Building Sustainable Capacity in Biosecurity through Team-Based Learning

Tatyana Novossiolova

University of Bradford

Awareness-Raising and Education on Biosafety and Biosecurity in Ukraine
4-6 October 2014
Kyiv, Ukraine

Outline

- Combining Strategy and Content
- Active Learning vs. Passive Learning
- Implications: Teaching Biosecurity via Team-Based Learning

Based on Bradford Briefing Paper No 7, available at

http://www.brad.ac.uk/acad/sbtwc/briefing/3_BP_7.pdf

S&T Advancement and Biosecurity

- ‘genetic engineering technology and the **practices of the community that sustains it** have definitively displaced the potential threat of biological warfare **beyond** the risks posed by naturally occurring epidemics’

- ‘…for voluntary controls to play a useful role in the management of problematic information…**scientists will first need to recognise their ethical and moral responsibilities to society** in the pursuit of knowledge. Scientists have obligations to society that involve **more than blind pursuit of information**. Like clinicians, scientists have an **obligation to do no harm**.’

Biosecurity Education and the BTWC (i)

- *the concepts of biosafety, biosecurity and bioethics, as well as their relevance to life sciences;*
- *relevant national and international oversight, including import/export controls and the Convention;*
- *biosafety, biosecurity, dual-use and bioethical risks of life sciences;*
- *approaches for the management of research and responsible conduct of research;*
- *dual-use conundrums and dilemmas that arise due to the impact of science and technology on society; and*
- *communication dilemmas that arise due to ethical, legal and social considerations.*

Biosecurity Education and the BTWC (ii)

The Meeting of States Parties in 2013

- *agreed on the value of promoting education on the Convention and the dual-use nature of biotechnology, including* ***through preparing easily accessible and understandable courses****, integrating consideration of biosecurity with broader efforts on bioethics, and* ***assessing the impact of such education****.*

- *agreed on the value of using* ***science responsibly as an overarching theme*** *to enable parallel outreach efforts across inter-related scientific disciplines, as well as taking* ***full advantage of active learning techniques****, consistent with national laws and regulations*

Why Pedagogy Matter?

- *'humans are not adept at making connections between disparate fields or types of knowledge, unless they are specifically helped to do so through education'* (NAS 2000)

Therefore, for education to be effective, attention has to be given both to the **content** of what is being taught and the **method** being used for the particular group being educated.

Active Learning

Active Learning vs. Passive Learning

- A learner-centred mode of instruction that stresses collaboration, enquiry and critical thinking and helps people take control of their own learning

- Increases *'the degree to which students will transfer to new situations without the need for explicit prompting'* (NAS 2000)

- NAS (2010): teaching strategies that encourage reflection and critical thinking could tremendously enhance the effectiveness of biosecurity education and promote its sustainability

Reverse Engineering Design

Traditional Approaches

1. **Select a textbook**
2. **Compile a syllabus and assignments**
3. **Construct examinations**
4. **Describe learning goals and objectives**

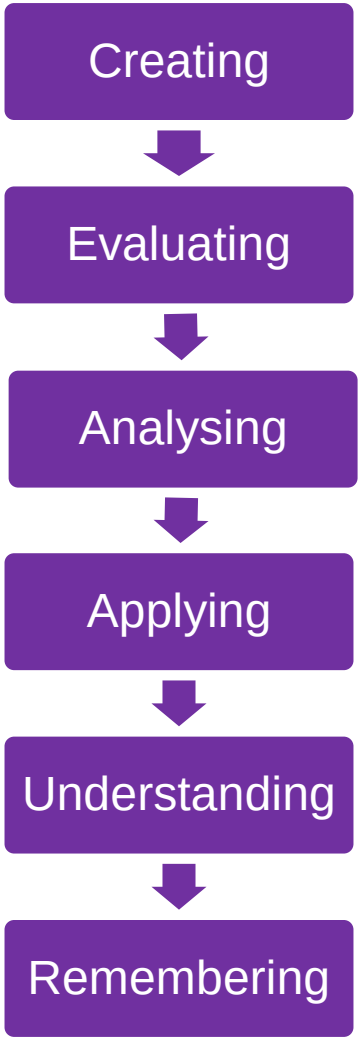
Active Learning

4. **Select a textbook**
3. **Construct examinations**
2. **Compile a syllabus and assignments**
1. **Identify learning goals and objectives**

Team-Based Learning (TBL)
Командное Обучение

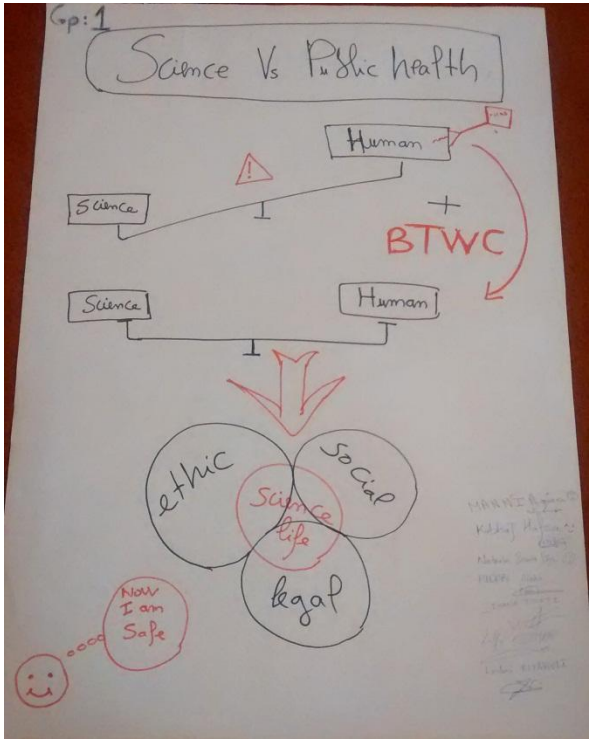
Специальная форма **интерактивного обучения**, в котором фокус смещен с подачи концепции инструктором на **применение концпций** командой студентов/участников

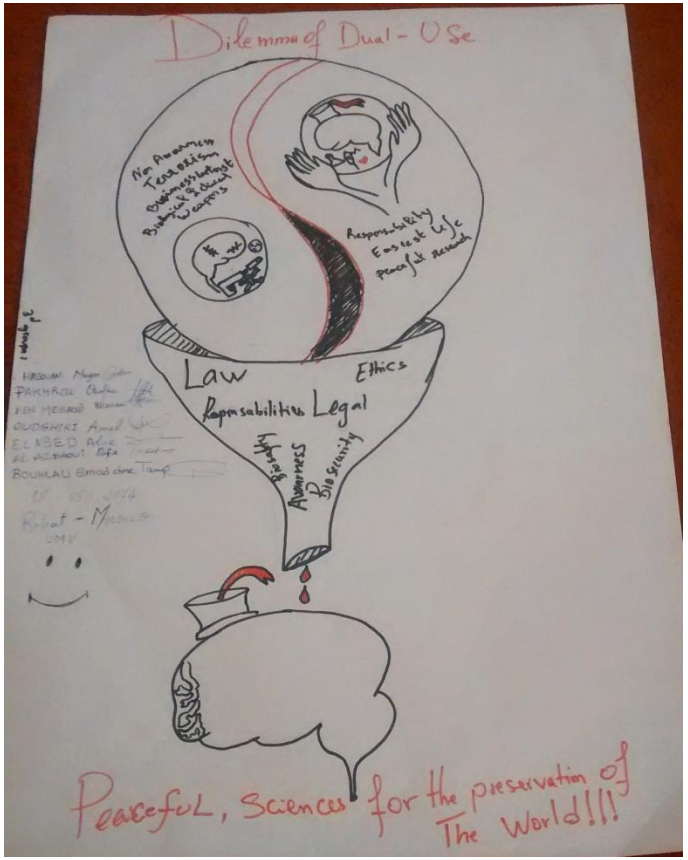
1. Pre-Reading Activity
2. Individual Readiness Assurance Test (iRAT)
3. Team Readiness Assurance Test (tRAT)
4. iRAT and tRAT Feedback Session
5. First Team-Based Application Exercise
6. Second Team-Based Application Exercise



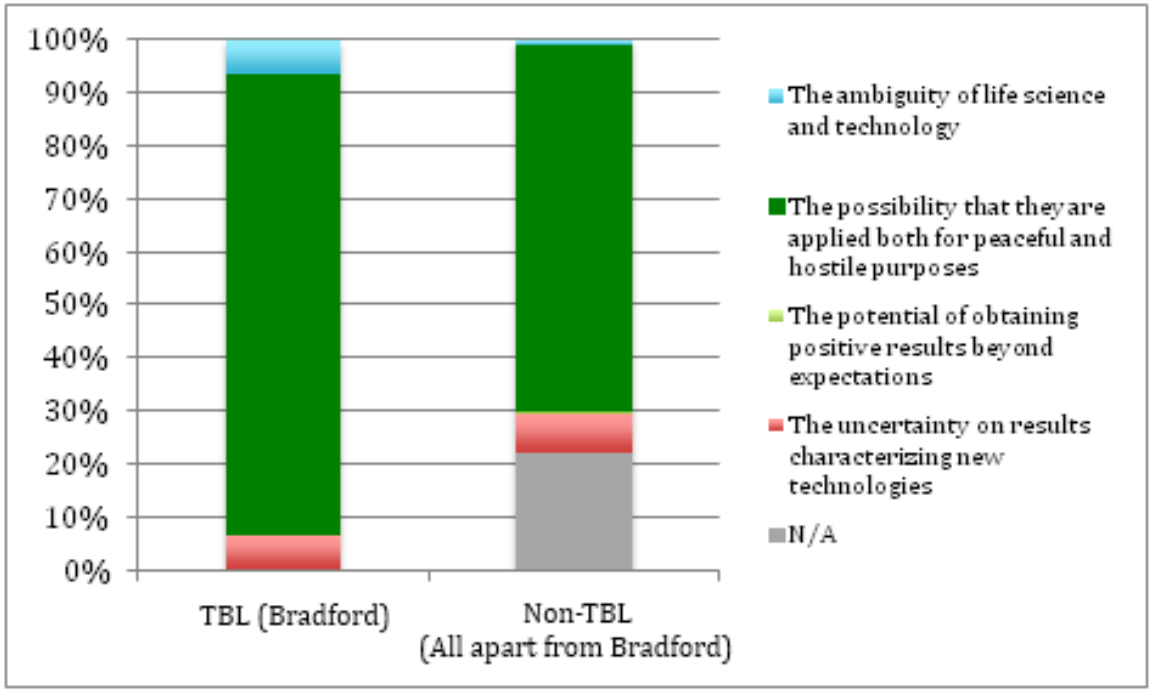
TBL in Bradford…

…and in Morocco





Teaching Biosecurity via Team-Based Learning



"Which of these statements best defines the dual-use dilemma?"

- *Bioethics and Responsible Research*, interactive seminar held at the University of Bradford (November 2012)
- 30 participants divided into 5 teams

Biosecurity Team-Based Learning Education Package

Five Threshold Concepts

1. General Purpose Criterion
2. Developments in S&T Relevant to the CBW Non-Proliferation Regime
3. Responsibilities of Life Scientists with Regard to Biosecurity
4. National Implementation of the BTWC
5. Web of Prevention

Biosecurity TBL Education Package: Key Features

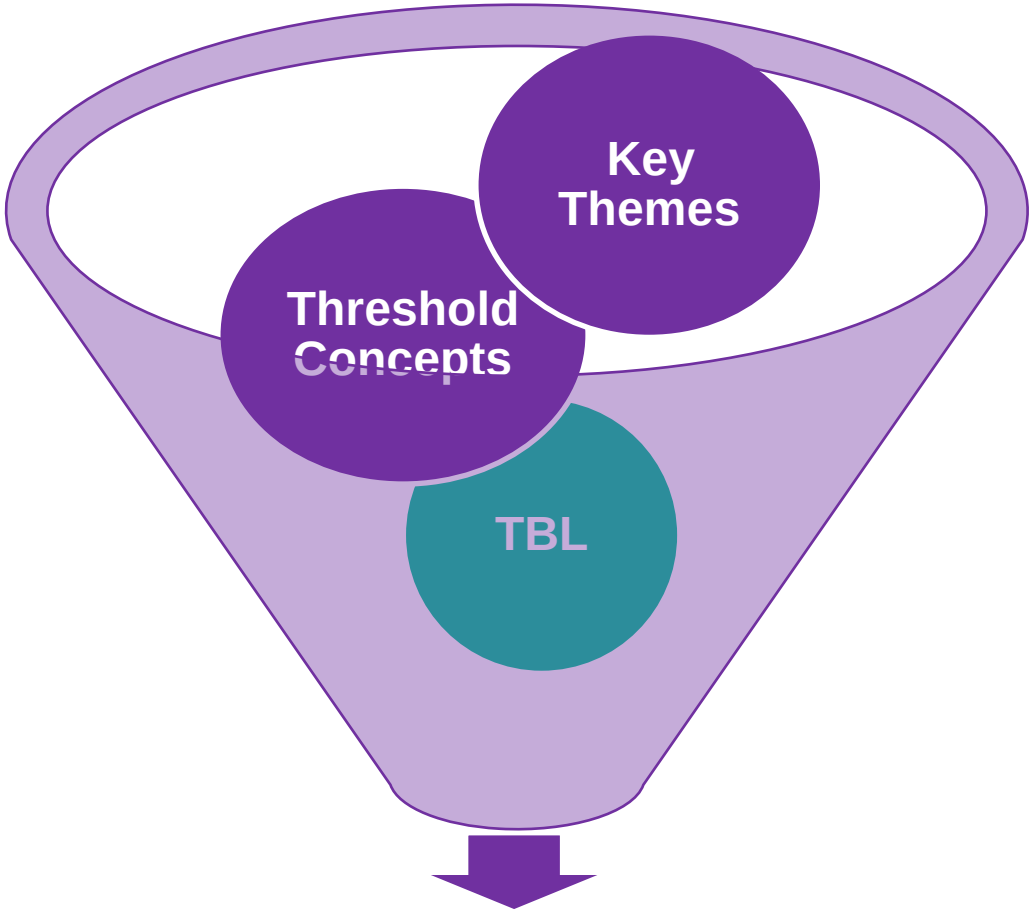
- Comprising pre-readings, iRAT and tRAT quizzes, sample application exercises, detailed train-the-trainer instructions and reference materials

- All materials are open-source, user-friendly and freely available online at http://www.brad.ac.uk/bioethics/

- Adaptable to different learning contexts and suitable to use both with students at university level and with practitioners as part of continued professional qualification

- Jointly funded by Canada's Global Partnership Programme and the UK Global Partnership Programme

- An online book that would be made available initially in both English and Arabic

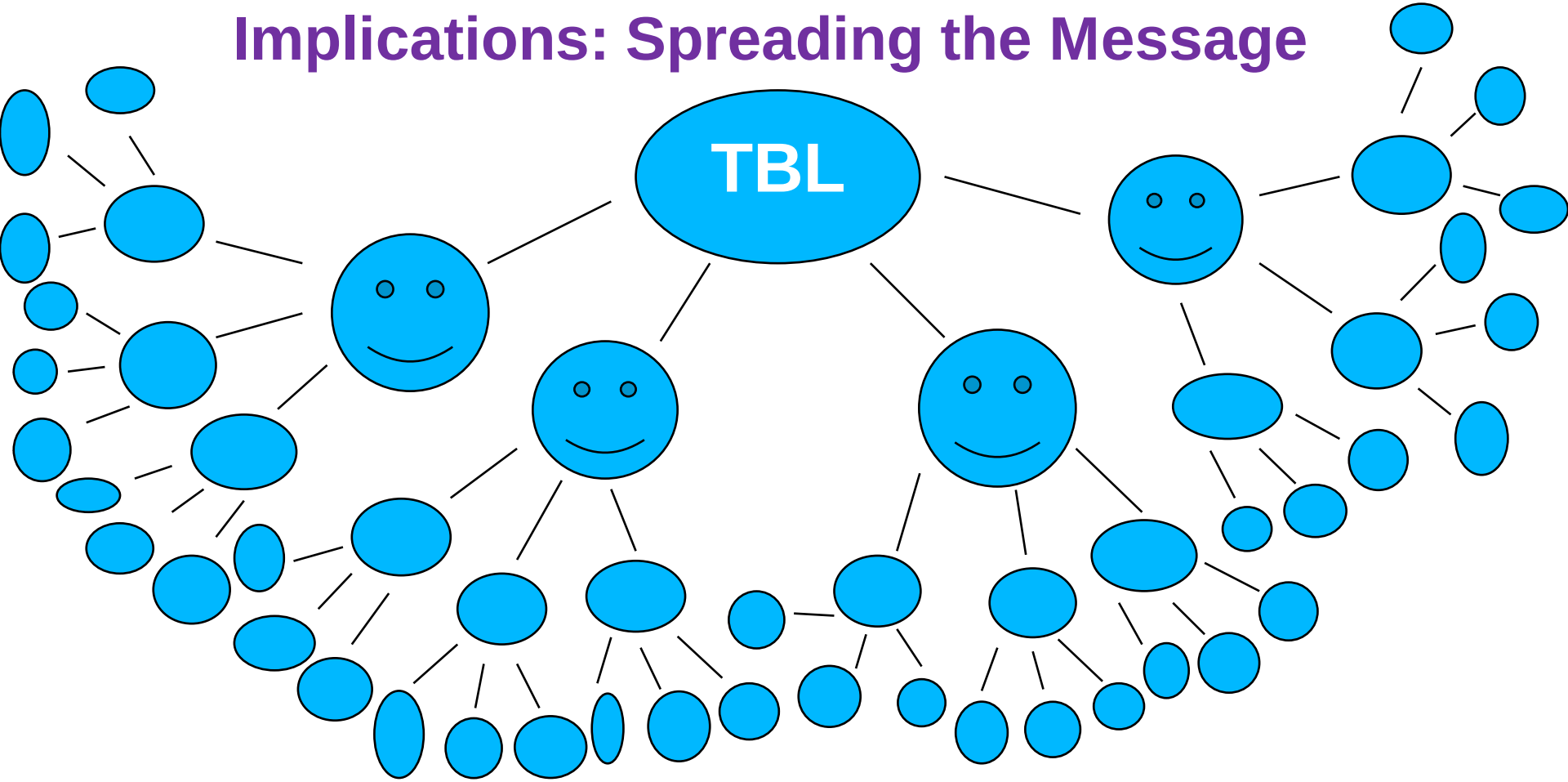


Biosecurity Textbook

Implications: Toward Biosecurity Competence

- Team-Based Learning is an efficient and effective technique for teaching biosecurity both to prospective and career life scientists
- It is a **teaching game**, not a learning game
- It is easy to replicate, so no extensive prior training is required
- It helps learners develop understanding of relevant threshold concepts, make connections between them and acquire skills for their practical application

Implications: Spreading the Message



Дякую за Увагу!

t.a.novossiolova@bradford.ac.uk
Tel: +44 (0) 1274 236861
www.bradford.ac.uk/bioethics