Nazarbayev Intellectual School of chemistry and biology in Turkestan
Action Research Group under the project "NIS Share"

Case Study

How we began

In Nazarbayev Intellectual School (NIS) of chemistry and biology in Turkestan with 643 students, we applied to be part of the SHARE project. We attended several workshops and discussed as an Action Research team about the problems that concerned the school. We started as a small team of a principal, vice-principal and teachers of English, Global Perspectives, Chemistry and Mathematics. We were deeply concerned about the fact that our school ranked at the bottom among all 20 NIS school branches across Kazakhstan in English language proficiency of learners *(Table 1).* This was not just statistics – it reflected a real issue with real implications. As a team, we began asking questions: Why our learners struggling in English? And more importantly, could this language barrier be affecting their understanding and performance in other STEM subject, which are taught in English?
Research Question: The impact of English Language Proficiency on students' academic performance in STEM subjects.

That's how our Action Research journey began. We formed an interdisciplinary team of English and STEM teachers and focused on the idea that low English level might be holding students back not just in English, but across their academic performance. Our hypothesis was straightforward – if learners do not have a solid grasp of English, they will naturally struggle to understand the concepts, vocabulary, and instructions in science lessons. Thus, as a major factor, we started observing the lessons and wanted to get an answer to a question: What is happening in the classroom? Reflecting on our experience, now we understand that wrong questions that we asked initially were: *What approach are teachers using in the lessons? Are they effective? How qualified are the teachers? Are they encouraging students? Are they adjusting lessons? Are they using appropriate materials?* The questions were mainly **about the teachers not about teaching**.

The school leadership initially emphasized improving the way teachers organize the lessons. As a team, we made efforts to bring more structure to our teaching approaches and integrate English language teaching methods more effectively, even with science classes. However, we soon realized that while instructing teachers was necessary, it was not enough on its own. Deeper issues were at a play.

Interviews

So far, we were focused on low level English and its influence on STEM subjects. To understand the root of the problem, we conducted interviews with both English and STEM teachers. We also surveyed students across different grades and spent several weeks observing lessons. But these observations were not just to evaluate teachers – they helped us see what the learners were actually experiencing in real-time. From the teacher interviews, several recurring themes emerged. English teachers expressed that many students entered the school with very basic English levels, which made it difficult for them to teach using standard curriculum. Also, during the observations, we noticed that some teachers struggled to use **differentiation** in the classrooms. Several teachers shared that they lacked adequate **resources** – both digital and printed – that matched the students' needs at these lower levels. Furthermore, the science teachers echoed similar concerns. During interviews, they mentioned that students often failed

to understand complex scientific ideas because they struggled to understand the language itself. For example, learners might memorize scientific terminology without truly understanding the concept behind it, simple because they could not follow the explanation in English.

Table-1. Classification of schools by average score on English language.

Intellectual School name	*2024 results (the highest-performing schools are listed first)*
Kokshetau NIS of physics and mathematics	***1***
Astana NIS of physics and mathematics	***2***
Almaty NIS of chemistry and biology	***3***
Almaty NIS of physics and mathematics	***4***
Oral NIS of physics and mathematics	***5***
Taldykorgan NIS of physics and mathematics	***6***
Aktobe NIS of physics and mathematics	***7***
Oskemen NIS of chemistry and biology	***8***
Karagandy NIS of chemistry and biology	***9***
Pavlodar NIS of chemistry and biology	***10***
Aktau NIS of chemistry and biology	***11***
Taraz NIS of physics and mathematics	***12***
Petropavlovsk NIS of chemistry and biology	***13***
Semey NIS of physics and mathematics	***14***
Kostanay NIS of physics and mathematics	***15***
Atyrau NIS of chemistry and biology	***16***
Shymkent NIS of physics and mathematics	***17***
Kyzylorda NIS of chemistry and biology	***18***
Shymkent NIS of chemistry and biology	***19***
Turkestan NIS of chemistry and biology	***20***

Observations

During classroom observations, we noted a few things ourselves. In many science lessons, teachers struggled with time-management. In some English lessons, we noticed that students could engage more easily with similar topics or when the lesson flow was from easy to difficult but froze when faced with unexpected complex and academic tasks. We also collected student feedback through surveys and many students admitted that they sometimes felt lost in English-related lessons. They mentioned that they struggled most when the lessons start with complicated tasks that require advanced level of academic English. Others revealed that they would often prepare for formative assessments by memorizing content without truly understanding it.

Narrowing down the research

While we initially tried to ‘change’ teacher approaches and solve this complex issue of improving both English and science subject results at the same time, this did not work out as effectively as we had hoped. Each subject had its own demands, curriculum requirements, and content specifics, which made it difficult to track progress of multiple departments. Trying to work across such different disciplines at once made the research too broad and hard to manage, and we quickly found ourselves overwhelmed **by too much data and not enough focus.** We

decided to narrow our research and focus only on the English Department. The made the process more manageable and allowed us to go deeper instead of wider.

Going to basics

Another issue we ran into was how we framed our questions at the beginning. We focused too much on the teachers themselves rather than the teaching process. We kept asking *What approach are teachers using in the lessons? Are they effective? How qualified are the teachers? Are they encouraging students? Are they adjusting lessons? Are they using appropriate materials?* While these questions seemed important, they led us to focus on teacher styles instead of actual structure and quality of the teaching happening in the classroom. Looking back, we realized that many classroom challenges came from weak or inconsistent lesson planning. Activities were not always connected; **lesson objectives** were not always clear to students and transitions **from difficult to easy** tasks could feel rushed or confusing (Teacher and student interview answers) and differentiation was ignored in most cases. Analyzing teacher interview data and observations, we concluded that the core problem lied in the simple act of planning that we took for granted. With this new direction, we finally landed on a research question that matched our goal and capacity: "*The Impact of structured lesson planning on English proficiency development in second language learners".* This new insight encouraged us for new actions –a) we selected only English teachers as our main research focus since data overload made it quite challenging to track changes more clearly and practically; b) we asked teachers to observe lessons give constructive feedback; c) we knew that the main problem lied in lesson planning, but we wanted to be certain and created SWOT analysis of English teachers' lesson observations.

SWOT analysis (teacher involvement)

After refining our research question and simplifying our focus to structured lesson planning, we encouraged English teachers to observe each other's lessons and provide constructive feedback. We asked every English teacher to attend their colleagues' lessons, not to judge, but to learn, reflect, and share thoughts. This process helped shift our team culture toward openness and ensure teacher engagement in decision making. Teachers noticed patterns in how lessons were planned, delivered and received by students.

After collecting feedback from these peer observations, we conducted a full SWOT analysis together during a department meeting. This analysis allowed us to clearly identify:

1. What we were doing well.
2. What needed to be improved.
3. What opportunities we had for growth.
4. What risks we needed to be aware of.

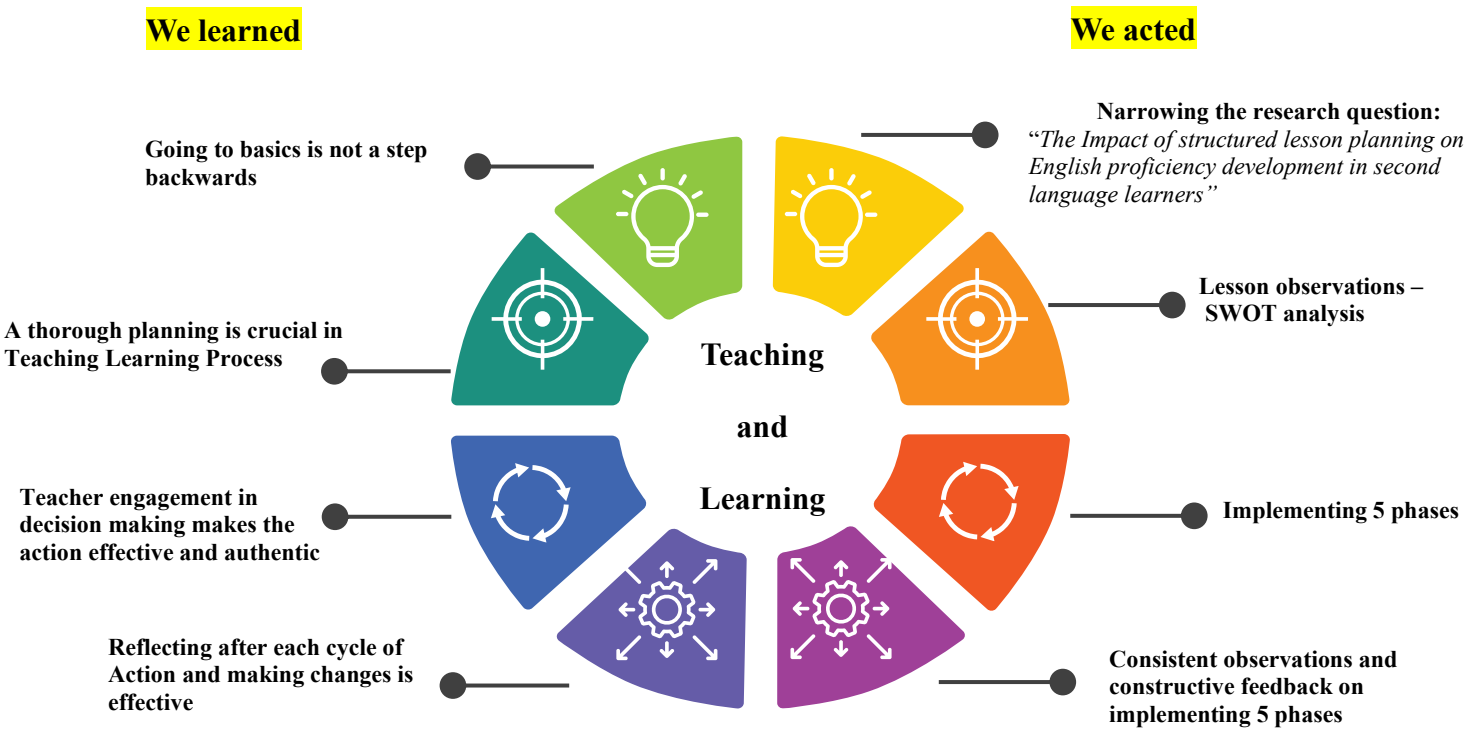
The SWOT analysis was not just a formality – it became a powerful tool for planning the next steps. For instance, we found that teachers were skilled at using active teaching methods like Socratic Seminars and Speed Dating to create a student-centered lesson. Students generally responded well to these methods, and classroom participation was high. Learners were interactive, but in in most cases, learning objectives were met partially and served as formality rather than a tool to organize the lesson. Moreover, several teachers struggled with delivering clear instructions, which left students confused about how to complete tasks. In some cases, the assessment criteria were not fully explained, making it difficult for students to understand how their work would be assessed. We also saw challenges with time management when too many activities were packed into a single lesson, leading to unfinished tasks. Some lessons lacked

logical progression or visible connections between objectives and outcomes. Finally, some lessons lacked differentiation and tasks based on high order thinking such as critical thinking, problem solving and reflecting.

While reflecting on the Opportunities section of the SWOT analysis, teachers in our focus group expressed a clear need for a structured planning framework. They shared that having a framework that breaks down what should happen at each stage of the lesson – from the introduction to the closing would make the planning process more manageable and less overwhelming. With a consistent format to follow, they could focus more on the quality of teaching rather than worrying about what to include or how to organize their lessons. Such a framework, they said, would not only keep them on track but also help ensure that each lesson was purposeful, balanced, and oriented on learning objectives.

Through this process, we learned some valuable lessons *(Diagram 1).* First, data overload is real. Too much unfocused information can prevent progress rather than support it. Second, true teacher engagement happens when teachers are part of the solution – not just being observed but actively reflecting, suggesting, and taking part in decision making. Third, "going to basics" was not a step backward. Focusing on structured, clear, and consistent planning brought clarity to the team.

Diagram 1. What we learned and how we acted.



5 phases of Lesson Planning

As SWOT analysis in English Department was a successful practice, at a December methodological association meeting, we had a discussion with other colleagues of our school based on lessons observed during the first half of the 2024-2025 academic year across different

subjects, including mathematics, biology, chemistry, physics, computer science, Kazakh language, Russian language and English. We discussed four focus areas: lesson planning, instruction, assessment, and overall assessment. Based on the lesson observation checklist, subject leaders were asked to identify two strengths and two areas for development in the teaching of each subject. During the discussion of solutions for the identified areas of development, it was proposed that each 40-minute lesson should be structured more clearly and systematically.

The key areas for development identified by methodological association leaders during the observations were very similar to those identified in the English Department:

1. Lack of time-management.
2. Ineffective planning and alignment of assessment methods, lesson objectives, and lesson content.
3. Limited ability to provide constructive feedback from teachers and among students.
4. Absence of differentiated instruction and challenges in applying differentiation strategies, especially in the context of deep learning and subject mastery.

As a proposed solution to address these shared challenges (both in English and other Departments of our school), we recommended to divide the standard 40-minute lesson into five distinct phases to bring greater structure and clarity to the lesson delivery process. *(Diagram 2)*

The proposed lesson phases were reviewed and accepted by the leaders of the methodological departments, and a presentation was conducted for the entire teaching staff. On January 21, a total of 78 teachers voted in favor of implementing the phases, and the decision was officially approved by the teaching staff.

After 3 months of using the five-phase lesson structure, teachers started sharing their feedback – and overall, it was very positive. Many said that the framework helped them stay more focused during planning and made their lesson feel more organized and balanced. They no longer felt overwhelmed about where to start or what to include. It also saved time, especially for newer teachers who previously struggled with structuring their lessons.

Diagram 2. The standardized 5 phases of a 40-minute lesson.

Phase	Name of the phase	Time	Reminder
I phase	Starter/Homework	5–7	**Starter:** Opening the topic/theme of a lesson through clarifying questions or brainstorming, ensuring 100% student participation by using methods that progress from simple to complex. **Reviewing Homework:** Checking homework through questions and tasks that gradually increase in difficulty, analyzing questions that most students found challenging, and providing constructive feedback.

II phase	Agenda/Learning objectives/Assessment criteria	2-5	Discussing the learning objective with students to check their understanding and help them create a structured plan for new knowledge. Using teacher's guiding questions to help students develop assessment criteria. Developing skills to understand new knowledge and connect it with what they have learned before.
III phase	Skills Practice/New knowledge, content	13-18	The lesson format must be student-centered, ensuring that students speak at least **80% of the time**. This stage should focus on developing students' skills, enhancing their abilities, or addressing their learning needs. Additionally, it is essential to create opportunities for students to provide **constructive feedback** to one another. To monitor their understanding of the topic, **formative assessment methods** should be applied throughout the lesson.
IV phase	Problem Solving/Depth/	12	**Differentiated teaching** methods should be applied by providing students with a set of tasks of varying difficulty, progressing from simple to complex. These tasks can be given through handouts to accommodate different learning levels. By using advanced tasks, students can reinforce new knowledge and **develop critical thinking skills, problem solving skills.** Additionally, formative assessment methods should be used to monitor students' understanding of the topic.
V phase	Reflection	2-3	Students should reflect on the lesson by revisiting the learning objectives and assessment criteria. Based on their reflections, the teacher must provide constructive feedback to support their progress.