

New options for teaching Scientific Reasoning in 2017-2018: Application of the EXPO-2017 tactics, errors, advantages and prospects

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This year we decided to have updated our course on scientific reasoning at KazNU for biologists, biotechnologists, plant ecologists and K-12 biology teachers by means of arranging an exhibition to demonstrate products, kits and technologies presented to the classmates and guests of ours.

So the graduates have been focused on different topics such as planting soil amelioration with the wool fiber matter (presenters graduate students U. Aliyaskarova, R. Matayeva, A. Krasilova, and A. Togombayeva), rapid manipulations allowing to analyse commercial potato chips and their fat components (team led by Mr. M. Umit), technology of three-step water cleaning (K. Qulymbet, D. Kakabaev, and S. Aken), bioreactor-based propagation of virus-free elite potato microtubers for the farms (A. Edilova, K. Mukasheva), carbon-based enterosorbent geroprotection (D. Bokenbay, D. Madi, O. Umirbekova, D. Khodzhabaeva), drip irrigation tree-planting technology in conditions of salty dry lands (presentation to be edited), anesthetic slime (presentation to be edited) and dry fruit vitamin composing (M. Smailova, K. Cherikbayeva), etc. Several others booths are supposed to be presented also this and next week.

Exhibition plan has been posted by the instructor including Ch. Vernon's recommendations (see: www.senatehouseevents.co.uk/features/how-plan-exhibition), F. Matassa tips (see www.cilip.org.uk/blog/10-tips-organising-exhibition-museums-libraries-archives), and known Smithsonian Institution's guide of 2002 available online. All these tips had been uploaded for the students by using KazNU Intranet network in advance.

Advantages of the exhibition arrangement are quite obvious as the graduate students are urged to work out a product, model or technology to be presented as a pilot project, working machine, hands-on experiment to be carried out right before the audience, or a cover letter to city (town) administration with the request for idea's sponsorship, and so on. This puts forward the issues of inventiveness and coordination of the team leader and his co-workers. Under such circumstances resourcefulness has to rise, since questions coming from the audience may stretch far beyond the model or technology itself, and there may be too short period for a suitable answer or proper demonstrating. Secondly, the exhibition improves artistic presentation skills, as repeated experiments may be needed to demonstrate pattern's implications, different versions of patterns or possibility to use suggested technology on the samples offered suddenly by the spectators. Moreover, such demonstrations occur to be highly competitive, and therefore the presentations are more accurate than those prepared for ordinary seminars. Exhibition format is also appropriate tool towards improving body language, speech mode and speed, pronunciation and the effect of narration on the audience.

As for the errors, typical faults are referred to as the lack of controls (positive and negative samples) while presenting hands-on experiments, inability to examine alternative samples, sets solutions, media, soils, reluctance to briefly summarize proper conclusions, absence or scarcity of references, experiment's conduction without gloves, eye glasses, and some other technical shortcomings. In addition, there are problems with pronunciation, speed and fluency of the speech. Nonetheless, owing to instant discussions arising around each exhibition pattern, model or technology, the quality of narrating and demonstrating becomes better. This tactics allows not only diminish errors but it develops further ideas how to improve a new product or modify technology for other conditions or populations. In the end this may bring to cheaper costs and new options for production or inventor's strategy. For instance, while discussing the assembly of the water filter, we claimed the presenters to modify filter's set for the case of natural water's softness observed in the mountain areas or the case of the chloride abundance in the water of South of Kazakhstan. So depending on the region and water consumption, filter's setting as its price may be reduced owing to simplified composition. After the exhibition and its hot discussions, all presentations and leaflets advertising products and technology are supposed to be edited, completed and saved in team's and instructor's portfolio.

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