Effective and Sustainable Biosecurity Education: The Benefits of Active Learning

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Outline

- Need for Education: Strategy and Contents
- 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

Biosecurity Education and the BTWC

13. The Conference notes the value of national implementation measures…to:

(c) promote amongst those working in the biological sciences ***awareness of the obligations*** *of States Parties under the Convention, as well as relevant national legislation and guidelines;*

SAI on *'Review of Developments in the Field of Science and Technology related to the Convention':*

(e) ***education and awareness-raising*** *about risks and benefits of life sciences and biotechnology;*

Education and the CWC

9.101 The Third Review Conference ***acknowledged the role of education, outreach and awareness-raising as a relevant activity for the national implementation of the Convention […]***

113. The Third Review Conference:

(c) Called upon States Parties and the Secretariat, as part of efforts to promote the ethical norms of the Convention, ***to encourage and promote efforts by the appropriate national and international professional bodies to inculcate awareness amongst scientists and engineers at an early stage in their training that the knowledge and technologies used for beneficial purposes can also be misused for harmful purposes;***

Lessons from Nuclear Security Education

Biosecurity education is a **long-term** objective which requires

- **Systematic strategic planning**
- **State-led initiatives**
- **International coordination and cooperation**
- **Adequate financial support**
- **Unequivocal continuous commitment**

Combining Strategy and Contents

- *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 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

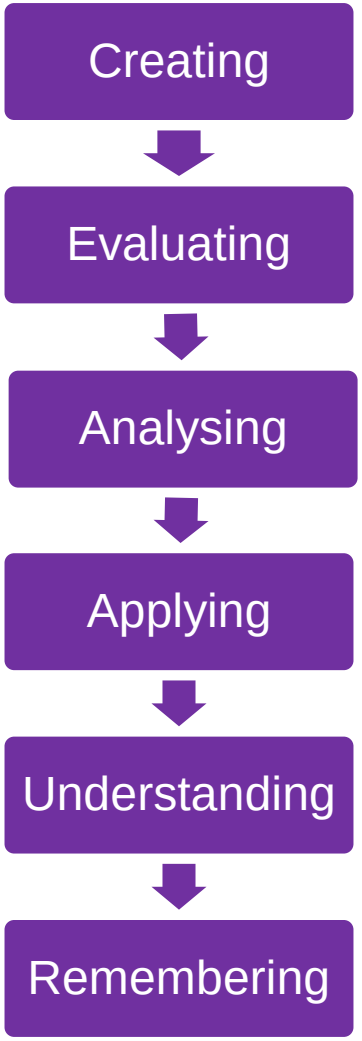
- Increases *the degree to which students will transfer to new situations without the need for explicit prompting'*(NAS 2000)

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

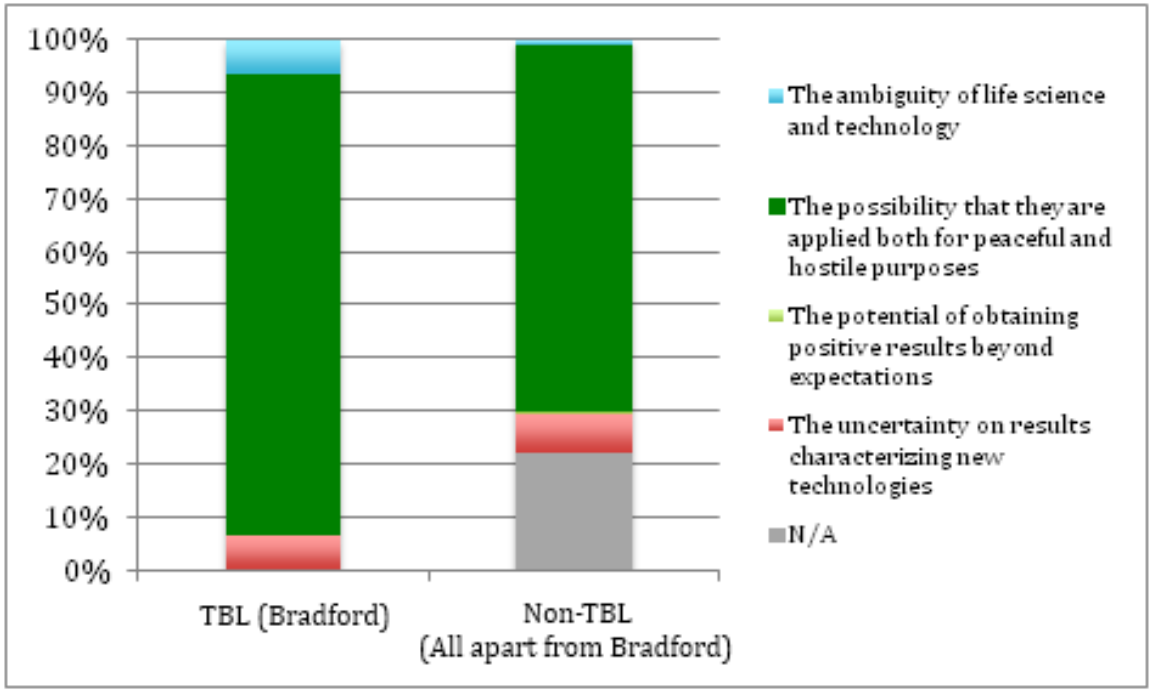
Team-Based Learning (TBL)

A special form of collaborative learning that **uses a specific sequence of individual work, group work and immediate feedback** to create a motivational framework, whereby the focus is shifted from conveying concepts by the instructor **to the application of concepts by student teams**

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



Teaching Biosecurity via Team-Based Learning



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

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

Toward Biosecurity Competence

- Team-Based Learning is an efficient and effective technique for teaching biosecurity both to prospective and career life scientists

- Short course in Biosecurity based on Team-Based Learning

  - International Prohibition Regime

  - S&T Development and Dual Use (e.g. Convergence)

  - Social Responsibilities of Life Scientists

  - National Implementation of the BWC/CWC

  - Web of Prevention