

**Case Study on the implementation
of the ESTABLISH
Teacher Education Programme
in Slovakia**

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Content

- Physics, Chemistry, Biology as teaching subjects
- In-service teacher training
- ESTABLISH Teacher Education Programme in Slovakia
 - First session
 - Second session
 - Third session
 - Fourth session
 - Following activities
- IBSE at school as a teachers` team work

Physics, Chemistry, Biology as teaching subjects

Physics, Chemistry, Biology as teaching subjects

- International Standard Classification of Education

ISCED 0 Pre-primary education

ISCED 1 Primary education - first stage of basic education
subject „Natural science“

ISCED 2 Lower secondary education – second stage of basic education
Physics, Biology, Chemistry = thematic field: Human and nature

ISCED 3A Upper secondary education (Gymnasium)
Physics, Biology, Chemistry = thematic field: Human and nature

<i>Lessons per week</i>	5th	6th	7th	8th	9 th	Total
Lower secondary	0/0/1	1/0,5/1	1/0,5/1,5	2/1/1	1/2/1	5/4/5,5

	1st	2nd	3rd	4th	Total
Upper secondary	2/2/2	2/2/3	1/1/1		5/5/6

Main objectives (upper secondary level)

Scientific inquiry

at the end of the course student should be able:

- to formulate a problem, research question, that can be answered by experiment
- to formulate a prediction,
- to test a prediction,
- to plan an appropriate experiment,
- to formulate a conclusion according to observation and experimentation, to comment on measurement errors,
- to formulate the validity of conclusions based upon a series of measurements,
- to evaluate the overall experiment including the procedures used in it.

In-service teacher training

In-service teacher training

- National programme/strategy for teachers` personal development
- Credit system for further teacher education
 - 1st and 2nd attestation
- Certificated courses - Ministry of Education Accreditation Commission for further education
- F2F and distance courses with help of e-learning,
- 5 days / school year
- National projects for teacher training:
 - Modernization of the education at primary and secondary schools
 - Support of professional orientation for technical education
 - ...



In-service teacher training

- Teacher training faculties – no special financing
- Long term tradition in further teacher education
 - Clubs of science teachers
 - Infoage project
 - Distance education
 - Modernization of education
- Club of school directors at Faculty of Science
- FP7 project Establish
Establish – Teacher educational programme

ESTABLISH
Teacher Education
Programme in Slovakia

ESTABLISH Teacher Education Programme in Slovakia

Organization

Number of participants:

- 50 in-service teachers
(19 – physics, 18 – biology, 13 - chemistry)
- 30 pre-service teachers
(5 – physics, 17 – biology, 8 - chemistry)



Number of sessions:

- In-service teacher training: 4 sessions, each session 3 hours
- Pre-service teacher training: running during the regular course aimed at science education
(biology – 16 lessons, chemistry – 10 lessons, physics – 12 lessons)

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First session

- Introduction to IBSE - what it is, why we need IBSE,
- Inquiry cycle, constructivist inquiry cycle (Llewyn, 2004),
- Group discussion about the IBSE elements in Slovak national curriculum, current situation of IBSE elements implementation at schools, which elements teacher use in their everyday practice and which not,
- Hierarchy of inquiry activities (5 levels according to Establish materials) with concrete examples for biology/physics/chemistry.
- Teachers were discussing about the levels of inquiry they dominantly use in their teaching

Conclusion: teachers dominantly use traditional methods with several tries of interactive demonstrations or guided discovery activities (guided inquiry very rarely).

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Second session:

- Introductory presentation of the units and their structure and content.
- Group work, teachers were working **in the role of students** on the Establish units activities of **different levels of inquiry**.
- Analysis of the performed activities from the point of view of skills that are being developed within the activity realization, with emphasize on the formulating problems, formulating correct hypothesis.
- It was announced that the course will be finished by the teachers' own output – design of own activity in IBSE mode.



Conclusions: From the point of view of teacher the regular interactivity and feedback was stressed since teachers tend to talk much during the classtime.

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Third session:

- Continuation of activities training with emphasize on **ICT element**.
- ICT tools were presented with the emphasize of their potential to enhance IBSE.
- Teachers carried out activities that contained ICT, e.g. measuring with sensors, video measurements.
- The stress was put on developing students' skills concerning **collecting data** and their **processing** and **analyzing**.



The lecturer directed teachers to try out selected inquiry activity in their class.

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Fourth session:

- Was aimed at training bounded/open inquiry activities with emphasize on **industrial links**.
- Analysis of the existing units from the point of view of industrial links.
- How teachers work with industrial links in their practice.
- Discussion on study visits based on the recommended Establish outline.
- Pre-service teachers visited transfusion centre and water work in Bukovec that supplies water for the city.



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Fourth session:

- Preparation of pilot teaching – in-service teacher training.
- Discussion about which activities to choose, how to implement, how to use the evaluation tools, teacher profiles and student profiles.
- Participants tried at least 3 unit activities completing teachers and students profiles.
- Results of this pilot teaching was provided for further analysis to the responsible Establish partner.



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Following activities:

- These four Establish sessions finally got a part of the **existing in-service teacher training course** offered by the Faculty of Science, P.J.Safarik University in Kosice:
„ Modern trends in science education“.
- The course is an accredited course of 65 hours (40 present hours and 25 distant).
- From the original number of 50 teachers, 25 (12 physics, 7 biology and 6 chemistry teachers) of them followed on with this accredited course.
- The final part of the course is a teachers' defense of their own work that they have to produce as a result of training.

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Following activities:

- Each of the participants developed his own IBSE activity on the selected level of inquiry.
- The activities were prepared keeping the Establish units format (material for teachers as well as materials for students – worksheets, files for computer, etc.).
- The teachers' projects were presented at the final defense (15 minutes presentation followed by discussion) in front of 3-members board where all the participants were present.
- These materials are available for the use of teachers online.

IBSE
as teachers` team work
at school

IBSE as teachers` team work at school

- The idea is to create **teams of trained teachers** from the same school that are educated in the field of IBSE.
- We are building school teams on the basis of teachers who were already trained in IBSE.
- Having one trained teacher from a school his colleagues – teachers of other subjects will be trained.
- These teams will be able to cooperate and exchange ideas and give support to each other.
- More lessons in IBSE mode in the same class in order to expose students to systematic influence of this way of teaching.
- The impact on students will be monitored and analyzed.

IBSE as teachers` team work at school

School projects for IBSE implementation

- Trained teachers initiated school projects for IBSE implementation
- Establish team members:
 - lecturers for one day seminars at schools,
 - reviewers of activities created by teachers within the projects.

Thanks to **Establish** project we started with study of inquiry activities, their adaptation, development, piloting and evaluation.

Thank you for your attention