

## Developing primary school students' skills on general developmental exercises and teachers' professional development on learning technologies in physical education

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### Abstract

This study aims to develop primary school students' general development exercise skills and reveal teachers' views about their professional development on learning technologies in physical education. Mixed method was used in the study with experimental and qualitative research methods. The main relevance of this study is an analysis that conducts an experiment of a system of general development exercises that are used to perform independently by primary school students to clarify, verify the results of the study and test an effective experimental method in this direction. During the study, the experimental groups and control group of primary school students were included and the results of experiment and qualitative data were analysed. In addition, the study revealed comparative data with analysis, synthesis, questionnaires, diagnostics and other practical methods. As a result of the experimental work, a system of specific general developmental exercises (GDE) aimed at developing the skills of independent performance by primary school students through GDE was developed. Elements of life movements taken from various roots of Kazakh national culture were introduced into the system of GDE within the framework of cooperation with class teachers, a series of thematic methodological seminars were held for physical education teachers and a methodological guide was developed. Results of this study provided practical implications for primary school teachers to use systems of a new direction of preparing children for a healthy lifestyle.

**Keywords:** General development exercises, primary school teachers, students, physical education.

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## 1. Introduction

Another dimension of instructional technologies is the teaching methods used by teachers in the learning-teaching process in traditional education. The method of forming students' skills to perform self-developed exercises should be the initial stage of achieving students' life success. As it is known, when getting used to the independent implementation of general developmental exercises (GDE), the mental development of students is also improved (Popovici, Popescu & Radu, 2017). In the process of teaching primary school students to independently perform GDE in physical education lessons, skills are formed that are necessary for the growth of a fully physically appropriate personality of each student, strengthening and preserving their health for many years, correctly using the values of GDE (Abdigapbarova, Smanova, Rakhmetova, Abdurahmanova & Uaidullakzy, 2014; Amirova et al., 2018; Agranovich et al., 2019). Doskaraev, who studied ways to promote the physical culture as a valuable element of general culture of our people, was one of the foundations on the territory of Kazakhstan. In his study, Doskaraev described physical education system features of the Soviet era from the Palaeolithic to the formation of Kazakh Khanate (14th century) on the basis of a step-by-step, in-depth analysis of the directions of physical culture and sports in Independent Kazakhstan (Nurgaliyeva, Zeynolla, Tulenova, Zulkarnayeva & Yespolova, 2018).

It is necessary to define a model of a special methodological system that forms the necessary skills for maintaining physical health in order to have a clear idea of individuals' own capabilities of developing exercises and turning primary school students into ordinary means of self-fulfilment. At the same time, it is important that each action should be comprehensively analysed, studied and, if possible, combined with one methodical system of physical education of younger students on the way to the development of pedagogy and didactics (Alp, Oz & Horozoglu, 2018; Cakmak & Nural, 2019; Ozturk, Tepe & Ozdemir, 2017). One of the scientists who developed the theory of physical education was Lesgaft. It is known that he developed a system of physical exercises for children. According to Lesgaft, the importance of focusing on the hygienic and recreational state in teaching children is emphasised. Lesgaft emphasises that student's anatomical features, psychology and physiology should be focus of students' physical activity and that they need to move from simple to complex with age (Aytac, Demirbas-Celik & Kiracioglu, 2019; Bakulev, Taymazov & Kuramshin, 2016).

Physical education classes organised in primary classes from the point of view of didactic and psychological, physiological requirements, strengthen the health of students, develop such basic physical qualities as speed, speed-strength, flexibility, endurance, special and specific coordination and coordination qualities. Functional capabilities of student's body are developed, in particular, cardiovascular, respiratory, nervous and musculoskeletal systems (Silva et al., 2018). GDE form motor skills as a means of making up the main content of daily morning gymnastics and making up a large part of physical education classes. It is important to support teachers' speech in performing motor actions. Because if they learn to perform such a system, the child will be able to quickly and efficiently master GDE.

It is known that the role of GDE in the system of physical education is determined by their great advantages. By allowing students to perform GDE and be able to perform them independently, they are encouraged to activate a higher motor centre which controls students' overall movement and improve physical qualities including skills of students, age-related strength and ability to navigate time and space.

Thanks to the students' ability to regularly perform GDE, the child's body gets a lot of useful skills. These skills are as follows:

- A child will be able to form coordination of movements of several parts of body at the same time;
- A child's ability to be flexible is formed by the ability to perform extensive body movements;

- Performing these skills promotes the body's ability to maintain balance when performing exercises on small and high supports;
- A child gets used to correctly perceiving these signs and pays more attention to the appropriate movements;
- When a child performs a movement in a certain way and at the right rhythm and pace, his/her consciousness will develop a sense of precision of space and time and a sense of appreciation (Aladzhev, 2013).

GDE for elementary school students are a set of movements designed specifically for students' hands, feet, body, neck and other body parts. It is well known that GDE system for each body is designed with different muscle tension, speed, rhythm and tempo (Pangrazi & Beighle, 2019).

Fournier, Calmels, Durand-Bush and Salmela. (2005) emphasised that GDE are performed individually and in pairs, by gymnastic means and various other means, and they also develop not only the body, but also the mental qualities of a child, particularly attention and attentiveness. According to Keneman and Khukhlaeva (1985), GDE are special exercises that play an important role in the development and recovery of the entire body. At the same time, researchers point out that GDE are exercises specially designed for human body organs (arms, shoulder girdles, whole body and legs), various muscles and joints, as well as for the entire body. Therefore, it is seen that GDE is developed for individual organs of the human body on the basis of which it is divided into an internal form. In addition, Stehlikova-Leskova (2005) stated that GDE are those exercises that play an important role in the physical education of child and are necessary for the timely development of body, the ability to consciously control their movements and the means of healing and energising body.

As it can be seen from these definitions, the nature of GDE is so broad that it is able to meet any need for the full development, healing and treatment of the individuals' body. It provides an elementary ability to perform general development exercises for the entry-level students to be easier in structure for multiple GDEs. As a result of the consistent implementation of the GDE system, the primary school students' own experience, motor skills and abilities are created. This development plays an important role in the life of students and also serves as a basis for the formation of gymnastic skills (Nunez, Da Silva-Grigoletto, Castillo, Poblador & Lancho, 2008).

Classifications of GDE are as follows:

- anatomical features;
- functionality;
- product usage;
- not using products.

GDE terms should clearly indicate a limited form of physical activity and should be easy to pronounce and understand. The GDE features are that they are equally understandable for teachers and students, increase the density of movement activity, increase educational and developmental potential, facilitate the management of students' activities and focus on the learning process. Based on this, the nature of GDE as an effective means of physical education is important. It is worrying that today's primary school students are too passive. An ever-decreasing daily decrease in physical activity can lead to a child's loss of strength, reduced stamina, insufficient speed and lack of dexterity, as well as a lack of coordination in overall coordination. As it is already mentioned, the direct branches of hypokinesia are hypodynamia, i.e., disorders of the heart, blood vessels, stomach, internal organs and metabolic systems, which begin with a decrease in movement (Kiepkava, Gromov, Shaikhetdinov & Terekhina, 2019).

It is important for individuals to motivate themselves to perform development exercises in general. There is a need to systematise several factors in solving this problem. These factors are:

- factors related to the physiological characteristics of primary school students;
- physical development of children;
- mental and psychophysiological factors of development of primary school students;
- individual characteristics of the student (Nur, Suherman, Subarjah & Budiana, 2019).

If students learn to perform general development exercises on their own not only during physical activity, but also outside of it, then physical activity in the cardiovascular system will be normalised and such skills will expand functional capabilities of children. When implementing general development exercises on their own, teachers should introduce students to areas that will help them build and maintain their physical culture. These areas:

- active participation of students in self-development and the ability to independently implement the GDE;
- readiness and willingness of the student to reveal the qualities and abilities of the student;
- use of creative elements in the student's independent implementation of GDE (Stephenson, Phelps & Colburn, 2018).

In the preparatory period of physical education, GDE is used to warm up the muscles and prepare the body for further work, as a means of active rest during the main training period, as well as to recover from the work performed at the final stage of the lesson, it is used locally to strengthen and develop individual muscles. In the methodological guide, these groups are divided into complexes, providing a variety of methodological instructions and visual information for each complex. Many researchers group general system of development exercises in the following groups (Amirova, Kamshat, Uaidullakzy, Bissenbayeva & Jandildinov, 2013; Acar & Erel, 2019; Masanovic, 2020):

- GDE performed without the use of products.
- GDE performed with the use of weights.
- GDE performed in pairs.
- GDE performed with a skipping rope.
- GDE with a ball.
- GDE performed by the hoop.
- GDE performed by gymnastic walls.
- GDE performed with gymnastic sticks.
- GDE performed using gymnastic chairs.

Mavilidi, Okely, Chandler, Cliff & Paas (2015) mentioned about methodological instructions on the implementation of GDE and provided detail on the nature and method of GDE. In particular, the main terms, forms of writing, compilation and recording of the GDE complex and features of load on students when performing GDE are considered. Analysing the content of the updated curriculum in the present study were mentioned that the importance of physical education in the pedagogical process and performing exercises gives information about the level of training. However, these programmes are basic, exemplary nature, so each teacher can change and add depending on local conditions and traditions.

Physical culture is an integral part of human culture. Therefore, ancient culture and the importance of its use in culture are the beginning of GDE. In his research in this area, Klara, Baktiyar, Sandygul, Raikhan & Gulzhiyan (2015) underlined, in particular, that the use of national types of games in physical education classes is focused on the specifics of exercises. In fact, national games are a source of training in primary learning skills, for primary school students also. From the didactic point of view

of the cultural aspect of national games, the elements of national game should be widely included in the daily systems of physical education and general development.

Since every detail of the national games recognises not only the national and cultural value, each of them also preserves signatures of ancestors who lived in the steppe and fought with it, preserving their offspring, defining the details of the national game adapted to the GDE system, embodied in the mind of every primary school student in Kazakhstan, describing how to perform them and teaching students how to preserve the treasures of Kazakh culture and body culture. It is important to analyse and integrate any element of Kazakh national game system into the wild, wildlife, hunting, physical education and sports, as well as to conduct a didactic assessment and consider ways to include it in the GDE system (Ifert Johnson, 2006; Tursyn, Aktolkyn, Gulmira, Dinara & Amanbaevna, 2013). The task of enriching the GDE system from a national source will be solved by an in-depth analysis of the game's methodology and incorporating their individual details into the overall development training system. Tleubayeva (2019) stated that theoretical formation of systematisation, Kazakh folk games and sports is recommended to be divided into five groups. These are traditional Kazakh life and entertainment, rules-based, fixed sports, intellectual, new and entertaining. From a methodological point of view, features of this method in the formation of students' self-learning skills are using GDE. Researchers in this field have suggested the following as key areas in developing students' ability to perform GDE independently:

1. Teachers strengthen the educational orientation of the lesson in developing students' self-realisation skills.
2. It is recommended to use more tasks for differentiation and individualisation (personalisation and differentiation), which will greatly help in formation of skills for independent work.
3. Students are offered GDE self-organisation and self-control skills.
4. It is proposed to use various didactic methods that stimulate the process of formation of GDE in their own way.
5. It offers pedagogical control over the students' independent performance of the lesson.

Furthermore, it is important to mention the necessary steps for student to learn how to do GDE by themselves. *First*, individuals need to learn how to maintain starting position (exercise), i.e., keep your hands on your waist, behind your head, in front of your chest, shoulders, up, forward, on both sides. *Second*, it is important how to perform exercises through separate parts of the body – first with your hands, then with your body and legs. Once they have mastered the basic movements through the individual parts of the body, they need to get used to their combination and execution, i.e., to the hands and feet and the body. *Third*, individuals need to perform individual exercises with the ball. Before performing the exercises, it is necessary to familiarise yourself with the state of the starting position and the main exercises performed by the body and hands.

The relevance of this study is determined by the fact that in the process of developing the country's primary education system in a new direction, much attention is paid to the physical education of children due to the fact that society is undergoing positive changes related to the worldview, education and spiritual modernisation, culture of Kazakhstanis, including the organisation of physical education of primary school students. The source of this strategic goal is lessons of physical education in primary school, the formation of students' skills of high-quality training and self-fulfilment of GDE. The development of physical culture of children by improving physical energy through the formation of skills for doing general exercises individually improves vital motor skills of younger students.

According to the literature, there is a theoretical and practical basis for the ability of primary school students to practice self-realisation through GDE. Although no special methodological system has been developed, it is shown that the countries where GDE are held reflect the patriotic and ideological orientation of the country; many aspects of the Kazakh national games are still not used in the development of the GDE system, so the development of the GDE system, which would fill the free and

heroic spiritual world of the descendants of Independent Kazakhstan takes a lot of time (Gallahue & Donnelly, 2007; Haerens, Kirk, Cardon & De Bourdeaudhuij, 2011). Considering the importance of the role of teachers in improving students' general development exercises, this study aimed to develop primary school students' general development exercise skills and reveal teachers' views about their professional development in physical education.

## 2. Method

### 2.1. Research model

An experimental model was used in this research. In practice, there are two groups: the experiment and control groups. Researchers might carry out interview or observe to support the quantitative data obtained as a result of an experimental study with qualitative data. In the mixed approach design, where quantitative and qualitative research techniques are equally dominant, the researcher tries to use both data collection techniques equally to understand an event or situation (Cresswell, 2002; Johnson & Onwuegbuzie, 2004; Johnson, Onwuegbuzie & Turner, 2007). Primary school students were in the experimental who received instruction on general development exercise and control groups. Interviews were carried out with primary school teachers in order to obtain their views on professional development in physical education.

### 2.2. Participants

The development of methods for developing skills for independent performance of general education exercises by primary school students was carried out in the following schools as practical and experimental bases for conducting a pedagogical experiment. Classes 1, 2, 3 and 4 of secondary school № 182 of Alatau district of Almaty and secondary school № 149 for the experimental group of classes 1, 2, 3 and 4 of school № 182, 1'g', 2'a', 3'g', 4'a' were taken. The number of students was 80. In the control group comprised 1, 2'd', 3'a' and 4'b'. The number of students was 80.

From classes 1, 2, 3 and 4 of school № 149, the experimental group had 1'a', 2'a', 3'a' and 4'a'. The number of students was 80. The control group had 1'b', 2'b', 3'b' and 4'b' classes. The number of students was 80. From grades 1 to 4 that participated in the pedagogical experiment, 160 students were identified as experimental group (EG) and 160 students as control group (CG). These schools also dealt with primary school teachers in physical education; there were eight of them. At the first stage of the pedagogical experiment, defining period, it was planned to attend physical education classes in primary schools as necessary and to monitor how well students were prepared to perform the GDE on their own. Elementary school classes in experimental schools were systematically planned. However, teachers determined that students were less likely to be able to practice GDE on their own.

### 2.3. Data collection tool

The questionnaire was received from teachers who took advanced training courses in physical education at Almaty Regional Institute of Teacher Training. 23 teachers took part in the interviews. The questions in the interview form included the following questions:

1. To what extent do you perform the exercises the overall development in daily physical education?
2. What prevents you from completing the full range of development in daily lessons?
3. What skills do students perform the GDE on their own?
4. How do you teach students to design the kits needed to complete NGP on their own?
5. How do you teach your students how and when they can do their exercises on routine?
6. Have you talked to parents about the value of GDE and health benefits for students?

7. How do you feel about introducing elements of the Kazakh national identity into the GDE system?

## 2.4. Data analysis

The analysis of the data obtained in the study was carried out using the SPSS 20.0 statistics programme. Research data were analysed by applying non-parametric tests. The Mann–Whitney U test was applied to determine whether there is a significant difference between the pre-test and post-test scores of the experimental group and the control group. Qualitative data were analysed with descriptive analysis method.

## 3. Results

The results showed that there is a need to focus on primary school teachers' attention on physical education so that their students can create their own GDEs. Most teachers noted that elementary school students do not have an elementary GDE methodology and a special integrated learning system for teaching students to work independently and all teachers supported the fact that the GDE system contained elements of Kazakh national characters.

### 3.1. Sections from general exercises for second grades

Exercise of the first segment. Sitting, performing a set of exercises related to the main vertical.

Exercise of the second segment. Quickly throw the ball from one hand to the other.

Table 1. Results of cross-section exercises for second-grade students

Classes	number	First segment exercise results		Second segment exercise results	
		Correctly executed	%	Correctly executed	%
Experimental Group –EG	40	9	22.5%	10	25%
Control Group – CG	40	9	22.5%	10	25%

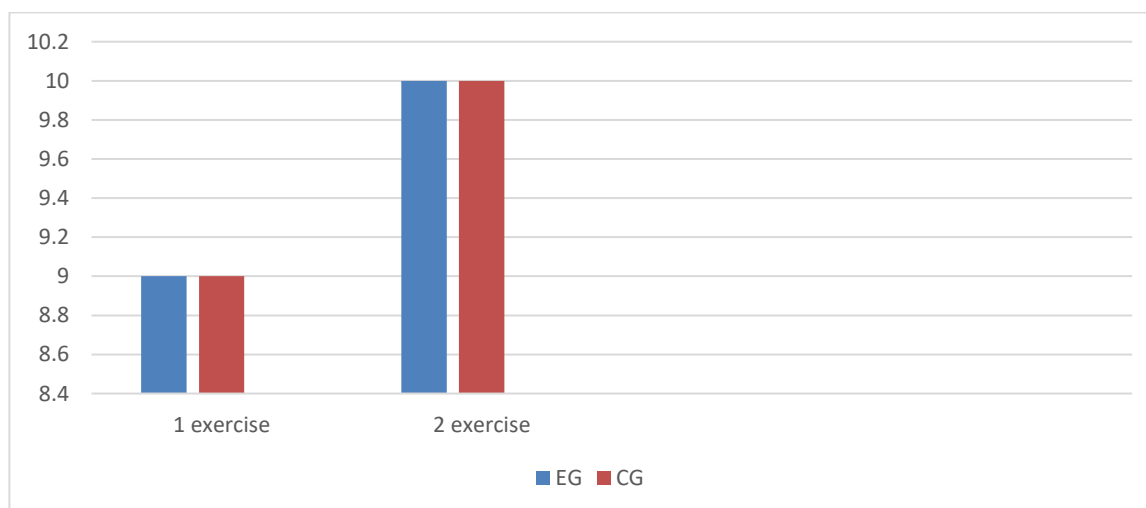


Figure 1. Performing segments of the defining period

By analysing the results of the defining period, it was found that the elementary school used the GDE elementary system, but that systematic methodological continuity was not given due attention to

the ability of students to perform independently. Based on these findings, a special training system was developed for the next stage of the pedagogical experiment – the training stage.

During the training experiment, a number of methodological seminars were held for primary school teachers and classrooms under the general theme '*Importance of primary school students' skills in self-implementation of the GDE*'.

In a series of seminars for teachers, there was a wide discussion of the importance of full GDE in physical education in primary school, the nature of GDE, as well as scientific and methodological issues necessary for students to develop their skills of independent work.

Excerpt from the class 2: '*Performing general developmental exercises based on elements of Kazakh national culture*'.

*The first is 'General developmental exercises with elements of chopping on horses'.*

1. Initial position-vertical position, limbs, hands forward. 1-slightly bending the knee of both legs, hands forward, two times forward, pulling the hand to yourself, two times jump; 2-come to the original form; 3-slightly bending the knees of both legs, hands forward, two times forward, pulling the hand to yourself, two times jump; 4-come to the original form. Repeat this 2–4 times.
2. Initial position: vertical position; limbs and hands forward. 1. Slightly bend the knee of both legs, move forward, lean to the right, touch the Ground; 2. give to the original position; 3. slightly bend the knee of both legs, move forward, lean to the left, touch the ground; 2. give to the original position. Repeat this 2–4 times.

A) *The second elements of hunting and 'animal style': a) elements that symbolise the flight of wings of eagle:*

1. Starting position: the hand is high. 1. gently lower your hands down, with applause; 2. calmly raise your hands up, with applause over your palms. Repeat this 8–10 times.
2. The original form is the main vertical stand. 1. bold, hands up, bent at the elbows, forward; 2. giving in the initial position; 3. bold, hands up, bent at the elbows, forward; 4. giving in the initial position. Repeat this 6–8 times.
3. The initial form is the main vertical stand. 1. tilt forward, hands back, up; 2. starting position; 3. tilt forward, hands back, up; 4. starting position. Repeat this 6–8 times.
4. Initial form: step, vertical position, hands on both sides. 1. tilt forward, hands back, up; 2- Starting position; 3-tilt forward, hands back, up; 4-Starting position. Repeat this 6–8 times.
5. The original form: a level, upright position, hands down. 1. gently raise your hands to the ends of your legs, look at your hands; 2. gently start the initial position; 3. calmly raise your hands to the ends of your legs, rise to your hands; 4. calmly approach the initial state. Repeat this 6–8 times.
6. Initial form: step, vertical position, hands in both sides. 1. smoothly up the arms, rise to the ends of the leg; 2. smoothly to the starting position; 3. smoothly up the arms, rise to the ends of the leg; 4. smoothly to the starting position. Repeat this 6–8 times.

B) *Elements that reflect movement – the movement of the Leopard. 'The course of Bary's slight movement'.*



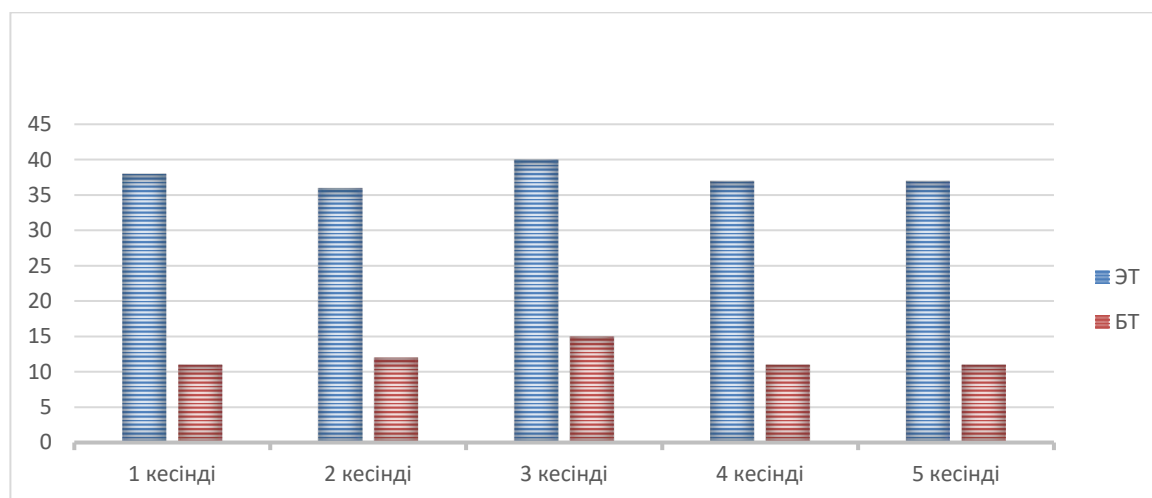
1. The original form: sitting, stretching both hands forward. 1. raise the right hand and extend forward, palms forward; 2. come to the original position; 3. raise the left hand and extend forward, palms forward; 4. come to the original position. Repeat this 2–4 times.
2. The original form: sitting, stretching both hands forward. 1. fixing slightly by force on two hands, lifting the chest up; 2. giving in the original position; 3. fixing slightly by force on two hands, lifting the chest up; 4. giving in the original position. Repeat this 2–4 times.

The second stage of pedagogical experiment is verification of experimental curriculum. In the experimental class, comprehensive support was provided, a system of special exercises was mastered and various methodological and pedagogical events were held with teachers and parents.

Control cross-section exercises were conducted in the second grade, and their results are presented in Table 2. The cut-out exercises were tested for each of the five sets presented in the experimental programme.

**Table 2. Control cross-section exercises conducted in the second grade and their results**

Classes	Number of students	1 section		2 section		3 section		4 section		5 section	
		Correct	%	Correct	%	Correct	%	Correct	%	Correct	%
EG	40	39	97,5%	38	95%	40	100 %	38	95%	38	95%
CG	40	12	30%	12	30%	16	40%	13	32,5%	12	30%



**Figure 2. Results of Control period**

Since both the EG and CG were trained in two different training programmes, there was an increased interest in both the first and second-grade EG in integrating elements of Kazakh national culture into the GDE system.

#### 4. Discussion and conclusion

This study aimed to develop primary school students' general development exercise skills and reveal teachers' views about their professional development in physical education. In line with this aim, this study considered the technique of forming elementary skills for performing elementary exercises in general education exercises for elementary school students as the basis of physical education and theoretical justification of system. Theoretical foundations revealed and experimentally

developed a system of methods for developing the skills of independent performance of GDE in primary school students.

Furthermore, the research tasks were set, in particular; features of independent progress through initial developing activity of primary school students and on the basis of a set of theoretical foundations are revealed; developed a system of special GDE designed to develop self-learning skills of primary school students through GDE; elements of life movements from different roots of Kazakh national culture were introduced into system of GDE; such exercises, which aroused great interest among students, were to be studied in the future as a special system; allowed primary school students to practice GDE on their own, using generalised exercises developed for each class individually, followed by a gradual transition to a specific type of movement.

By expanding GDEs capabilities in their own way, they were able to develop their strength, resilience, and resilience in primary school students. Students learned to breathe correctly by acquiring the ability to perform GDE on their own. It was decided to show respect and teamwork by giving GDE the ability to act independently in pairs, groups and classes. Thus, improving the health of primary school students, developing correct posture, physical, spiritual and social harmonious development of children in the process of their education.

In a series of seminars for teachers, there was a wide discussion of the importance of full GDE in physical education in primary school, the nature of GDE, as well as scientific and methodological issues necessary for students to develop their skills of independent work. As noted by Stodden et al. (2008), many researchers promoted the importance of 'competence'. However, there are models speak to how perceptions of competence affect persistence in physical activity participation, as opposed to addressing how perceptions drive the development of actual motor competence. A significant contribution of Stodden and colleagues' model was the notion that inflated perceptions of competence in early childhood may, in part, positively drive the development of actual motor competence. However, actual competence may effectively drive continued development of skill later in childhood (via more accurate perceptions of competence) (Lopes, Rodrigues, Maia & Malina, 2011). In regard to the results of the present study, following recommendations are presented:

1. Teachers, who are the implementers of the programme, should be given the opportunity of long-term in-service training, especially with workshops on learning, teaching and evaluation processes.
2. Schools should be supported in terms of facilities and equipment in order for the programme to be successful.
3. In order for the programme to be implemented and to be successful, the current lesson time should be increased and it should be brought to a level that will give the person a physical activity habit.
4. Further research might examine the effect of different programmes to improve students' skills on general development exercise and attitudes of teachers at different class levels towards developing professional development on physical education.

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