CONSTRUCTION AND VALIDATION OF INNOVATIVE TECHNOLOGICAL TOOL FOR STUDENTS IN THE FORMATIVE PROCESS IN THE HEALTH FIELD

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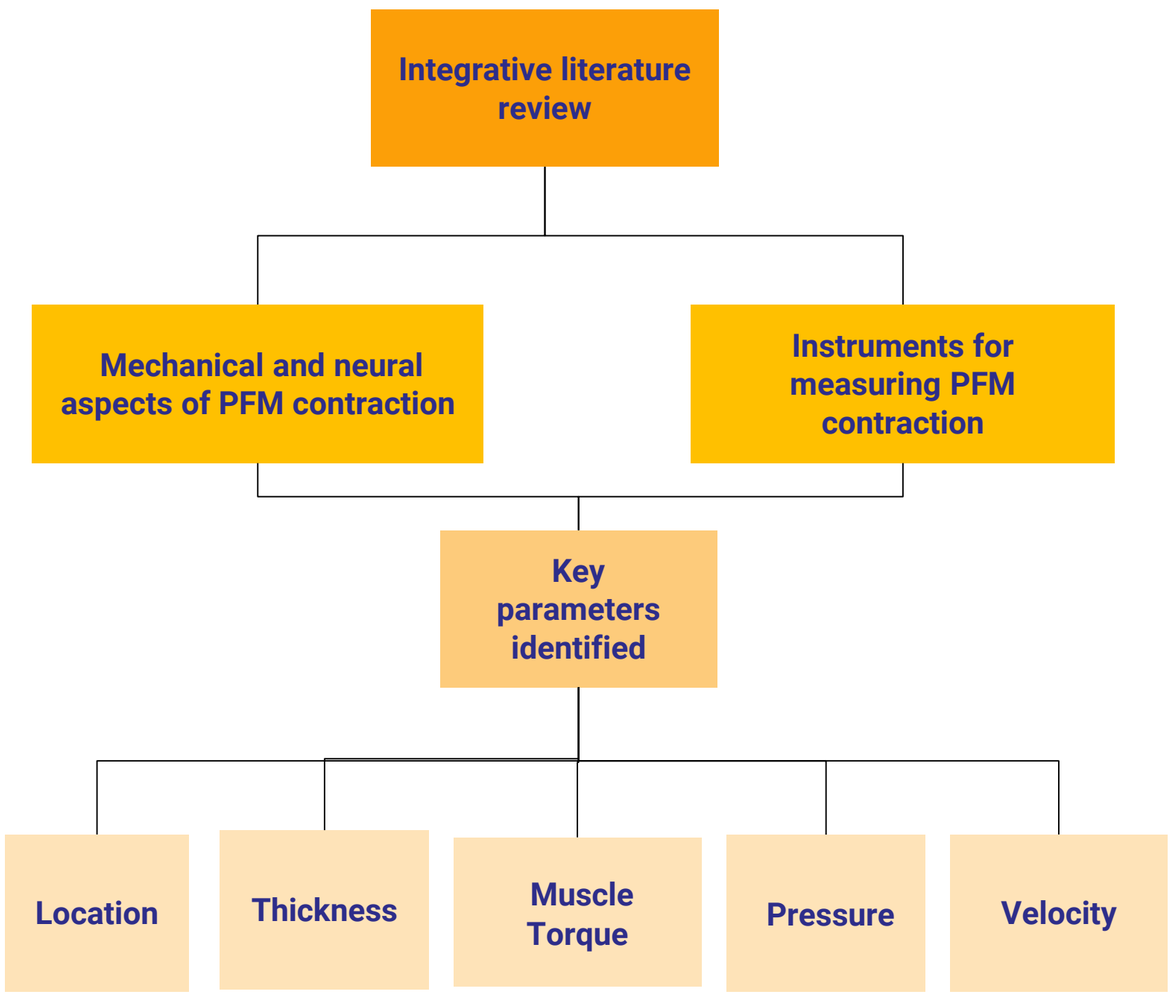
Hypothesis / aims of study

EXAMINATION ➡ PELVIC FLOOR MUSCLES ➡ REHABILITATION PLANNING

However, healthcare students' training is still a challenge, considering the evaluation of power, speed, endurance, and ability to relax the pelvic floor muscles.

This study aims to construct and validate a female haptic pelvis for the practical training of undergraduate students in Women's Health. The device is intended to simulate the functional assessment of the pelvic floor, incorporating dynamic graduated strength to mimic muscle contractions.

Study design, materials and methods



These parameters provided essential physiological characteristics of the pelvic floor muscles and supported the development of a device for simulating pelvic floor muscle function across four levels, as outlined by Brink et al (1989)[1]. This measure uses concepts of pressure (rated 1 to 4), time and displacement. The device uses an Arduino board as a central processing unit.

Device setup and functionality

01	Integrated Development Environment (IDE)	- Supports C/C++ programming language - Provides an interface for writing, compiling, and uploading code to the Arduino.
02	Arduino function	- Controls each actuator individually. - Simulates each pelvic muscle individually.
03	Scientific basis	- Pre-defined information on the physiology of the pelvic floor muscles.
04	Support structure	- 3D printed pelvic bone: supports the artificial muscles. - Vaginal canal: made of silicone rubber.

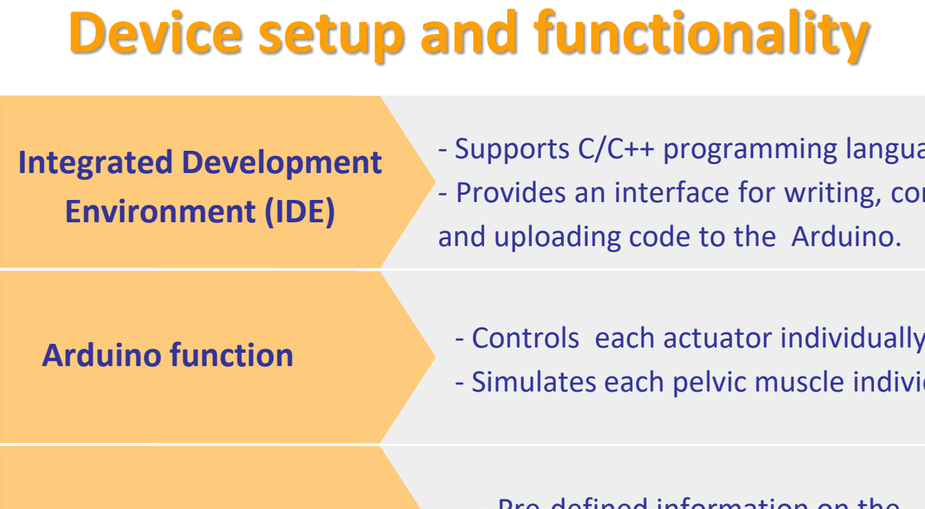
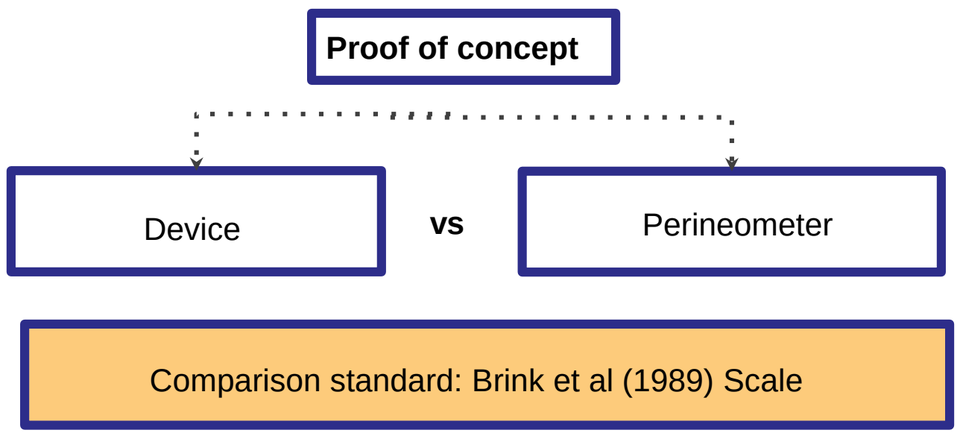


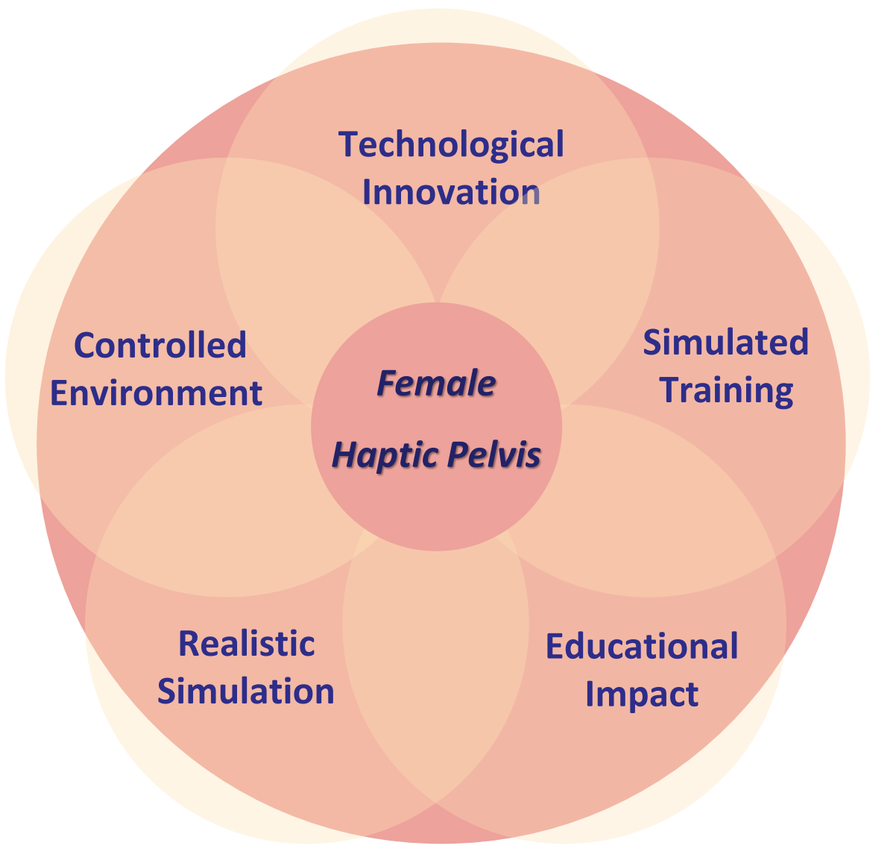
Figure 1: 3D printed female pelvis model for positioning of servo motors (13kg/cm of torque or 1128.35 lbf·in) and artificial muscles attached to the 3D printed structure.



Results and interpretation

Silicone Rubber Extra Soft Selection

- **Type 00-10, Platinum Cure:**
  - Properties: 120 psi tensile strength, 800% elongation
  - Tube Dimensions: ~10 cm length, anterior 7.5 cm, posterior 10 cm, diameter ~4.3 cm or ~3.94 inches, anterior ~2.95 inches, posterior ~3.94 inches, diameter ~1.69 inches
  - Thickness: ~3 mm (~0.12 inches) with rugae
  - Use: Fibromuscular vaginal wall simulation
- **Type 00-50, Platinum Cure:**
  - Properties: 315 psi tensile strength, 980% elongation
  - Dimensions: 2.5 cm diameter (~0.98 inches), 3 cm depth (~1.18 inches)
  - Use: Cervix reproduction



Conclusions

The Arduino-based female pelvis has great potential to enhance pelvic muscle examination training for students. It fosters critical thinking and problem-solving skills during clinical practice, promoting a deeper understanding of women's health. By integrating theory and practice in simulated training, it enriches the educational experience for undergraduate healthcare students, preparing them to make a significant impact on women's health.

References

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