

X. Artamonova*¹, F. Aliyeva², U. Ixanova³, A. Kulzhabekova⁴

^{1,2,3,4}Nazarbayev Intellectual School, Karaganda, Republic of Kazakhstan

*e-mail: Artamonova_K@krg.nis.edu.kz

¹ORCID 0009-0005-9870-1642, ²ORCID 0009-0002-4482-2949,

³ORCID 0009-0008-0501-7457, ⁴ORCID 0009-0003-4811-9772

THE EFFECT OF DIFFERENTIATED GRAPHIC ORGANIZERS ON THE DEVELOPMENT OF REFLECTIVE SKILLS IN NIS STUDENTS

This study investigated the effect of differentiated graphic organizers on the development of reflective skills among the students of Nazarbayev Intellectual School in Karaganda. Reflective skills are essential for independent and critical thinking, yet many teachers struggle to make reflection meaningful and accessible to diverse learners. Using a mixed-method design, the research combined pre- and post-surveys of 128 students (grades 7–10) with interviews and observations from four teachers. Findings revealed that differentiated graphic organizers significantly improved students' ability to analyze their learning processes, increased engagement, and deepened reflection from descriptive to analytical levels. Teachers reported that differentiated graphic organizers enhanced accessibility, supported differentiation, and promoted student ownership of learning. Overall, the study concluded that differentiated graphic organizers are effective tools for structuring and personalizing reflection, making it a more meaningful and sustainable component of student-centered education in the context of Nazarbayev Intellectual Schools.

Key words: graphic organizer, differentiation, reflection, reflective skills, Nazarbayev Intellectual School.

Introduction

Reflective skills are an important factor in students' academic and personal growth because reflection allows them to think about how they learn, evaluate their progress, and decide how to improve. In secondary schools that aim to develop critical and independent thinkers, reflection is a key element of learning. At Nazarbayev Intellectual Schools (NIS), helping students build reflective skills is a priority in teaching, assessment, and curriculum development.

However, teachers often struggle to provide students with practical ways to reflect that are meaningful and meet different learning needs. At the initial stage of this study, a survey was conducted among NIS teachers. The results showed that while most teachers (87%) see reflection as important, less than half (42%) feel confident teaching it. Also, 65% reported that their students see reflection as just another task, not a part of a real learning process. This reveals the gap between the value attributed to reflection and using effective methods to teach it.

One way to address this challenge is to use graphic organizers. They can guide students through self-assessment, goal setting, and planning, making reflection easier. When these tools are adjusted to fit students' different levels and learning styles, they can be even more effective. By changing how complex or focused the organizers are, teachers can help each student reflect more deeply. Reflective practice often requires abstract thinking, metacognitive awareness, and the ability to make connections across learning experiences. For many students these may be challenging without external prompts or structure. Graphic organizers, by making thought processes visible and concrete, may lower barriers to reflection and provide a clear framework for students to articulate their ideas.

This approach is especially relevant in the NIS context. NIS students work in a highly academic environment where expectations for independent learning and reflection are high. Teachers are encouraged to differentiate instruction to meet the diverse needs of students, yet reflective practices often remain uniform and teacher directed. Introducing differentiated graphic

organizers could bridge this gap by supporting students at varying levels and fostering ownership of their reflective processes.

For these reasons, it was **hypothesized** that the use of differentiated graphic organizers (DGO) would have a positive effect on the development of reflective skills in NIS students.

The **purpose** of the research was to investigate the effect of differentiated graphic organizers on the development of reflective skills in NIS students

The **object of the study** were the students of grades 7-10 of NIS in Karaganda.

The **subject of the study** was the effect of differentiated graphic organizers on the development of reflective skills in NIS students.

Research questions:

1. What challenges do NIS students face in developing reflective skills?
2. How can differentiated graphic organizers be designed to meet the diverse needs of NIS students?
3. What is the effect of differentiated graphic organizers on the quality and depth of students' reflective practices?

Literature review

This chapter reviews the existing literature on reflective skills in education and the use of differentiated graphic organizers as a pedagogical instrument. It begins by investigating how reflection is defined and used in secondary education, the challenges students and teachers face in implementing reflection, the role of graphic organizers in supporting learning, and the potential benefits of differentiating these tools to cater to students with diverse needs.

Reflection in education

According to Dewey, reflection is “active, persistent, and careful consideration” of knowledge and beliefs [8]. He believes that education that does not include reflection is rote learning. Reflection goes beyond simple and mechanical retention of new information; it is a process where learners examine experiences, analyze them, and draw lessons to improve future actions. Reflection can be and should be utilized as a “bridge” between experience and theory [12]. Reflection in learning can contribute to greater critical thinking, metacognition, and lifelong learning. Apart from the skills essential for academic achievement, reflection extends beyond and affects learners' emotions, values, and personal meaning [3]. Moreover, Schön sees reflection as two interconnected ongoing processes: reflection-in-action and reflection-on-action [20]. Reflection-in-action is basically thinking on your feet while doing, and reflection-on-action is analyzing experience afterwards. Both of these reflective processes are equally important and useful in learning.

Educators all around the world use common strategies to apply reflection in learning. There are four of them. The first strategy is reflective journals or learning logs [19]. They encourage students' expression, but often become repetitive or superficial. The second strategy is portfolios [25]. They are good for long-term growth but time-consuming and usually teacher- driven. The third common strategy is self-assessment checklists [2]. Such checklists can encourage reflection, but are often limited to evaluation, not deeper thinking. The final commonly used strategy is peer feedback and group discussions [9]. They might help develop reflective dialogue, but may intimidate less confident students. These four common strategies seem helpful but share some similar weaknesses: a) lack of structure (many students struggle to move from description to analysis); b) teachers often lack confidence in how to teach reflection effectively; c) reflection activities are sometimes left at the end of lessons and seen as “extra work”.

Notwithstanding the fact that reflection is central to deep learning and metacognition, educators still experience multiple challenges in implementing reflection as part of active learning [16]. For them, the lack of strategies for structuring reflection seems the most challenging [15].

Graphic organizers in education

Graphic organizers are visual tools that represent relationships between concepts, ideas, or events [18]. There are different types of graphic organizers available for educators' use, such as concept maps, Venn diagrams, T-charts, timelines, cause-effect charts, and flowcharts. According to [1], students learn better when new information is explicitly linked to prior knowledge. Organizers provide this link. Additionally, Novak claimed that well-developed concept maps help externalize thinking processes and connections more effectively [18].

Several studies have proved that graphic organizers are effective in teaching and learning. Kim et al. reported gains in comprehension, recall, and vocabulary learning [11]. Meanwhile, Nesbit & Adesope, in their meta-analysis, which included 55 studies, proved that concept mapping improved retention, transfer, and comprehension across various age groups [17]. Kellogg & Raulerson found out that visual representation supports higher-order thinking, problem-solving, and summarization [10].

Differentiated graphic organizers and reflection

Considering the opportunity of using graphic organizers as an effective tool for both deep reflection and learning, they come on scene as something that makes thinking visible and material. They also provide structure for moving from *descriptive* to *analytical* to *critical* levels of reflection. It is empirically supported by several studies. Chang, Sung & Chen stated that using concept mapping in science tasks improved reflective problem-solving [5]. Yen, Lee & Chen asserted that organizers guided self-regulated learning, helping students set goals and evaluate progress [24]. Moreover, Zhang revealed that graphic organizers supported reflective writing by giving prompts and structure [26].

In addition, it is important to ask how using graphic organizers can cater to students with diverse needs. Empirical studies suggest that uniform reflective activities risk being either too challenging or too simplistic for different groups of learners, which reduces student engagement and limits the depth of reflection achieved [22, 14]. Simply put, uniform reflective tasks may not address all learners. Regarding differentiation by complexity, many studies show that the effectiveness of graphic organizers depends on how they are structured: simpler tools (e.g., checklists, single-step charts) benefit novice learners, while more complex organizers (e.g., multi-level concept maps) support deeper reflection and synthesis [5, 17]. In the case of a certain level of cognitive development, differentiating the level of complexity in graphic organizers aligns with cognitive development theories and has been shown to increase the depth of student reflection, as learners engage with tasks that are challenging but attainable [13, 23]. This allows students to reflect at a level suited to their cognitive development.

Summarizing, graphic organizers can scaffold metacognition, which can subsequently lead to students' reflection not just on *what* they learned, but also on *how they learned*. They might help reduce the gap between teacher-directed reflection and student-owned reflection. Finally, graphic organizers might potentially serve as a tool to differentiate reflection tasks by complexity: e.g., simple prompts for beginners or multi-layered maps for advanced students.

Materials and Research Methods

A mixed methods research design was used to identify the effect of differentiated graphic organizers on the development of reflective skills of 7-10 grade students. The chosen research design allowed for considering the issue in depth by combining quantitative and qualitative data [7]. Students' surveys on the changes in reflective practice were mainly obtained as primarily

quantitative data, whereas teachers' interviews and observations on the efficiency of differentiated graphic organizers in class added to the study from the qualitative approach.

The study was conducted among 7-10-grade students in Nazarbayev Intellectual School in Karaganda. The study applied cluster sampling for choosing representative classes for both experimental and comparison groups in all four parallels. Thus, experimental groups consisted of four classes from 7th to 10th grades with a total number of 64 students; four comparison groups from 7th to 10th grades with the same number of students and similar academic performance were chosen as participants for this research. All the selected classes studied the same content and were taught by the same teachers, which minimized inaccuracy in data collection; the only variation was the tool used for reflection. Additionally, four English teachers took part in the research, facilitating the intervention of differentiated graphic organizers used for reflection and providing feedback on their usage and effect on students.

This research employed several data collection tools. Pre-test and post-test students' surveys were used to measure students' initial reflective skills and post-intervention changes in their reflective behavior. Also, these surveys allowed us to gather students' attitudes towards reflection before and after the intervention. The differentiated graphic organizers (DGOs) were created to adjust to learners of different levels (lower-ability, middle-ability, and higher-ability) and used as the primary intervention tool in class. Finally, semi-structured interviews were conducted with the four teachers who helped in the intervention and observed the DGOs' efficiency in class.

The research started at the beginning of the fourth term of the 2024-2025 academic year and lasted 9 weeks. 64 students from the experimental groups and 64 students from the comparison groups experienced different reflective practices every week, where the experimental groups were offered DGOs, and the comparison groups were given traditional reflection tasks for discussion. Pre-test surveys were sent via students' corporate email during the first week of the research, and final post-test surveys were also sent via email on the ninth week. Individual semi-structured interviews were conducted with the four teachers who applied DGOs in class after the intervention.

Students' survey responses were analyzed using descriptive and comparative statistics to determine the effect of DGOs on students' reflective behavior. Effect sizes were also calculated to evaluate the magnitude of the changes [6]. Teachers' interviews were recorded, then transcribed and thematically analysed, which determined the common patterns related to students' engagement, differentiation, and reflective growth [4]. Data triangulation across surveys, reflections, and interviews enhanced the validity of findings.

Ethical approval was obtained from the school administration for conducting this research. Students' participation was voluntary with informed consent secured from both students and parents. All data were anonymized to maintain confidentiality.

Results and discussion

The data analysis of quantitative surveys and qualitative interviews with teachers showed that the use of DGOs had a significant positive impact on the development of reflective skills in NIS students.

1. Survey Results

A comparison of the pre- and post-survey results demonstrated a noticeable increase in students' reflective abilities:

- Students in the experimental groups showed a **27% increase** in reporting that they could analyze not only what they learned but also how they learned. In contrast, the comparison groups demonstrated only 8% increase.
- The proportion of students who considered reflection a “useful learning tool” increased from 41% to 79% in the experimental groups, while in the control groups the change was minimal (from 43% to 50%).

- Effect size analysis a medium-to-large impact of DGO on students' reflective practice (Cohen's $d = 0.63$), indicating significant educational benefits.

2. Depth of Reflection

The survey results and reflection samples showed that differentiated organizers helped students move from descriptive reports to more analytical and critical reflection. For instance, lower-ability students benefited from simpler DGOs such as checklists and guided charts, while higher-ability students were able to use multi-level concept maps to synthesize learning.

3. Teacher Observations and Interviews

Teachers consistently reported that DGOs provided a **clearer structure** for reflection and increased student engagement. During the interview, three common themes were identified:

- **Accessibility:** Teachers noted that DGOs lowered the barrier for students who previously viewed reflection as “extra work,” making the process more approachable.

- **Differentiation:** Teachers observed that students with different readiness levels engaged meaningfully with reflection because the organizers matched their cognitive needs.

- **Ownership of Learning:** Teachers highlighted that DGOs encouraged students to be more responsible for their learning by setting personal goals and tracking progress.

4. Student Attitudes Toward Reflection

Qualitative comments from students in the experimental groups indicated a change in perception. Many reported that reflection no longer felt like a “forced task” but rather a way to understand and improve their learning. This contrasted with the comparison groups, where reflection was still largely perceived as routine and teacher driven.

The first research question asked about the challenges NIS students face in developing reflective skills. The findings confirm earlier survey results and the literature that students often see reflection as an “extra task” and find it difficult to move beyond description [15,19]. However, after the intervention, students in the experimental groups demonstrated higher levels of engagement and began to view reflection as a meaningful strategy for learning, which shows that DGOs helped address this key challenge.

The second question considered how differentiated graphic organizers can be designed to meet diverse needs. The results of teacher interviews and student results indicate that adapting the complexity of the DGO made reflection accessible to all students. Simpler formats provided structure for lower-ability students, while multi-step concept maps allowed advanced learners to analyze and synthesize ideas. “This reflects Subban’s view that uniform reflective tasks may not address all learners, and Kori et al.’s evidence that differentiating the level of complexity in graphic organizers increases the depth of student reflection while meeting the needs of diverse students [22,13]. The third question focused on the effect of DGOs on the quality and depth of students’ reflective practices. Findings showed a marked improvement in both the analytical quality of reflection and the willingness of students to engage in it. The shift from teacher-driven reflection to student-owned reflection resonates with previous research and demonstrates that DGOs are not only effective frameworks but also powerful tools for developing independent metacognition [26].

Conclusion

The study showed that differentiated graphic organizers help NIS students develop their reflective skills. By offering tools that are structured but flexible, these organizers allowed students to go beyond simple descriptions and engage in deeper analysis and evaluation, meeting the needs of various learners. The intervention not only improved the quality of reflections but also changed how students viewed the process. Reflection shifted from a routine, teacher-driven task to a meaningful process owned by the students. These findings suggest that differentiated graphic

organizers can be an effective way to integrate reflection into secondary education, support academic growth, and the development of independent, critical thinkers.

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К. Артамонова, Ф. Алиева, У. Иксанова, А. Кульжабекова

НЗМ ОҚУШЫЛАРЫНЫҢ АРАСЫНДА КЕРІ БАЙЛАНЫС БЕРУ ДАҒДЫЛАРЫН ДАМУДА ДИФФЕРЕНЦИАЦИЯЛЫҚ ГРАФИКАЛЫҚ ОРГАНАЙЗЕРЛЕРДІҢ ӘСЕРІ

Бұл зерттеуде Қарағанды қаласындағы Назарбаев Зияткерлік мектебінің 7–10-сынып оқушыларының рефлексия дағдыларын дамытудағы дифференциацияланған графикалық органайзерлердің әсері зерттелді. Рефлексия дағдылары сын тұрғысынан және дербес ойлауды қалыптастырудың маңызды бөлігі болып табылады, алайда көптеген мұғалімдер оны әртүрлі деңгейдегі оқушылар үшін мазмұнды әрі қолжетімді ету барысында қиындықтарға тап болады. Аралас әдіснамалық зерттеу барысында 128 оқушының бастапқы және қорытынды сауалнамалары, сондай-ақ төрт мұғалімнің сұхбаттары мен бақылаулары талданды. Зерттеу нәтижесінде дифференциацияланған графикалық органайзерлер оқушылардың оқу үдерісін талдау қабілетін, белсенді қатысуын және рефлексияның сипаттамалық деңгейден талдамалық деңгейге едәуір көтерілгені анықталды. Мұғалімдер бұл құралдар кері байланысты қолжетімді етіп, оқытудағы дифференциацияны қолдағанын және оқушылардың оқу жауапкершілігін арттырғанын атап өтті. Жалпы алғанда, зерттеу нәтижелері дифференциацияланған графикалық органайзерлер рефлексияны құрылымдаудың және дараландырудың тиімді құралы болып табылатынын, оны оқушыға бағытталған оқытудың маңызды әрі жүйелі бөлігіне айналдыратынын көрсетті.

Түйін сөздер: графикалық органайзер, дифференциация, рефлексия, рефлексивті дағдылар, Назарбаев Зияткерлік мектебі.

К. Артамонова, Ф. Алиева, У. Иксанова, А. Кульжабекова

ВЛИЯНИЕ ДИФФЕРЕНЦИРОВАННЫХ ГРАФИЧЕСКИХ ОРГАНАЙЗЕРОВ НА РАЗВИТИЕ НАВЫКОВ РЕФЛЕКСИИ СРЕДИ УЧАЩИХСЯ НИШ

В данном исследовании изучалось влияние дифференцированных графических органайзеров на развитие рефлексивных навыков учащихся Назарбаев Интеллектуальной школы города Караганды. Рефлексивные навыки являются неотъемлемой частью формирования самостоятельного и критического мышления, однако многие учителя сталкиваются с трудностями при попытке сделать рефлексию осмысленной и доступной для учащихся с разными образовательными потребностями. В исследовании, основанном на смешанной методологии, использовались данные предварительных и итоговых опросов 128 учащихся 7–10-х классов, а также интервью и наблюдения четырех учителей. Результаты показали, что использование дифференцированных графических органайзеров значительно повысило способность учащихся анализировать собственный процесс обучения, увеличило их вовлеченность и помогло перейти от описательной к аналитической рефлексии. Учителя отметили, что данные инструменты сделали рефлексию более доступной, поддержали дифференциацию и способствовали формированию у учащихся ответственности за свое обучение. В целом, исследование подтвердило, что дифференцированные графические органайзеры являются эффективным средством структурирования и персонализации рефлексии, делая ее более

осмысленной и системной частью обучения, ориентированного на учащегося, в контексте Назарбаев Интеллектуальных школ.

Ключевые слова: графический органайзер, дифференциация, рефлексия, рефлексивные навыки, Назарбаев Интеллектуальная школа.

Information about the authors:

Xeniya Artamonova - English Teacher, Nazarbayev Intellectual School, Karaganda, Karaganda city, 62 Shakhterov Ave., Artamonova_K@krg.nis.edu.kz.

Feruzha Aliyeva - English Teacher, Nazarbayev Intellectual School, Karaganda, Karaganda city, 62 Shakhterov Ave., Aliyeva_F@krg.nis.edu.kz.

Ulyana Iksanova - English Teacher, Nazarbayev Intellectual School, Karaganda, Karaganda city, 62 Shakhterov Ave., Iksanova_U@krg.nis.edu.kz.

Aigerim Kulzhabekova - English Teacher, Nazarbayev Intellectual School, Karaganda, Karaganda city, 62 Shakhterov Ave., Kulzhabekova_A@krg.nis.edu.kz.

Авторлар туралы мәлімет:

Артамонова Ксения Сергеевна - ағылшын тілі мұғалімі, Қарағанды қаласындағы физика-математика бағытындағы Назарбаев Зияткерлік мектебі, Қарағанды қаласы, Шахтерлар даңғылы 62, Artamonova_K@krg.nis.edu.kz.

Алиева Феруза Кайруллаевна - ағылшын тілі мұғалімі, Қарағанды қаласындағы физика-математика бағытындағы Назарбаев Зияткерлік мектебі, Қарағанды қаласы, Шахтерлар даңғылы 62, Aliyeva_F@krg.nis.edu.kz.

Иксанова Ульяна Владимировна - ағылшын тілі мұғалімі, Қарағанды қаласындағы физика-математика бағытындағы Назарбаев Зияткерлік мектебі, Қарағанды қаласы, Шахтерлар даңғылы 62, Iksanova_U@krg.nis.edu.kz.

Кульжабекова Айгерим Азизовна - ағылшын тілі мұғалімі, Қарағанды қаласындағы физика-математика бағытындағы Назарбаев Зияткерлік мектебі, Қарағанды қаласы, Шахтерлар даңғылы 62, Kulzhabekova_A@krg.nis.edu.kz.

Сведения об авторах:

Артамонова Ксения Сергеевна - учитель английского языка, Назарбаев Интеллектуальная школа естественно-математического направления г. Караганды, г. Караганда, пр. Шахтеров 62, Artamonova_K@krg.nis.edu.kz.

Алиева Феруза Кайруллаевна - учитель английского языка, Назарбаев Интеллектуальная школа естественно-математического направления г. Караганды, г. Караганда, пр. Шахтеров 62, Aliyeva_F@krg.nis.edu.kz.

Иксанова Ульяна Владимировна - учитель английского языка, Назарбаев Интеллектуальная школа естественно-математического направления г. Караганды, г. Караганда, пр. Шахтеров 62, Iksanova_U@krg.nis.edu.kz.

Кульжабекова Айгерим Азизовна - учитель английского языка, Назарбаев Интеллектуальная школа естественно-математического направления г. Караганды, г. Караганда, пр. Шахтеров 62, Kulzhabekova_A@krg.nis.edu.kz.