

Project P633 EDUCATION AND AWARENESS-RAISING IN UKRAINE

Report

1st Testing of the educational module

(March 3, 2017, Dnipro, Ukraine)

The 1st Testing of the educational module developed within the Project P633 in certain Ukrainian universities was held at the State Establishment ‘Dnipropetrovsk Medical Academy of Ministry of Health of Ukraine’, Department of Microbiology, Virology, Immunology and Epidemiology, Dnipro, Ukraine on March 3rd, 2017.

The 1st Testing consisted of the pre-reading homework stage and the classroom activities. ‘Biological weapons as weapons of terror: perspectives on the threat’ was the subject of the lesson. A team-based learning (TBL) was used. The target group was Master-level students of 5 course, field of education ‘Medical practice’ (27 person) and their teacher (Dr. Stepanyki Dmytro, Doctor of Medical Science, Associate professor, Department of Microbiology, Virology, Immunology and Epidemiology). Guests: the faculty and administrative staff, other engaged employees (13 persons). Auditors: Dr. Galyna Gergalova and Dr. Iaroslava Maksymovych.

Testing results

For this testing, Dr. Stepanyki used Chapter 4 ‘Biological weapons as weapons of terror: perspectives on the threat’ of ‘Preventing Biological Threats: What You Can Do’ and Chapter 4 ‘Examining the Risk of Bioterrorism’ of ‘Biological Security Education Handbook: The Power of Team-Based Learning’.

Team-Based Learning approach was used during the training. The following activities were performed: Individual Readiness Assurance Tests (iRAT), Team Readiness Assurance Tests (tRAT), First and Second application exercises. The 27 students were divided in four groups (7 persons were in 1st, 2nd and 3rd groups, 6 persons in 4th group).

1) iRAT and tRAT analysis.

After the homework pre-reading, in the classroom participants passed the individual quizzes (iRATs) well. 62% of students chose the answers that were considered as ‘correct’ options. The easiest question was the following: ‘What is the commonly accepted difference between ‘bioterrorism’ and ‘biocrime’?’. 96% of participants thought that ‘The kind of motivations that underpin them’. More detailed results of iRAT and tRAT tests are presented in Table 1. Additionally, the table shows that the students passed tRAT more successfully than iRAT (80% and 62% of correct answers correspondingly). It sustains the effectiveness of team-based learning, when students have possibility to share their knowledge, discuss and choose the correct answers.

Table 1. Answers to iRAT and tRAT tests

Question	Correct Answer	iRAT, %	tRAT, %
1 What is the commonly accepted difference between 'bioterrorism' and 'biocrime'?	The kind of motivations that underpin them.	96	100
2 According to Chapter 4, a bioterrorist attack	is likely to have a significant psychological impact.	67	100
3 Which statement about the 'Amerithrax' is FALSE?	It was the first case when the causative agent of anthrax was used for the purposes of bioterrorism.	63	100
4 Tacit knowledge is	difficult to transfer.	41	50
5 Which statement BEST characterises the risk of bioterrorism, as presented in Chapter 4?	Increasing access to materials and proliferation of expertise could raise the risk of small-scale bioterrorism attacks.	44	50
Average Score		62	80

2) First application exercise analysis.

The task of the First application exercise was: 'Based on the information provided in Chapter 4, which one of the following options best summarises the potential threat posed by bioterrorism:

- A. The threat is exaggerated; there is limited potential for the life sciences to be misused by non-state actors;
- B. The development / acquisition of even a very crude and simple biological weapons is very difficult and its effectiveness is not guaranteed;
- C. The tacit knowledge barrier means that would-be bioterrorists would always face obstacles to using novel technologies for hostile purposes, regardless of how much the technology evolves;
- D. While a bioterrorist attack involving high technology may be unlikely at this stage, the risk of a low-cost attack involving a crude weapon is real and requires that countermeasures are taken;
- E. The potential sources of a bioterrorist attack are known and clear, so it is easy to predict and assess the risk of who may choose to use pathogens and/or toxins for hostile purposes and under what circumstance;
- F. The scientists working in high-containment laboratories with access to dangerous pathogens pose by far the biggest bioterrorist threat;
- G. Synthetic biology poses by far the biggest bioterrorist threat as it allows would-be bioterrorists to develop biological weapons fast, cheaply and in the absence of sophisticated equipment;

H. Novel technologies can be easily exploited for bioterrorist purposes even by individuals with no scientific expertise.'

All groups had to complete the task within 20 minutes. The students' choices were the following: 1st and 3rd groups selected option F (see above) but 2nd and 4th groups selected option D (see above). The presentation of answers during the First application exercise resulted in a hot discussion. While a bioterrorist attack involving high technology may be unlikely at this stage, the risk of a low-cost attack involving a crude weapon is real and requires that countermeasures are taken. The students showed high level of understanding of learned materials and capability to defend their opinions.

3) The Second application exercise analysis

The Second application exercise promotes students to apply their knowledge in a practical way.

The task of the Second application exercise was: 'Your team forms an institutional biosafety committee within a high-containment research facility, where work on dangerous pathogens, such as the causative agents of anthrax, plague, and Q fever, is carried out. In light of the anthrax letters attack, you have been tasked with reviewing the internal biosecurity policy to ensure that appropriate rules and procedures are in place with regard to the risk of bioterrorism. Suggest at least three measures that could help to enhance biosecurity within the facility and prevent the potential hostile misuse of the pathogens hosted there. Think about how you would promote the new rules among the life scientists working at the facility.'

All groups completed the task within 40 minutes. All groups have done this exercise very well. The students selected needed measures that could help to enhance biosecurity within the facility and prevent the potential hostile misuse. Each group presented the adequate measures. Totally, proposals of all groups covered all aspects of biosecurity within the facility. The students of the 3rd group presented their measures very creatively.

4) Participants' feedback

During the debrief, students provided positive feedback and emphasized the 'creativity, freedom, brainstorming, and competition' of team-based learning.

The teachers who observed the classroom activities were surprised by the TBL capabilities to efficient teaching of students. They suggested that this approach minimize the time for lectures preparation, but requires more time and creativity for development of tests and application exercises. The teachers indicated that this learning approach provides possibility to see students from other side and to evaluate students' capability to apply knowledge in practical way.

The University administration is preparing a document on the effectiveness of the module implementation at the University.