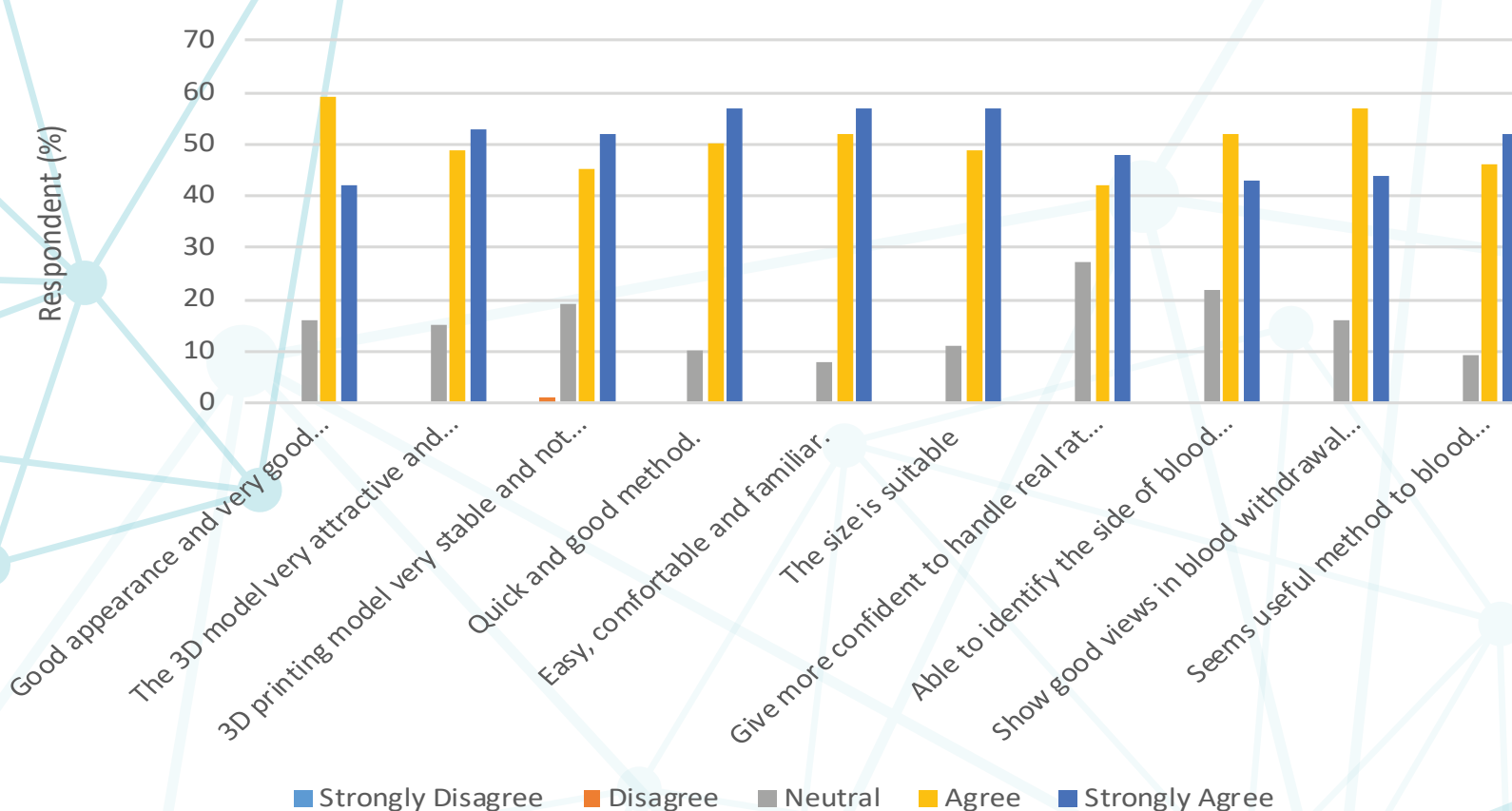
ETHICAL
- Application for Human ethic
- MSU-RMC-02/FR01/06/L1/004

DEVELOPMENT
- Develop 3D musculoskeletal system
- Develop questionnaire

OBTAIN DATA
- Conducted workshop
- Data Analysis paired t-test

IMPORTANT

This 3D printing rat models can be replace real rat as part of teaching method for blood withdrawal technique. It also will help to reduced the usage of animal in teaching purpose as part of supporting the 3Rs rules (Replace, Reduce and Refine). Using this kind of model not only improve students technique, it could put a brake on the demand if usage of rats and overcome some of the ethical and legal issue related to animal abuse.

RESULT & DISCUSSION

ASSESSING THE USE OF 3D MODEL
Respondent (%)
Good appearance and very good... / The 3D model very attractive and... / 3D printing model very stable and not... / Quick and good method. / Easy, comfortable and familiar. / The size is suitable / Give more confident to handle real rat... / Able to identify the side of blood... / Show good views in blood withdrawal... / Seems useful method to blood...
Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

D: Majority number of the students agreed with the application of 3D printing model had enhanced their knowledge in musculoskeletal system . The objective and goals for the research of anatomy studies in musculoskeletal system after using 3D printing model were successfully achieved

Ethics approval: MSU-RMC-02/FR01/06/L1/004
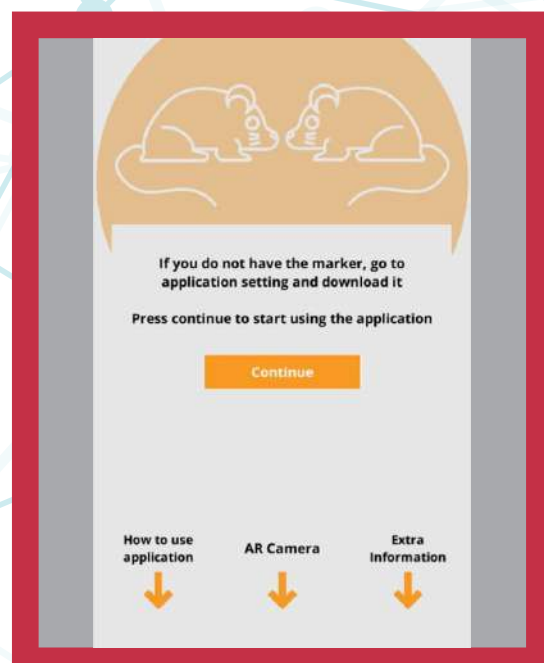

FUMO 3D SDN BHD INDUSTRY
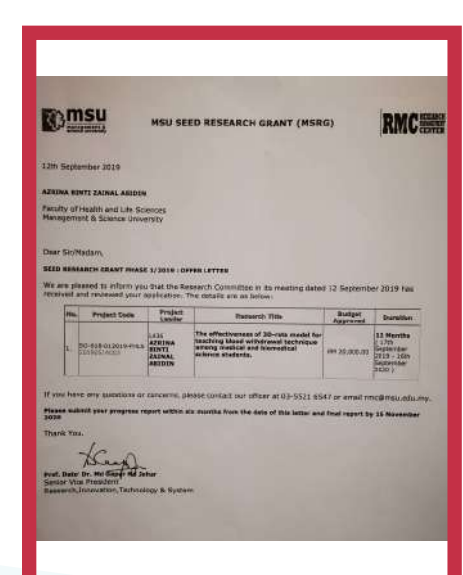
MSU SEED GRANT RM20K

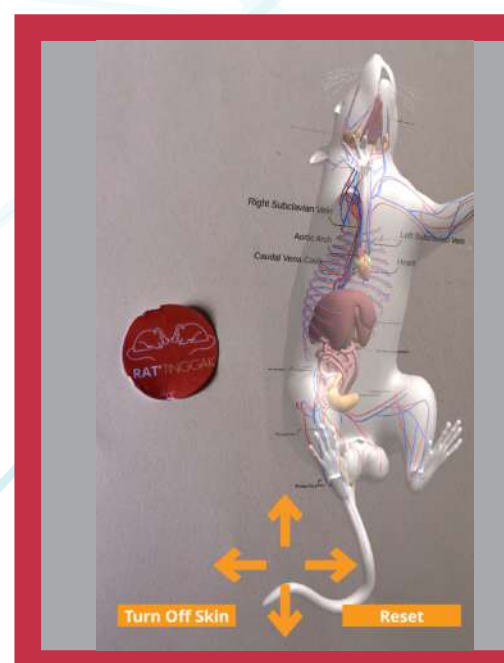WORKSHOP ON 3D MODEL AND APPS AMONG STUDENTS

3D MODEL OF RATS

MOBILE APPS

MOBILE APPS INTERFACE

AR OF RATS IN DIFFERENT SIX SYSTEMS ORGAN

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