

The Process Of Increasing Self-Efficiency Of Students Through The Introduction Of Problem-Based Learning (PBL)

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Context

- **Region:** Kazakhstan
- **School:** School funded by government
- **Admission requirements:** Entry exams
- **Focus group:** Grade 11 Biology students in NIS school in Taraz, Kazakhstan
- **Number of students:** 8
- **Language of instruction:** Russian, Kazakh and English
- **Problem:** Low level of effectiveness of students



Introduction of Problem-based learning



Temasek Polytechnic is a post-secondary institution located in Tampines, Singapore.



Research phases:

1. Study PBL (2013)
2. Analysis of teaching practice (2014)
3. Data collection(2014)
4. Introduction of PBL(2015)
5. Monitoring and data analysis

PBL supporters

Karen (2009) states that using PBL increases student's communication skills, critical thinking skills, problem solving skills, working in groups and self-regulation.

Barrett, Terry (2010) persuades the need of using PBL for student's learning.

Wells, Samantha H. et.al (2011) considered PBL as a constructivist approach to learning.

- Lack of consistency in defining and measuring the effectiveness of learning

Research question

- How to identify and justify problem based learning in order to increase the student's self-efficiency?

Problem-based learning

PBL model tested in this research

1. Creating a group

2. Identifying the problem

3. Generating an idea

4. Researching the problem

5. Independent research

6. Synthesis and application

7. Resume and reflection

The image shows a handwritten FILA table with four columns: Facts, Ideas, Learning Issues, and Action Plan. The text is written in blue and black ink on a white background.

Facts	Ideas	Learning Issues	Action Plan
<ul style="list-style-type: none">The Yamskaya street #13775 years old manFireall document and money were destroyed. He had no money.his wife and son died (burned)Social organization	<ul style="list-style-type: none">The reason of fireWhy hethe turn his documentsThis organization was illegal.to apply for documents	<ul style="list-style-type: none">Why was this fire?How was he saved?How was he living & surviving for the 5 years?What types of documents did he lose?How much money did he have?Why did he left & nursing home?What to do	<ul style="list-style-type: none">His son & Parents should keep lightning instruments in a safe place.All houses must have a fire extinguisher at home.Everyone should know all emergency numbers. (fire department)He should identify the types of documents and then reapply for them.He could make a book

FILA table – groups results

Assessment criteria

Calculation of efficiency was based on ten criteria that have been formulated in Vygotsky (2005), Perry (2002), Bronson (2000) works

Student's able to...

- formulate the topic of the lesson
- formulate the aim of the lesson
- work in group
- plan own work
- identify strategy to achieve learning objectives
- put forward ideas to achieve learning objectives
- persuade
- self-evaluate
- peer evaluate
- analyze results

Research methods

Mixed method

- LESSON OBSERVATIONS
- INTERVIEWS
- FOCUS GROUPS
- QUESTIONNAIRES

Formula to calculate the efficiency of each student

$$\mu_{se} = \frac{K_0}{K_n} \cdot 100\%$$

here μ_{se} - student's efficiency coefficient (%)

K_0 - number of criteria achieved by one student

K_n - number of all criteria achieved by all students

PBL – is a way to update the teaching

Changing the plan of teaching

- Using PBL to in whole units, but not in separate lessons

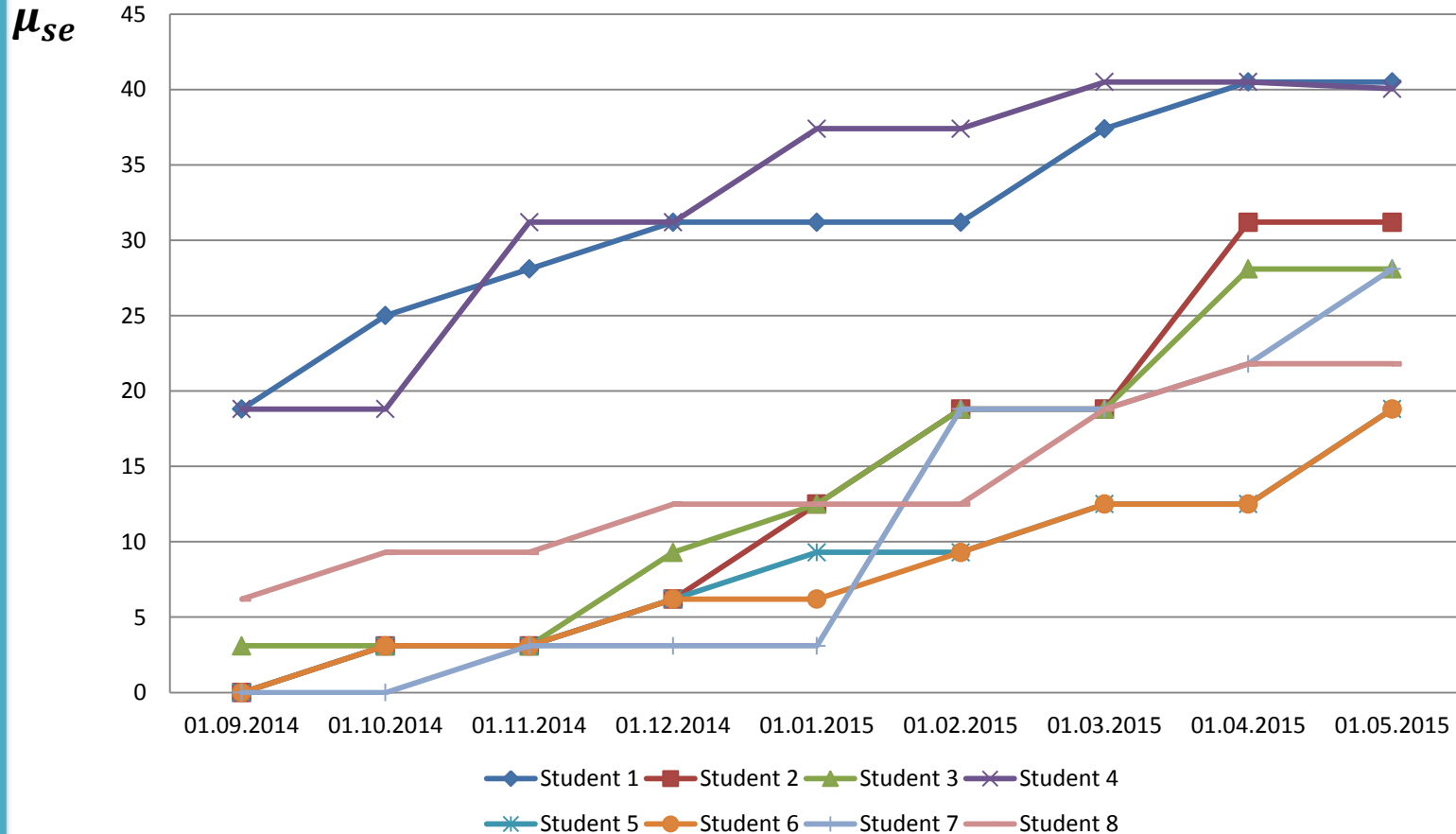
New format of lessons

- Learner centered
- Teacher acts as an observer

Work with students

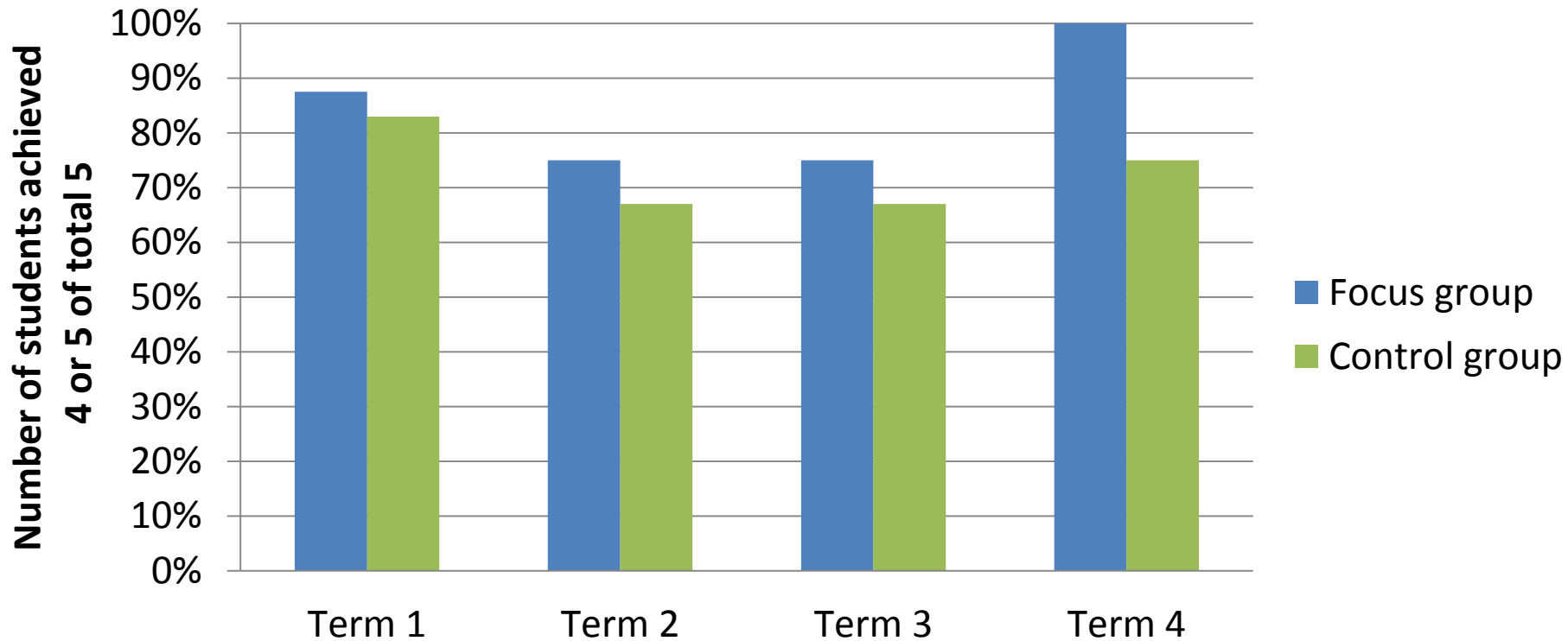
- Explaining PBL's practical value

Monitoring students' individual efficiency



Self efficiency increased by 45%

Student's achievements during one school year



In Term 2 and 3 both groups showed decrease the quality of knowledge. This is due to many learning objectives for Term 2 and 3, also new format of learning.

By the end of the school year

Focus group's summative assessment results increased by 12%.

But control group's summative assessment results decreased by 8%.

Conclusions

By the end of one school year

- the efficiency of students increased by 45%.
- 95% students showed positive attitude towards PBL
- 95% students achieved all learning objectives

Despite the positive dynamics of self-efficiency

- 12.5% of students demonstrated difficulties in group work
- 37.5%-in planning their activities
- 12.5% - in choosing strategies to achieve the goals and ideas
- Same number in offering arguments to support ideas
- Same number of students have difficulty in peer assessment

Student opinions

At the beginning...

- I like to listen to the teacher (Student 1)
- I like teacher explaining the whole lesson (Student 2)
- I like to learn textbook by heart at home (Student 3)

At the end ...

- I independently acquire knowledge and achieve learning objectives. I like teacher acting as an observer (Student 1)
- I like to work in a team. I develop my critical thinking and public speaking skills (Student 2)
- My ability to self-realization and self-assertion has been increased (Student 3)

My vision

- The introduction of PBI improves student's effectiveness.
- If the focus group was average at baseline, after the study the focus group was advanced and successful.
- At the external evaluation 100% of students showed a good results.
- Implementation of PBL already implemented at the Biology Department and planned to be implemented throughout the school.
- The results of the study has been presented through workshops and master-classes for NIS teachers.