

III International Circus Seminar

« Educational Horizons »

CAMPINAS, Brazil

May 5-6, 2016



École  
nationale  
de cirque

M O N T R É A L

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Director of Research and Teachers training programmes

# the NCS at a glance

- Private art school founded in 1981
- 175 students (High school, College)
- 60 teachers
- 30 support staff
- Accredited by the Social Sciences and Humanities Research Council of Canada in 2011
- SSHRC Industrial Research Chair for Colleges in 2012
  - The only chair for colleges in Canada in social innovations
- Research Center in 2014 (CRITAC)

# The Research Center (CRITAC)

## Six major research fields

1. Technological innovation through the development of equipment, costumes, accessories, and scenery specific to circus disciplines
2. Circus Arts teaching
3. The writing and dramaturgy of the Circus Arts
4. Adaptation and application of new interactive and immersive technologies to the Circus Arts
5. Health and safety in the practice of Circus Arts
6. History and aesthetics of the Circus Arts

# The Research Center (CRITAC)

## Highly collaborative

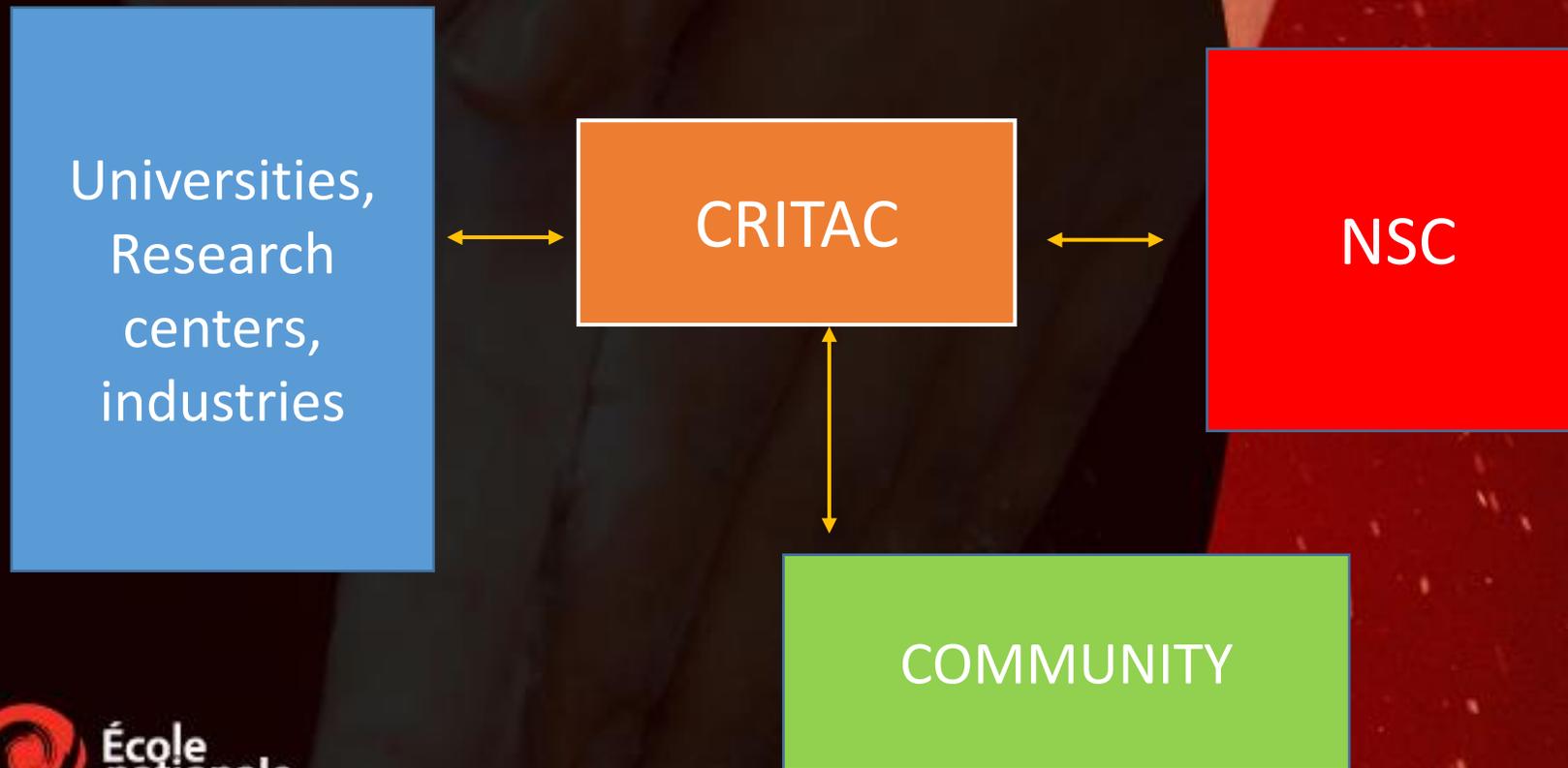
25 active partnerships

- Universities and colleges
- Research centers
- Community partners

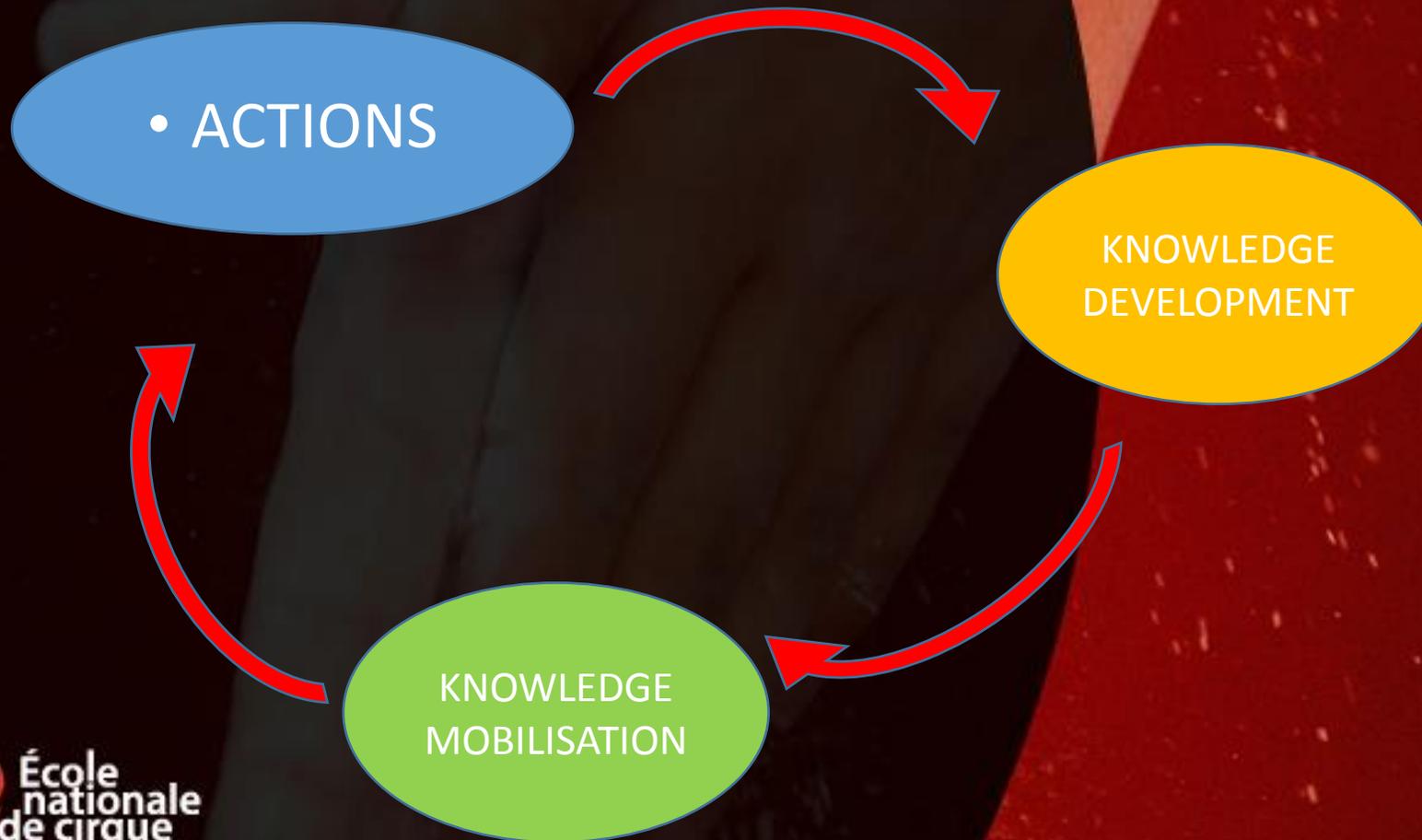
## Varied Fields

- Dramaturgy
- Psychology
- Physiology
- Biomechanics
- Engineering
- Medicine
- Sociology
- Education

# The Research Center (CRITAC)



# The Research Center (CRITAC)



# Circus training and its contemporary challenges

## Key concepts:

### 1. Circus arts are about....

**DOING  
USING  
INTERACTING**

# Circus training and its contemporary challenges

## 2. circus practice is on a continuum

Technique is explicit

Exercise physiology

Biomechanics

Motor learning

synthetic knowledge



Art is conceptual

narrative

intent

perceptions

Symbolic knowledge



# Circus training and its contemporary challenges

## 3. Innovation driven

Circus body as a mean of expression of self!  
AND a mean of communication with others!

# Circus training and its contemporary challenges

**2 questions then....**

**HOW DO WE TRAIN CIRCUS ARTS ?**

**HOW DO WE WRITE CIRCUS ARTS ?**

Circus training and its  
contemporary challenges

**Long Terme Circus Artist Development  
(LTCAD)**

**Developing Best Practices!**

**Beginners to elite to professionals**



# Getting beginners on the right track

- **Impact and Effect studies**
  - Provide evidence base advocacy
  - Leverage for stakeholders
- **E-learning**
  - Giving circus teachers a strong baseline
- **Web tools development**
  - Start up and community of practice

- Impact and Effect studies

## PURPOSE

To examine the impact of circus arts instruction on the physical literacy of children in grades 4 and 5.



Social Sciences and Humanities  
Research Council of Canada

Conseil de recherches en  
sciences humaines du Canada

Canada



UNIVERSITY  
OF MANITOBA

CIRQUE DU SOLEIL®



- **Impact and Effect studies**

## The Problem: low PA, high Obesity!

- In the past 25 years, obesity rates have tripled
  - 26% of youth (2-17 years) are overweight or obese (Stats Canada)
- Serious health implications and economic burden due to physical inactivity and obesity
- Canadian economic burden:
  - \$10 billion for physical inactivity
  - \$19 billion for excess weight(Kruger, Turner, et al, 2014)

- **Guideline for Children:**  
**> 60 min MVPA**

Age	Males	Females
6-11	48.9	34.7
12-15	11.9	3.4
16-19	10	5.4
20-59	3.8	3.2
60+	2.5	2.3

**Literacy** is the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts.

is the ability to read and write

is the ability to use vocabulary to participate in society

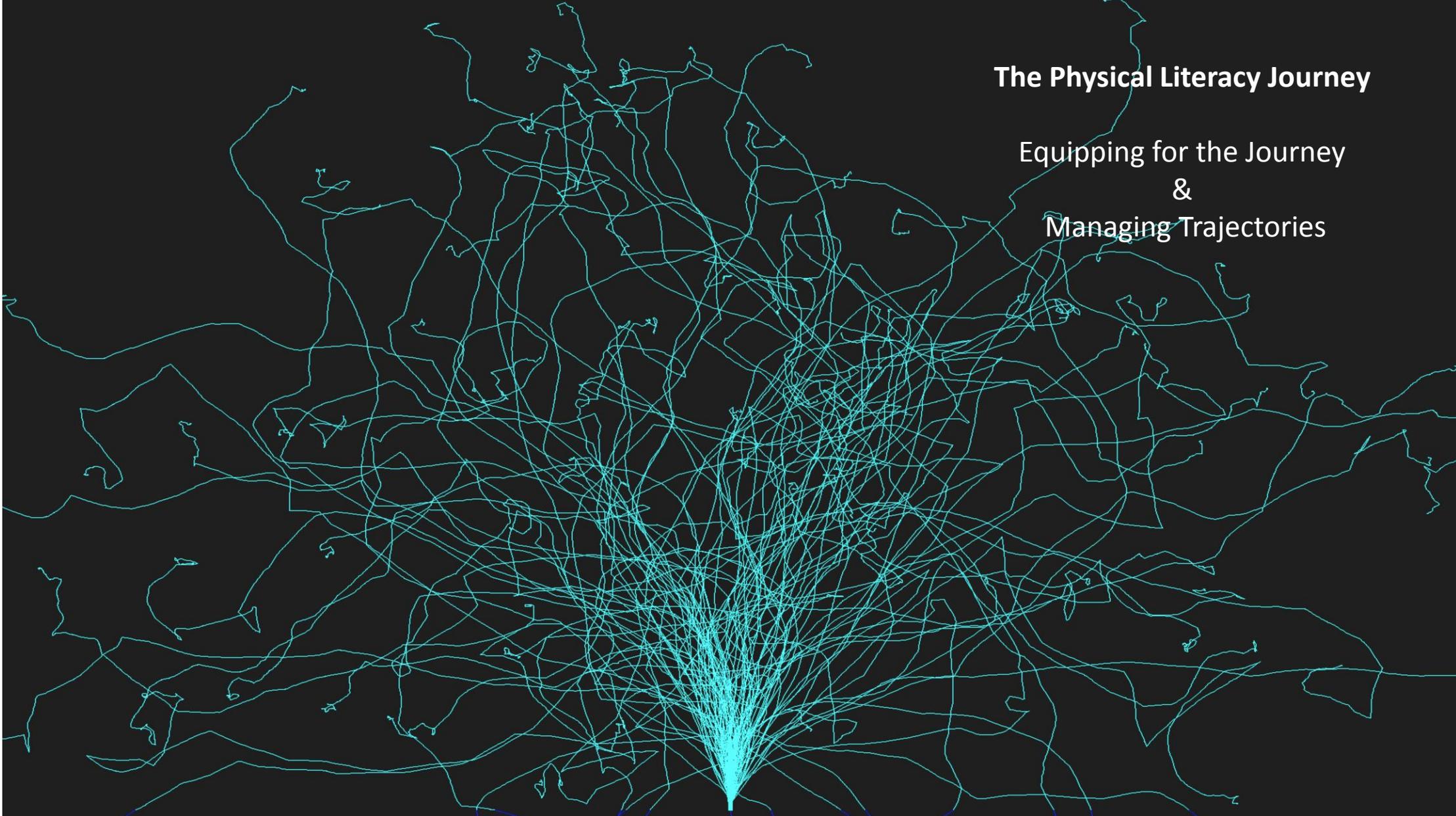
**Physical literacy** can be described as the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life.

competence to move

is the ability to use movement vocabulary to participate in activity

# The Physical Literacy Journey

Equipping for the Journey  
&  
Managing Trajectories



Birth

# DESIGN

- Quasi-experimental design with SES match comparison schools (clustered field trial)
  - 3 schools already utilizing circus arts instruction (PE CIRCUS)
  - 3 schools (PE)
  - N=211
- Repeated measures
  - Time 1 – Start of winter semester (January, 2014)
  - Time 2 – End of same semester (June, 2014)

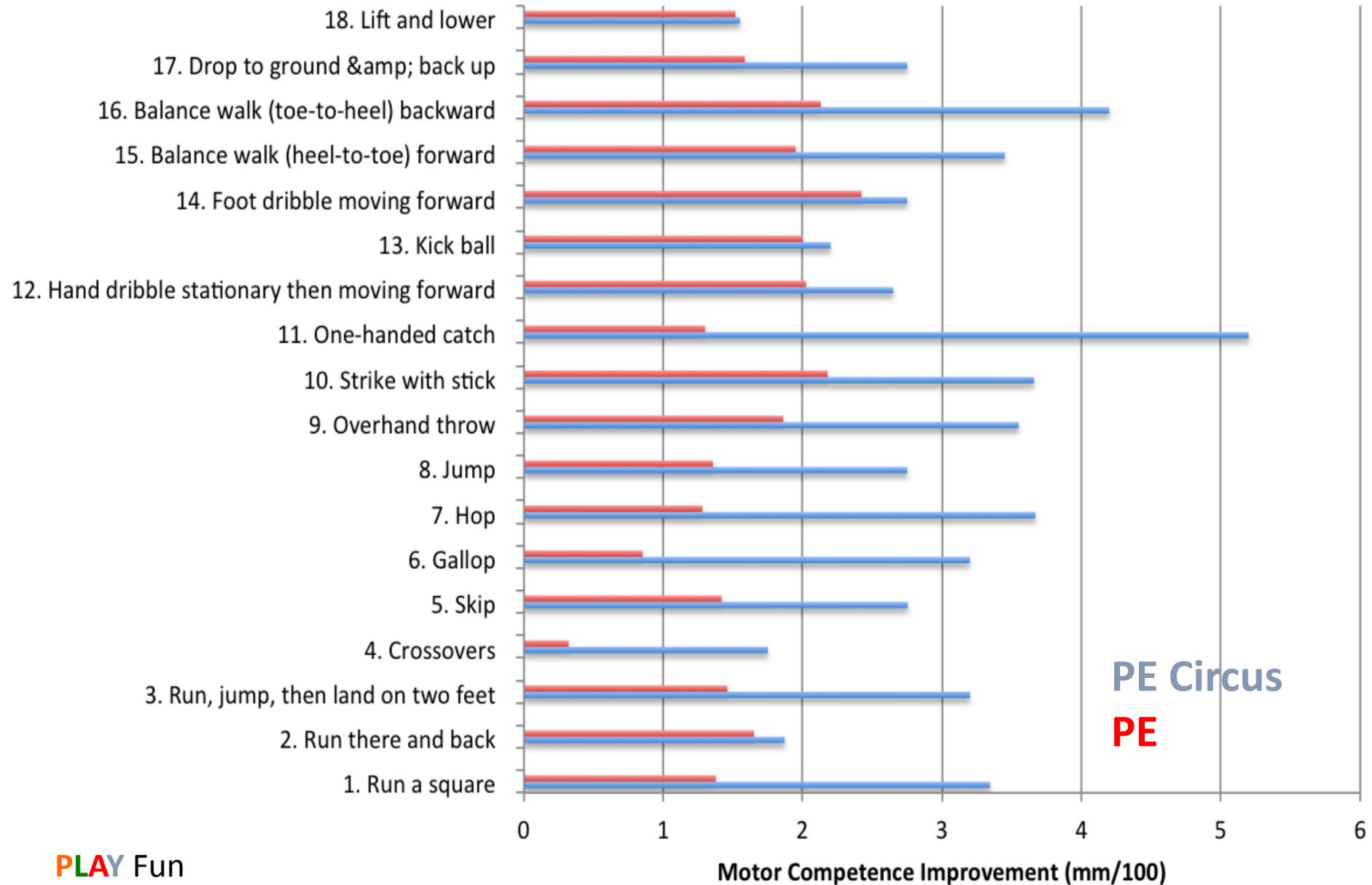


Physical Literacy  
Assessment  
for Youth

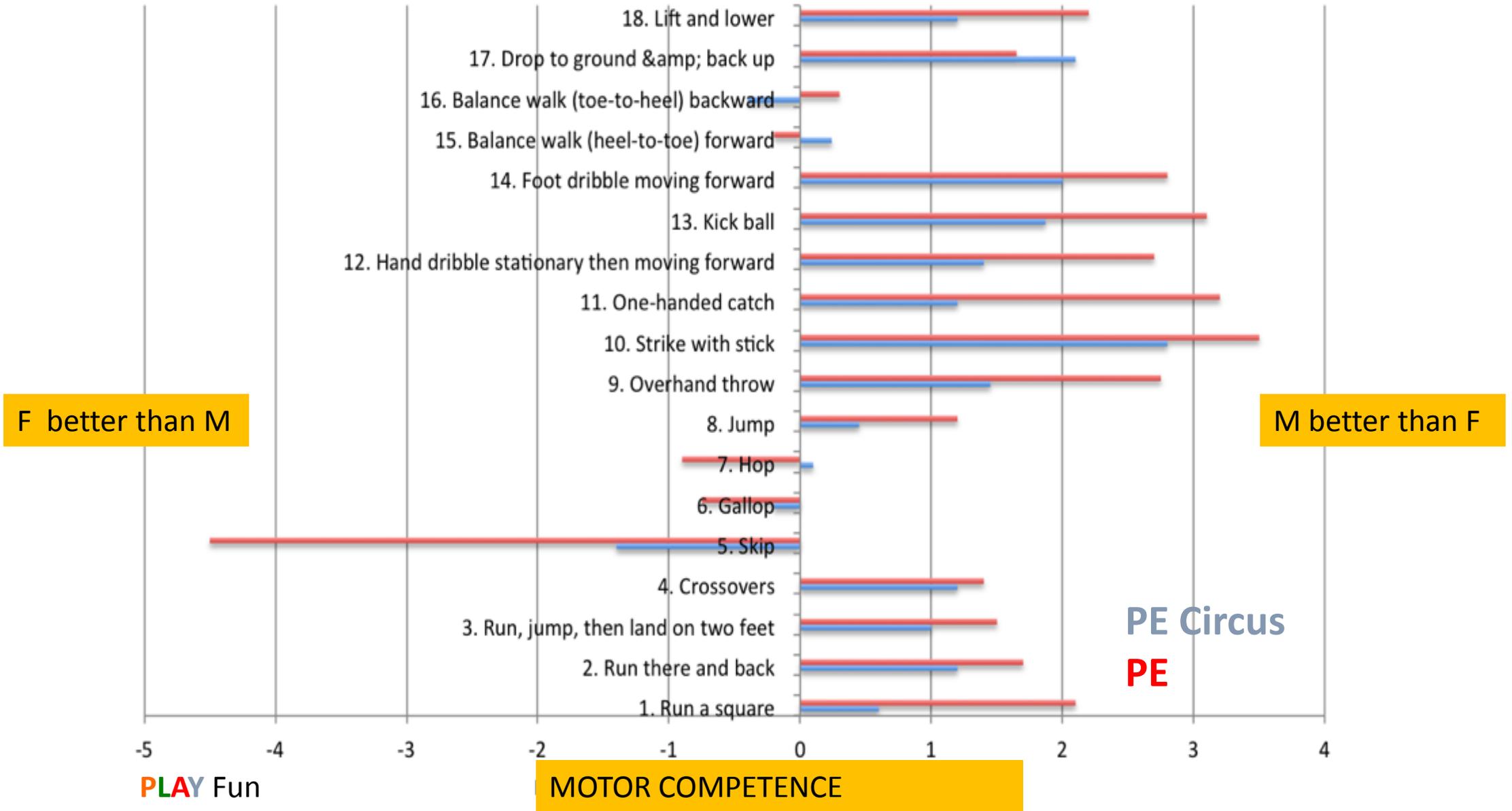
## Domains

- **Physical**
  - Environments
  - Diversity
  - Competence
- **Psychological**
  - Comprehension
  - Self-efficacy
  - Worry
  - Confidence
  - etc
- **Social**
  - Participation
- **PLAY Fun**
  - Motor Competence
  - Confidence
  - Comprehension of terms
  - Quantity of Acquired Movement Vocabulary
- **Perception Tools**
  - **PLAY Self**
  - **PLAY Parent**
  - **PLAY Coach**
- **Participation (PLAY Inventory)**
  - Type
  - Environment

# Motor Competence (Change over time)



# Sex Based Differences in Motor Competence (Circus reduces gender gap)



# PLAY Results

- Increased confidence and comprehension of movement terminology ( $p < 0.05$ , PLAY Fun)
- Increased participation in other activities
- Children in PE CIRCUS ( $p < 0.05$ , PLAY Self)
  - Feel they are talented.
  - Are more eager and motivated to participate, especially females.
  - Accept the importance of learning new movements.
  - Feel they comprehend movement terminology ( $p = 0.07$ )
- Coaches/PE teachers of children in PE CIRCUS rate them as having higher ( $p < 0.01$ , PLAY Coach)
  - Confidence, motivation, comprehension, and diverse movements

A person wearing a black jacket is holding a thick, braided white rope. The rope is coiled and has a metal ring at the end. The background is a dark, textured surface.

- **Impact and Effect studies**

- Master thesis done Tia Kiez
- Scientific poster, done
- Publication, coming....

New 3 year social innovation and research project funded through SSHRC

Looking at the effect of the initiation to circus arts  
**on Physical literacy, creativity and resilience**  
in children grade 5 and 6 (Patrice Aubertin, Dean Kriellaars,  
Michael Ungar, Patrick Leroux, Doug Klein, Alisan Funk)



(Adapted from Liz Taplin)



- **E-learning**

Assistant instructor and instructor training using a hybrid form of e-learning and presence learning.

- 3rd cohort
- English and French for now
- Portuguese and Spanish on its way

Ecolenationaledecirque.ca

<https://enc.moodle.deccllc.gc.ca/course/index.php?categoryid=9>

- **Web tools development**

Circus arts Implementation guide for elementary schools

- Decision matrix for stake holder; principals, school boards
- Advocacy, research and best practices
- Community of practice building

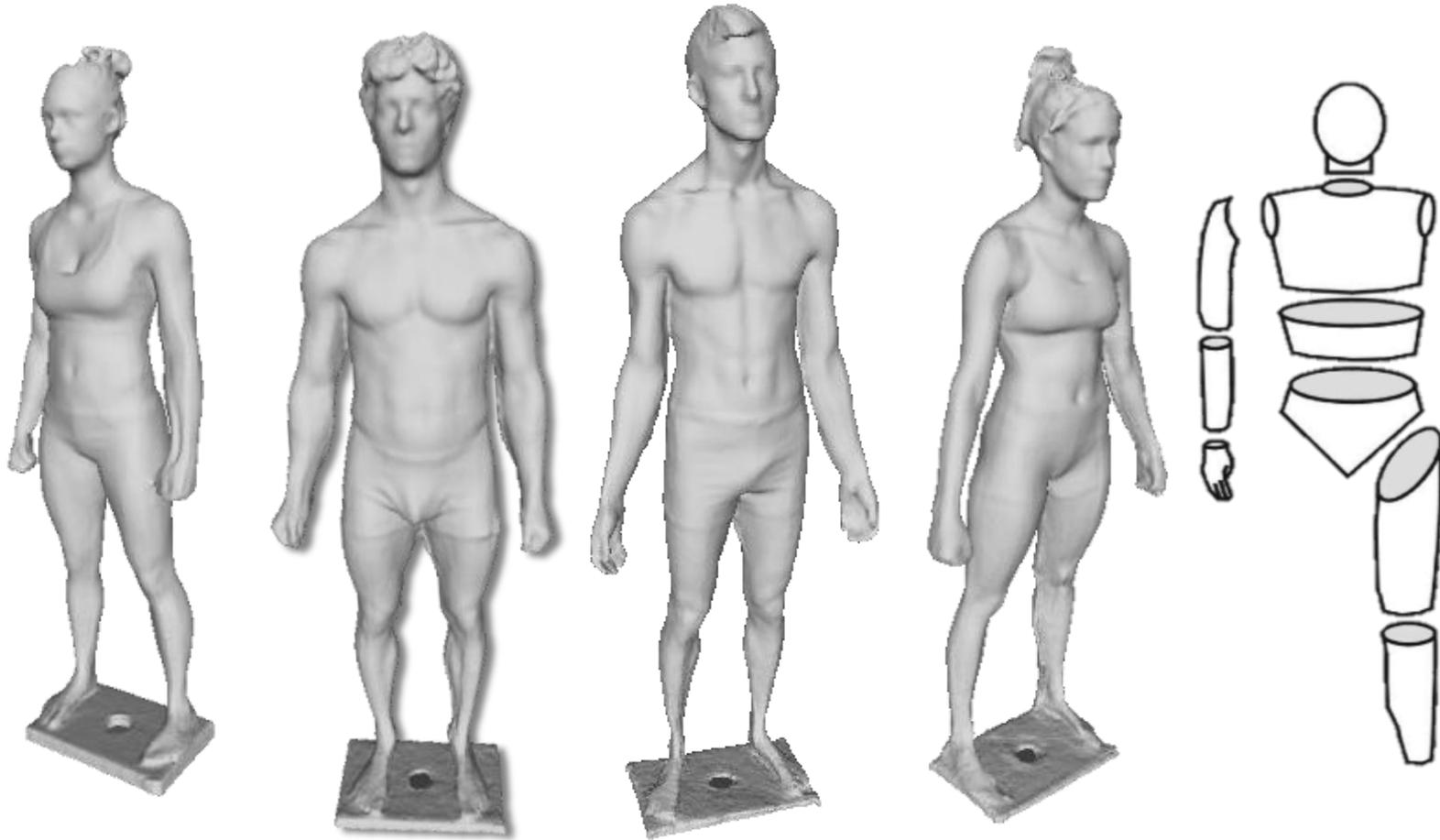
# ELITE

4 year project

- **University of Montréal;** Dr François Prince, Raphaëlle Creniault
- **University of Manitoba;** Dr Dean Kriellaars, Adam Decker, Dr. Sarah Travis
- **École Polytechnique de Montréal;** Dr. Annie Ross, Marion Cossinà
- **Concordia University,** Dr Patrick Leroux, Alisan Funk
- **Casting and Performance Cirque du Soleil**
- **National circus school**
  - Physical and mental readiness
  - Injury prevention/return to play
  - Risk management
  - Pedagogy



# Processed & Virtual Dissection



# Body Composition

**InBody230**  
BODY COMPOSITION ANALYZER



- TBW, DLM, LBM, SMM, FM
  - Expressed relative to BM (%)
- Ratio of UL, LL to BM and TRUNK
  - Normalize to own body
  - Relative comparisons
- Asymmetry for ULs
  - RUL and LUL mass
  - $RUL-LUL / (AVG \text{ BOTH LIMBS}) * 100$
- Asymmetry for LLs
  - RLL and LLL mass
  - $RLL-LLL / (AVG \text{ BOTH LIMBS}) * 100$
- Hydration status
  - $TBW/BM < 0.55$  Male
  - $TBW/BM < 0.51$  Female

# Circus Life Challenges

	1 Not a challenge at this time	2 Little challenge	3 Moderate, I can manage the challenge	4 <b>Moderate, having issues managing</b>	5 High, but I can manage	6 <b>High, difficulty managing</b>
Academic work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships (family)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships (friends)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships (romantic)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relationships (staff, teacher, coach, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demands of the school (schedule, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Language / Culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Preparation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical Skill (progression, level, achieving objectives)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artistic Skill (personal, objectives, performance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coping emotionally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substance misuse and abuse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DALDA (Rushall) &  
DHQ (Kanner)

# CIRCUS LIFE Challenges

- 1 Not a challenge
- 2 Little challenge
- 3 Moderate but can handle
- 4 Moderate having issues**
- 5 High but I can manage
- 6 High and having issues**

	Average	Min	Max	Major and Minor Coping Issues	Major Coping Issues
academic	1.95	1	6	4	1
financial	2.49	1	6	10	1
family	1.80	1	6	5	1
friends	2.23	1	6	11	2
staff	1.41	1	3	0	0
school	2.55	1	5	1	0
language	2.17	1	6	9	2
physical	2.79	1	6	10	3
technical	2.99	1	6	11	1
artistic	2.93	1	6	14	3
sleep	2.69	1	6	19	5
nutrition	2.37	1	6	14	1
coping	2.16	1	6	12	2
injury	2.36	1	6	11	4
substance	1.40	1	5	1	0

# Sleep Data

	REFRESHED	QUALITY	LATENCY
	1- refreshed	1- very well	1- no trouble
	10- exhausted	10- poorly	10- difficult
Average	4.1 / 10	3.7 / 10	4.1 / 10
Num > 5	21	17	18
% > 5	24.4	19.8	12.8

Manipulation students had the easiest time to get to sleep.

# ELITE

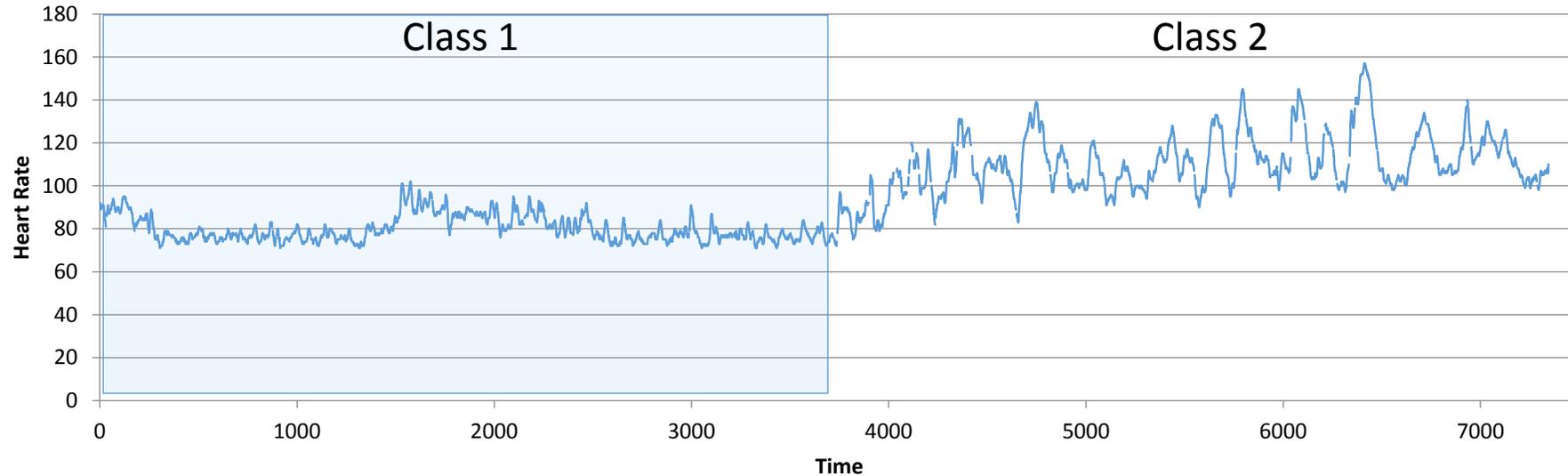
ABOVE measurements taken 4-5  
times/year  
September – December – January –  
March – (June)

# Biometrics from Hexoskin

- Heart Rate (Physiological load)
- Energy Expenditure (calories you burn from PA)
- Acceleration (Mechanical load)
- Steps
- Breathing



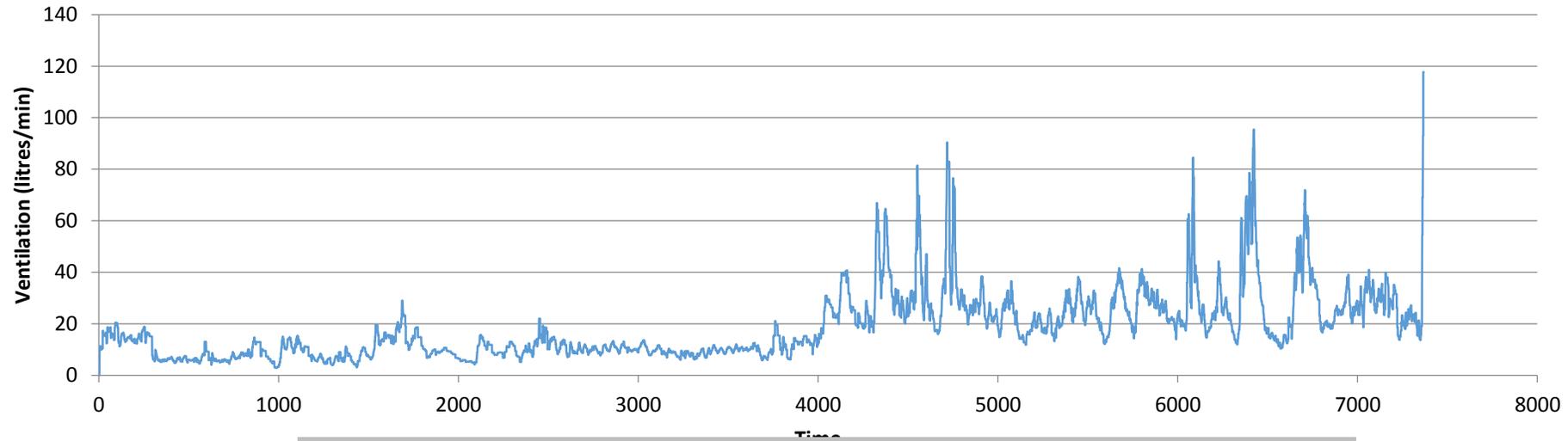
# Heart Rate – physiological load



STATS	MIN	MAX	MEAN	SD	SUM	COUNT
HEART RATE	71	157	94.70	18.63		7047

HR Zones	Min %	Max %	Duration (min)	Duration (%)
light	50	63	40.1	32.6
moderate	64	76	13.2	10.7
high	77	95	1.4	1.1
maximal	96	100	0.0	0.0

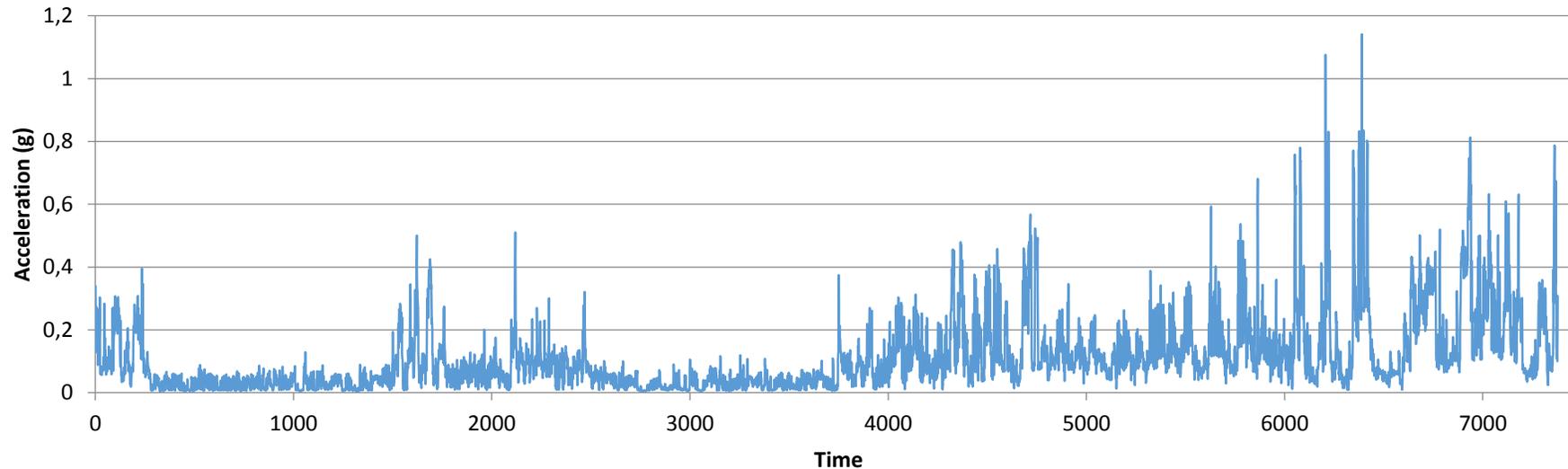
# Ventilation



STATS	MIN	MAX	MEAN	SD
Breathing Rate (bpm)	5	53	21.95	6.80
Ventilation (litres/min)	2.8	125.8	18.58	13.48
TIDAL Volume (ml)	106.2	6387.68	863.53	639.18

Ventilation	Min	Max	Duration (sec)	Duration (min)	Duration (%)
low	0	10	2256	37.6	30.58
med	10	30	4055	67.6	54.97
high	30	60	906	15.1	12.28
very high	60	max	155	2.6	2.10

# Acceleration – mechanical load



STATS	MIN	MAX	MEAN	SD
ACC	0.006	1.14	0.11	0.11

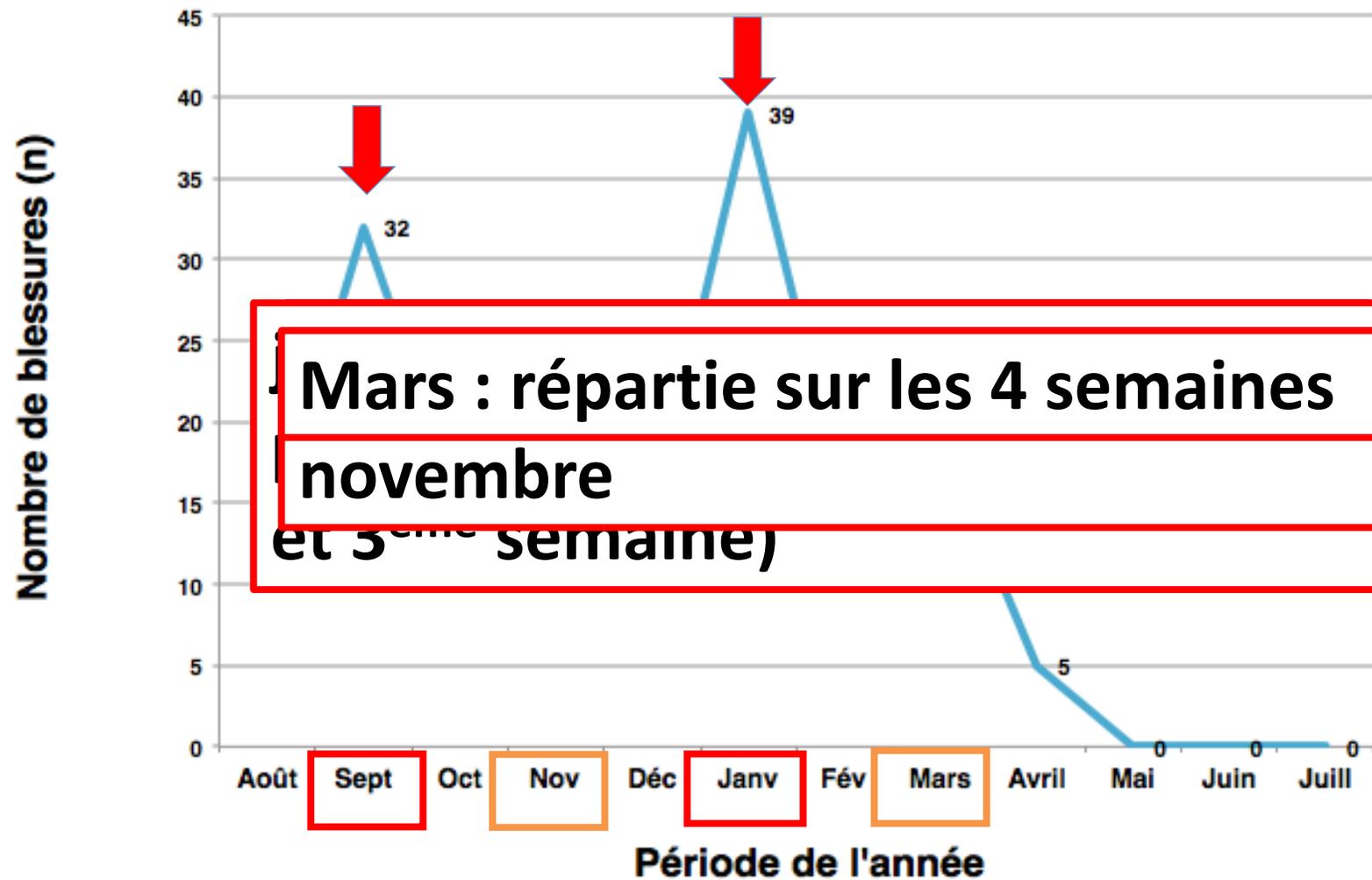
ACC	Min	Max	Duration (min)	Duration (%)
very low	0	0.02	18.13	14.75
low	0.02	0.1	59.52	48.41
moderate	0.1	0.3	37.08	30.16
high	0.3	1	8.18	6.66
very high	1	Max	0.03	0.03

# ELITE

ABOVE measurements taken every  
months for one week

# INJURIES : YEAR CALENDAR

NOMBRE DE BLESSURES DES ÉLÈVES AU CYCLE SUPÉRIEUR À L'ÉNC  
EN FONCTION DE LA PÉRIODE DE L'ANNÉE 2014/2015



# Performance Optimisation

## Risk management

RIG LOAD study

Single point, five disciplines

Evaluating Max Force, practice, rehearsal,  
performance

\*\*\*\*STRAPS = 7.9G found

Previous data (Vogel 2014) was 4.94G

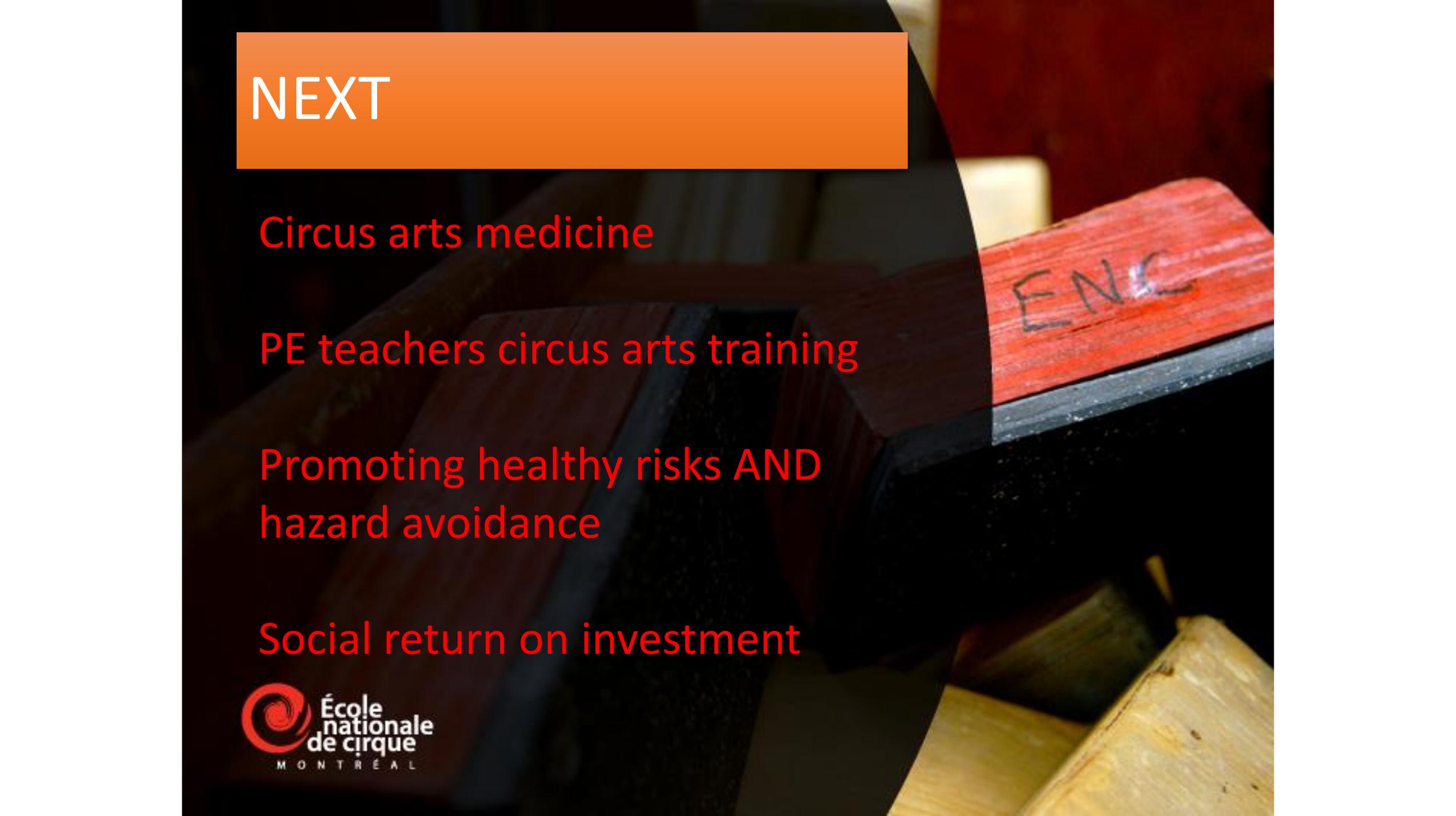
Breaking point at hanging point should  
now be at 22KN

# Performance Optimisation

**Circus arts pedagogy;**  
Triangulation = teacher- student-  
artistic counselor  
Relationship artist – art piece

- **Circus arts dramaturgy;**
- The codes, the material
- The relationship; action-intent-  
perception



The background of the slide is a photograph of a hand holding a red wooden block. The block has the letters 'ENC' written on it in black marker. The hand is wearing a dark, possibly black, sleeve. The background is dark and out of focus, showing some wooden structures.

# NEXT

Circus arts medicine

PE teachers circus arts training

Promoting healthy risks AND  
hazard avoidance

Social return on investment



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M O N T R É A L

**MERCI!**

