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Implementation of the trilingual policy through the Advanced Teacher Training System for secondary schools teachers of «Computer science», «Physics», «Chemistry» and «Biology» in English

The article is devoted to the process of implementing the trilingual policy, on the example of organizing advanced training courses by three additional educational centers, such as: Nazarbayev University Educational Excellence Centre, «USTAZ» Professional Learning Centre, JSC «ORLEU» Institute for professional development. Considerable attention is paid to how the above-mentioned organizations conducted training of secondary school teachers to the teaching Biology, Chemistry, Physics, and Computer science in English. The main methods and approaches used by these organizations are described and analyzed, such as an integrated approach to learning to improve language skills and development of skills, a cascade learning model and a new philosophy of education and the use of modern innovative educational technologies to ensure the improvement of the quality of education in Kazakhstan. In conclusion, the authors show the necessity to research the transformation of advanced teacher training system, based on the fact that it is an integral part and a tool for implementing the policy of all educational reforms.

Keywords: teacher training courses, trilingual policy, Cascade Model of Training, implementation of the reform.

Introduction

According to the strategic plan of Ministry of Education and Science for 2017–2021 to successfully implement Trilingual Policy, Advanced Teacher Trainings should be realized by means providing the Centers of Excellence teacher professional development programs under the patronage of the Autonomous Education Organization (AEO), Nazarbayev Intellectual School (NIS) to transfer and implement new methods of training and professional development model which were confirmed by the Government of Kazakhstan Republic [12; 24].

The implementation of Trilingual Policy depends directly on the proper organization and provision of the qualified professional staff for effective teaching and learning to achieve a high-quality education system which is one of the main goals of Kazakhstan. The Advanced Teacher Training System needs to be investigated further for identifying key factors which have an impact on the progress. We cannot be sure that changes in the teacher training program and their implementation contribute to the achievement of the main objectives of the trilingual policy. Therefore, the analysis of the past stage and possible further consequences will need to be investigated to understand the gaps and avoid multiple mistakes complicating the implementation of the reform in the future [7].

In this paper, the focus will be only in-service school teacher's preparation by centers of excellence such as Nazarbayev University Educational Excellence Centre, Ustaz Professional Learning Centre and National Training Centre «Orleu» institute of improvement of professional skill of pedagogical workers.

Roots and problems of the reform

Kazakhstan is now on its way to enhance the level of education and the government sees it as a priority objective above other spheres. The English language has become a part of Kazakhstani compulsory education due to the cultural project «Trinity of languages in Kazakhstan» for the development of languages in 2001–2010 [16]. From the 2019–2020 high school students (11–12) classes should be taught 2 subjects of choice of 4 (Computer science, Biology, Physics, Chemistry) in English [12; 24]. In this regard as the State Program of the Republic of Kazakhstan 2011–2020 states that the preparation of highly qualified staff for the education sector through the provision of teacher training should be solved [10]. For this reason, the Center of Excellence (CoE) was established by the Government of the Republic of Kazakhstan under the patronage of the Autonomous Education Organization (AEO) Nazarbayev Intellectual School (NIS) in May 2011 [22]. According to the Strategic Plan (2016), the training of approximately 120 thousand teachers who are 40 per-

centages from the total 307 thousand school teachers from different comprehensive school around the Republic of Kazakhstan should be realized by 2016. It is expected that teacher training is the first step to implement Trilingual policy and then all prepared and well-qualified teachers are going to apply a range of their acquired skills and knowledge in practice, and also collaborate and exchange with their colleagues.

The University of Cambridge Faculty of Education (FoE) and Cambridge International Examinations (CIE) were accredited the creation of in-service teacher training and assessment program along with AEO NIS in August 2011. In October and November in cooperation of both partners the teacher training course and evaluation procedures were created, and thus Cambridge University appeared to be strategic partners in this process of the implementation of the educational reform. The training has started since January 2012 and it is still in process [21]. The cooperation with an experienced partner will help to increase the chances of successful implementation of the program by adopting the already developed programs and adapting them in the Kazakh context.

Goals of the program

The main goal of the transformation of the teacher training system and the Centre of Excellence program is to improve teachers' capability to educate the young generation of this era, to provide the opportunity to become self-motivated, conscious, digitally literate, independent, critical thinking and confident in an ability to interact in three languages: Kazakh, Russian and English. The additional aim is to establish a cooperate network between centers of professional development which is expected to provide leadership to all regions of the country for the development of the progress and the long-lasting improvement after the first stages of training [20].

To succeed in this program and achieve following aims Kazakhstani trainers should be mentoring teachers to assure the understanding of the new educational methods. There are several topics which should be covered as the basic knowledge of the program designed by the Kazakhstani authorities, such as the management and leadership of the learning, critical thinking, new teaching and learning approaches, new assessment system, digital literacy, inclusive education, cognitive development and age-related differences [20]. Moreover, the Cambridge professional development program has represented three new changes and ways to help trainers to educate Kazakhstani teachers which are ways of thinking, ways of working and tools for working. Additionally, the main change is to let teachers investigate what are the fundamental principles of leading learning in their classroom environment. For example, to understand what critical thinking is, recognizing students' perceptions and propensities, know how to learn, assess, communicate, reflect, do the planning and use digital technologies [20].

Cascade Model of Training

The Centre of Excellence program was realized through the cascade model of training and aimed to re-train 120 000 school teachers by 2016 [5; 301]. This model was chosen since it provides an opportunity to cover more in-service teachers in a short period. Hayes benefits this model as a large-scale change and extremely profitable which requires in-service teachers with existing experience and lasts a short period out of service. It is argued that the cascade model of training represents the transmission of knowledge and information from the specialist or expert to the ongoing teachers with a lower level of awareness and skills [6; 135]. Additionally, the cascade model is efficient as it consists of stages which could be easily controlled.

Nevertheless, there are some problems and concerns associated with the cascade model. Kennedy claims that frequently the process of this model is focused on skills and knowledge, but infrequently in values and perceptions [8; 235]. According to Nieto in the preparation of teachers it requires to focus not only on «how» and «what» to do, but also on «why» everything has to be done, what for and to whom, as the understanding of the learning process and students' needs are crucial aspects for better teaching [15]. Moreover, she argues that it is not enough to know the different teaching methods and strategies, but also it is important to explore the mand to be confident in their usage. Finally, there is a risk of loss of reliable information as the knowledge is transferred from the local trainers to the target teachers can be distorted [20].

The cascade model consists of several stages such as producing training materials or guides for the systematic training process, mentoring the training at different stages and follow-up training for strengthening the goals and closing the gaps [4].

Hayes defines five principles of an effective and successful cascade model of professional development:

- The training should be based on the experimental and reflective method, but not transmissive;
- The training should be open to rethinking, but not too strict adherence to prescribed working methods;
- Expertise should spread through the system widely as much as possible, but the concentration on the top should be minimized;
- Various stakeholders should be involved in the preparation of training materials;
- It is advisable within the cascade structure to decentralize responsibilities [6].

The structure of the program

The program of Centre of Excellence consists of three levels of teacher training: at the third and basic level teachers introduce the changes in their own classroom, at the second and intermediate level they continue with leading changes and also they mentor and train their colleagues, at the first advanced level teachers do the same, but there is more focus on the whole school leadership and develop school planning through coaching and mentoring [17]. Furthermore, all levels have three steps lasting one month which include a seminar «Face to Face One» with theoretical content, then a practical period «School based period» and the last period «Face to Face Two» with reflection. In the first phase «Face-to-Face One», teachers and trainers will learn by experience how to teach and learn by using the new educational methods. Next, at the «school-based period» the practice modeling contributed to the active use of knowledge about the content of the program by teachers and trainers. Finally, at the «Face-to-Face Two» phase of the program the participants are assisted in self-awareness on the applied knowledge in practice and also in supporting of the development of skills in critical reflection [20]. After the program, each teacher has to have a portfolio, make a presentation and pass an exam which takes place in the NIS Centre for Pedagogical Measurements in Almaty. By the data for 2012, roughly 7 % do not finish courses with success. However, teachers who completed the basic level will have a rise of their salary by 30 %, for the intermediate level the salary will increase in 70 % and for the advanced level teachers will be awarded a 100 % growth of their salary [17].

The most essential issue here is that Kazakhstani teachers need to work collaboratively and be engaged in the classroom practice rather than only be involved in training and keep acquired knowledge for themselves.

Implementation of Reform

According to the state programme for education, and science development for 2016–2019, subjects such as Chemistry, Physics, Biology and Computer Science will be taught in English in 10–11 grades from the first of September in 2019 and the main requirement for STEM teachers is to have a B1 level of English proficiency [11].

According to the «State Program of Education Development in the Republic of Kazakhstan for 2011–2020» (2010) to reform the teacher training system, conceptual and structured methods have been identified and three main teacher training centers have been established, such as: Nazarbayev University Educational Excellence Centre, «USTAZ» Professional Learning Centre, JSC «NCPD «ORLEU» Institute for professional development and centers of advanced teacher training at educational institutions and pilot schools which appended to these institutions [9].

The teacher training programs were released in 2016 around Kazakhstan to implement trilingual policy through developing STEM teachers' English language competence and providing them the foundation of subject teaching methods [18].

According to the Message of the President Nursultan Nazarbayev, on the 24 of May in 2011, the Government of the Republic of Kazakhstan approved conceptual approaches for the development of the system of advanced teacher training and ordered the establishment the Center of excellence AEO «Nazarbayev Intellectual schools» in cooperation with foreign partners to develop multi-level training programs for Kazakhstani educational staff using the best world experience and teaching practice. The main directions of the center of excellence are based on the idea of the continuing professional development of teachers in the conditions of integration of Kazakhstani education into the international arena, Center Excellence.

Nazarbayev University Graduate School of Education (NUGSE) prepared 675 STEM teachers in 2016. In the fall of 2017 4897 school teachers of Biology, Chemistry, Physics, and Computer Science subjects took part in the professional development program organized by the Nazarbayev University Graduate School of Education and Educational Excellence Center. The program lasted two and half months and consisted of an English language training course for 2533 school in-service teachers from rural areas of the country and

2364 urban teachers. The program aims to implement Trilingual policy through the development of teachers' English proficiency, the acquisition of the subject terminology and academic language, and the CLIL (content and language integrated learning) methodology. The course included three modules: the first was the English language intensive course of A1 and A2 levels taught by using the course book «Straightforward» by Macmillan Publishers, the second was the subject component in which academic and subject terminology in English was taught by using the «Core» course book of Cambridge University Press for Physics, Chemistry, Biology, and Computer Science subjects and the third module was the video lectures of the Nazarbayev University faculty provided in three languages comprised of new teaching methods. Moreover, the overall number of trainers who taught in this program was 524 (307 in the first module and 217 in the second). All participants from different regions in Kazakhstan finished the program successfully after the final examination of English language elementary level A2 [14].

In 2018, to continue this program the MoES constituted an agreement with Nazarbayev University Educational Excellence Center (NU EEC) and the training of the CLIL methodology was commissioned to the professional learning center «Ustaz». 3074 participants took part in the program and they were divided into two groups. The first group was of 1723 teachers, 92 trainers, 34 local coordinators (instructional assistants) and the second was of 1351 teachers, 79 trainers, and 34 local coordinators. The program covered 18 places of realization around Kazakhstan. It consisted of two modules: the first was the intensive English language training at B1 (200 hours) and B2 (220 hours) levels, the second was the subject terminology and basic methodology of teaching subjects in English (CLIL) with 72 teaching hours. The periods of the first and second modules for the first group were from the 19th of February to the 1st of June and from the 5th to the 15th of June. For the second group in two modules, they were from the 27th of August to the 7th of December and from the 15th of August to the 24th of September [18].

There are several educational centers of excellence that have signed an agreement with the Ministry of Education and Science of Kazakhstan to provide professional development courses for secondary school subject teachers («Biology», «Chemistry», «Physics», «Computer Science»), in order to teach English and new pedagogical approaches [19]. One of them is «Ustaz» Professional Learning Centre which conducted courses with the author's educational program «Bilingual Subject Teacher». For the first time, this program was realized in English from the 21st to 31st of August in 2017. The courses were held in 23 regions of the Republic of Kazakhstan, the overall number of trained subject teachers was 1749. It was a subject course which covered the terminology and the foundation of teaching in English of subjects «Biology», «Chemistry», «Physics», «Computer science» at secondary schools of the Republic of Kazakhstan. The courses were conducted by trainers with experience in teaching subjects and knowledge of the CLIL approach. After completing the course, the participants received certificates, collections of terminology and «Biology», «Chemistry», «Physics», «Computer science» textbooks of the 8th grade published by «Astana Kytap» [1].

On the 5th of March, 2018 «Ustaz» professional learning center realized the advanced teacher training course based on the author's educational program «Teacher of the 21st century» for «Biology», «Chemistry», «Physics», and «Computer science». The purpose of this course was to increase the English level of proficiency up to B2 providing an integrated learning approach to improve language proficiency and skills in the application of teaching methods. The course consisted of 492 and 292 academic hours, and extra daily 2 hours of the workshops at the teachers' expense. There were three stages: at the first stage teachers acquired B1 level of English in 200 hours, at the second stage they received B2 level of English in 220 hours and both stages hold for 8 hours a day and 3 times a week on the job. At the last third stage subject component was held for 5 days a week and 8 hours a day in total 72 academic hours in which participants acquired the terminology of subject component in English, the information and communication technologies that increase the educational and cognitive interest of students, be able to use the CLIL (Content Language Integrated Learning) approach to teach subjects in English and learn new pedagogical approaches. At the end of the course, teachers passed the exam and received the certificates with CEFR (Common European Framework of Reference) standard [2].

JSC NCPD «Orleu» Institute for professional development was established in 2012 by combining the Republican Institute for professional development of leading and scientific-pedagogical staff of education system and 16 Institutes in regions and Astana, Almaty cities for advanced teacher training. Every year JSC NCPD «ORLEU» supplies advanced teacher training for about 73.3 thousand educational staff for every level. The main goal of the JSC NCPD «ORLEU» is to provide systematical professional development for educational staff which provides high-quality of education based on co-operating governance, translation of Kazakhstani and world practice. One of the high-potential trends of activity of JSC NCPD «ORLEU» is an

international cooperation with leading educational organizations, involved in teacher professional development. JSC NCPC «ORLEU» developed a model of a new training system for educational staff which is based on a new philosophy of education and the use of modern innovative pedagogical technologies providing the improvement of the quality of education in Kazakhstan [7].

According to all provided data, it is obvious that Nazarbayev University Educational Excellence Centre provides more opportunities to better implementation of trilingual policy through the professional development program for STEM teachers. Because they cover more participants as a result let to more intensive program realization. It is expected that the general teachers' and trainers' attitudes towards the program are positive as both sides benefit from it. Evaluation report for the Nazarbayev University community concludes that the professional development program achieved goals due to the collecting outcomes from the teachers and trainers feedback after the program [18]. Moreover, further investigation will be required to the implication of acquired skills and knowledge of teachers in the real classroom to see how effectively the trilingual policy will be implemented in practice.

Conclusion

In general, our attitude towards the trilingual policy is positive, but nobody denies that the Government of the Republic of Kazakhstan has a set of difficult goals for itself, institutions, teachers and students that cannot be achieved in a short period of time and without mistakes and attempts to correct them. Our country is chronically reversing the system of education in all parts, such as pre-school, primary, secondary, high and inclusive education, also in governance and funding and so on. The main goal is to correspond to the worldwide trends by the development of the human capital of the nation which can increase our economic position in the world arena. Free education is one of the advantages of our country and we believe it is the best decision of our President to improve it and make it competitive.

We have decided to investigate the transformation of advanced teacher training system because we see it as an essential part from all educational reforms since teachers are the tools to implement the policy and make the reform and without them we cannot build anything. Students' knowledge depends on the teachers' qualification, because of the fact that what teachers bring to the students' minds, so they will be in the future. Even if my perception of the reform is affirmative, there are some challenges that we have to deal with such as the lack of qualified teachers who can teach subjects in English, especially in rural areas of the country, the shortage of high-quality language learning materials, unawareness of teachers, parents and teachers and the fear of reducing the development of the state language since there is an opinion that the English language is given more time and effort as a result of which it will lead to a decrease of interest in relation to the Kazakh language.

In our opinion, the existing professional development program is effective but needs to be developed further, as I see that the huge amount of work has already done and it is still in process with the continuing improvement each year. We consider that Nazarbayev University Educational Excellence Center provides more convenient conditions to the teachers as the center pays a monthly stipend for rural teachers and supplies with the accommodation. Moreover, we believe that the intensive off-the-job courses are much more effective than long-term on the job because teachers fully immerse into the program and do not distract by the work. So, that is why «Ustaz» professional learning center has changed a bit their syllabus from the everyday 2 hours classes after work to three times a week of courses and other 3 days they can work. Therefore, daily practice and full immersion are the main criteria for successful language acquisition. However, from our own experience as trainers at the professional development program organized by Nazarbayev University Educational Centre of Excellence in 2017, we found some limitations which have to be corrected or improved.

First of all manuals, for the first and second modules of teaching English (A1 and A2) trainers were provided by the course books «Straightforward» by Macmillan Publishers and additional resources such as tests and activities, but for the last module of subject component, there was only one textbook of Core Biology without any additional sources and audio. We think it is important to acquire specific and unfamiliar terminology from the audio records as in the class as by themselves at home because teachers need to practice them constantly by listening and repeating. Furthermore, we struggled with the preparation of progressive tests and only final examination was given.

Secondly, it was impossible to use the e-learning approach since the classrooms were not provided by the computers and projection devices. The reason was that the venue was a college and some schools which at the same time were not fully equipped in all classrooms.

Finally, we quite concern about the quality of the examination, how truthful and accurate are the test results after the end of the course because the final exam was conducted and tested by the trainers themselves, which causes a conflict situation and deprives the objectivity of the results.

In addition, the initial level of English ranged from zero to confident A1, as the age range was quite large from 23 to 60 years old, these factors influenced the learning process, as it was difficult due to the large differences, but it was possible. We consider that from the first day after the test to determine the level of English that was held in the first lesson, the participants had to be divided according to the level and age, as a result of these differences there were conflict situations.

From our point of view, we will suggest attracting foreign trainers who are the specialists in second language acquisition (SLA) and content language integrated learning (CLIL) approach like David Marsh and Do Coyle. Moreover, it is important to pay more attention to teachers from rural areas as they do not have an access to the main centers located in Astana, Almaty or other cities.

In conclusion, the idea of any reform requires lots of effort and hard work which cannot be achieved in one moment without falls and mistakes. The trilingual policy is a necessity of the rapidly developing world in which our country wants to take its niche. The main idea of this paper is to show the whole picture of how trilingual policy is being implemented through the teacher training system reform. First of all, it was the establishment of centers of excellence with the Cambridge University collaboration which helps to create the program based on the cascade model of training. The main focus of the centers was on the in-service teachers training from urban and rural secondary schools to prepare them for teaching Biology, Physics, Chemistry, and Computer science subjects in English. The teachers were provided with the conditions for learning English and also new teaching approaches such as CLIL and leading learning. The data of the program implementation by different centers such as EEC, Ustaz, and Orleu were described and analyzed. Most of the work has successfully done, but there are lots of limitations that need to be investigated and changed.

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**«Информатика», «Физика», «Химия» және «Биология»
пәндері бойынша ағылшын тілінде жалпы білім беретін мектептердің
педагог кадрларының біліктілігін арттыру курстарында Біліктілікті
арттыру үштілділік бағдарламасын жүзеге асыру**

Мақала үштілділік саясатын жүзеге асыру үдерісіне арналған, атап айтқанда: Назарбаев Университетінің Білім беру көшбасшылығы орталығы, «ҰСТАЗ» кәсіби оқыту орталығы» ЖШС, «Өрлеу» біліктілікті арттыру ұлттық орталығы» АҚ сияқты үш негізгі қосымша білім беру орталықтарының біліктілігін арттыру курстарын ұйымдастыру үлгісінде. Жоғарыда аталған ұйымдар орта мектеп мұғалімдерін биология, химия, физика және информатика пәндерін ағылшын тілінде оқытуға қалай үйреткеніне көп көңіл бөлінді. Осы ұйымдар тілді меңгеру деңгейін арттыру және кәсіби дағдыларды дамыту үшін оқытудың кешенді тәсілі, оқытудың каскадты моделі және білім берудің жаңа философиясы және Қазақстанда білім беру сапасын арттыруды қамтамасыз ету үшін қазіргі инновациялық педагогикалық технологияларды пайдалану сияқты қолданатын негізгі әдістер мен тәсілдер сипатталып, талданды. Қорытындыда авторлар барлық білім беру реформаларының саясатын іске асыру үшін ажырамас бөлігі мен құралы болып табылатындығын негізге ала отырып, мұғалімдердің біліктілігін арттыру жүйесінің өзгеруін зерттеу қажеттілігі туралы қорытындыға келді.

Кілт сөздер: біліктілікті арттыру курстары, үштілділік саясаты, оқытудың каскадты моделі, реформаны жүзеге асыру.

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**Реализация Программы трехязычия на курсах повышения квалификации
педагогических кадров общеобразовательных школ по предметам
«Информатика», «Физика», «Химия» и «Биология» на английском языке**

Статья посвящена процессу реализации политики трехязычия, на примере организации курсов повышения квалификации тремя основными центрами дополнительного образования, такими как «Центр

образовательного лидерства» Назарбаев Университета, ТОО «Центр профессионального обучения «ҰСТАЗ», АО «Национальный центр повышения квалификации «Орлеу». Значительное внимание уделяется тому, как упомянутые выше организации проводили обучение учителей средней школы к преподаванию биологии, химии, физики и информатики на английском языке. Описаны и проанализированы основные методы и подходы, применяемые данными организациями, такие как комплексный подход к обучению для повышения уровня владения языком и развития профессиональных навыков, каскадная модель обучения и новая философия образования и использования современных инновационных педагогических технологий для обеспечения повышения качества образования в Казахстане. В заключение авторы приходят к выводу о необходимости исследования трансформации системы повышения квалификации учителей, основываясь на том, что она является неотъемлемой частью и инструментом для реализации политики всех образовательных реформ.

Ключевые слова: курсы повышения квалификации, политика трехязычия, каскадная модель обучения, реализация реформы.

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