

# Extracurricular Inclusive Education Activities at Orphanages

**Marina Tyuleneva**

Independent Researcher, Russia

## Abstract

One of the most troublesome issues in Russia is a considerable amount of orphans. These children live in specific institutions – orphanages – that are subsidized by government. Having limited assets, it is not always possible to supply orphanages with human resources and provide students with a modern education. Moreover, children at orphanages experience lack of social activity and remain isolated from society due to isolation of such institutions. Being social orphans in childhood, they experience social abandonment as adults. These children often choose low-prestige jobs and struggle with all kinds of social interaction. This article will address the problems of inclusive education for children living in orphanages. It will also suggest a strategy of extracurricular education that might be a solution to the educational problem and, additionally, a guidance for acquiring social skills and connections. The main area of knowledge that seems suitable as a good educational program in this context is IT, as one of the most rapidly developing areas with numerous working places. Along with the basic skills in IT, such areas as design, programming and cybersecurity will also be considered, as well as their value for social skills development among children at orphanages. The program might give children the opportunity to acquire useful knowledge that can be considered as the first step towards obtaining a professional education, and scalability of the educational approach could introduce inclusive learning throughout Russia.

**Keywords:** orphanage, inclusive education, computer science, learning and studying, extracurricular activity

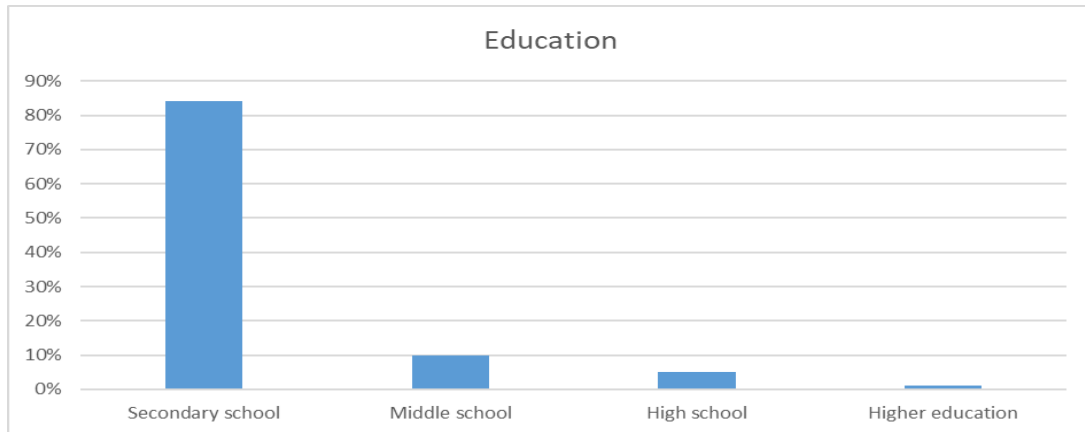
## 1. Introduction

Every year in Russia a large number of children left abandoned. At the end of 2020, this number was 43395 according to official statistics providing by Russian government [Orphanages statistics].

These children live at orphanages - special institutions with an isolated environment. Thus, children do not have the opportunity to communicate with people outside the orphanage due to policies restrictions and safety measures. There are often schools in orphanages where children go, which create an isolated environment and the inability for children to socialize.

At the same time, one of the biggest problems is the problem of education and socialization of the orphans, and these problems seem to be connected. According to statistics, 84% of the surveyed children from orphanages in Russia choose for themselves non-prestigious secondary school education – institutions that prepare low-qualified workers.

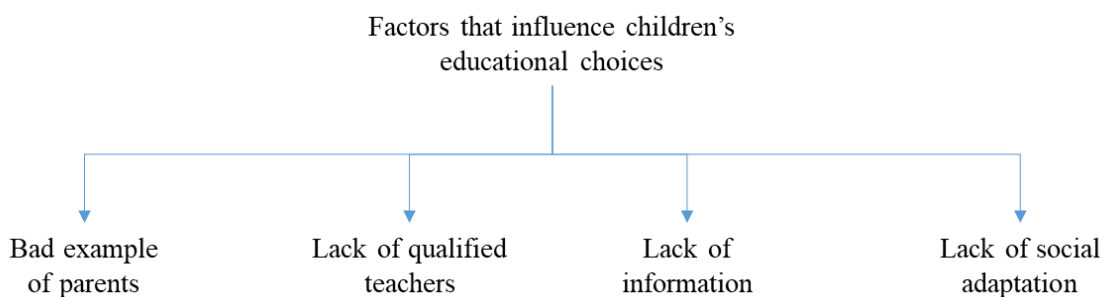
The most popular specialty among them turned out to be a chef, auto mechanic, a primary school teacher and a welder. Thus, only 5% of graduates choose to continue their studies in high school and only 1% intend to obtain higher education (see Figure 1).



**Figure 1.** Education children from orphanage obtain

At the same time, human development is influenced by three factors: biological, psychological and social (Goetz&Hunt, 1997). The first includes physiology and anatomy, the general level of health and genetics, the second - the emotional stability and ability to respond to external stimuli, the third includes cultural and socio-economic factors.

Thus, a change in the social environment can help a child to improve their education (Heslinga, 2015). Moreover, learning from competent teachers will allow children to choose a more sophisticated and demanded by employers specialty. However, children with dysfunctional environment often do not consider for themselves the opportunity to obtain good education, and therefore finish their studies after middle school or go to secondary schools. At the same time, the curricula of orphanages often is focused on giving basic school education due to lack of teachers with qualification in specific disciplines (Figure 2).



**Figure 2.** Education choices of children from orphanage

Furthermore, children living in orphanages are deprived of the opportunity to participate in extracurricular activities that are available to children who have families. Thus, their choice is limited due to lack of knowledge about available professions and activities. One more factor that seems essential in terms of obtaining a profession is social maladaptation. Children from

orphanages often have limited social connections communicating only with their peers, thus, they are unable to expand their knowledge.

Children from orphanages are less aware of multiple life aspects compare to those who live in families, whose parents can provide them with various information about world due to their diverse backgrounds and spheres of interests and learn from them about different types of jobs. Along with that, children from orphanages have similar ideas about professions due to the lack of diversity in their backgrounds, and the absence of a family leads to the fact that their social interests and social circle do not become wider.

Thus, children from orphanages graduate from school not having had access to the information that children with families have. Accordingly, they do not understand the importance of good education in future careers and socialization.

The purpose of this work is to propose the idea of an extracurricular program that would meet several requirements simultaneously. It should:

- Raise children's awareness of existing in-demand professions;
- Constitute basic professional education;
- Provide career guidance;
- Carry educational value itself;
- Serve as a factor of socialization.

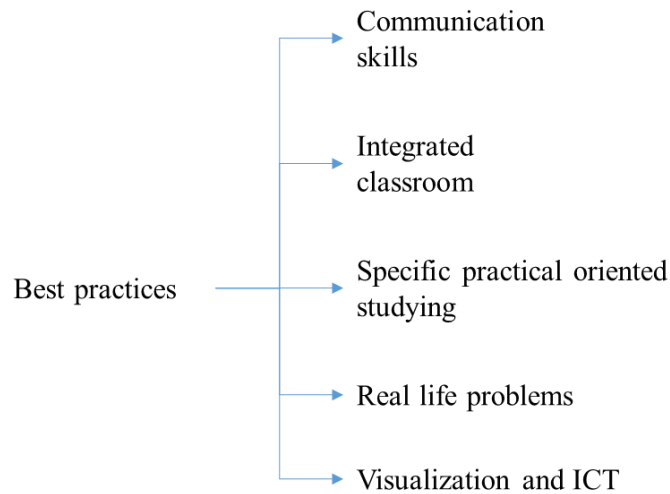
## **2. Method**

During the preparation of the teaching methodology, various activities might be considered in order to achieve the desired outcomes.

The best practices involves:

Listening to the student and giving an opportunity to present their findings;

- Designing a student-centred curriculum;
- Student enjoying learning;
- Doing to understand – active learning;
- Relating learning to the world of the student;
- Providing professional development.



**Figure 3.** Best practices of teaching methodology

Best practices on the methodological approach include achieving good communication skills, using integrated classroom and specific practical oriented studying with real life cases, as it is shown on the Figure 3. Modern technologies, such as visualization and ICT, should be involved (Kazis, 2005).

## 2.1 The field of study

The chosen subject for studying is computer science. The IT industry is a rapidly developing field of knowledge. Digitalization penetrates into all spheres of human activity – digitalization of non-IT companies, technology development and exponential growth in the number of digital devices. There are a huge number of specialties in the IT field, many of which require from candidates not only technical skills, but also management and communication abilities, basic knowledge in design etc. Although candidates with strong technical skills are valuable workers at IT companies, there is a need of employment non-technical professionals, such as accountant or editor. Among the most popular technical specialties are the following:

- Data Scientist;
- Software Developer;
- Information Security Analyst;
- Computer Systems Analyst;
- Web Developer;
- Sales Engineer;
- Information Technology Manager;
- Computer Research Scientist;
- Network and Systems Administrator;
- Computer Support Specialists.

Specialists can also choose a career in the IT industry that does not require technical skills. As you can see in the diagram below, non-technical areas include team formation, product development, and distribution, as it is shown on the Figure 4.

Team formation	Product Development	Distribution
<ul style="list-style-type: none"> <li>• <b>Business Operations</b> explores opportunity</li> <li>• <b>HR</b> hires team</li> <li>• <b>Corporate development</b> acquires team</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Research</b> analyzes customers</li> <li>• <b>Product management</b> sets vision</li> <li>• <b>Project management</b> oversees development</li> <li>• <b>Operations</b> builds systems</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Marketing</b> creates awareness</li> <li>• <b>Sales</b> closes deals</li> <li>• <b>Business development</b> inks partnerships</li> <li>• <b>Customer Service</b> handles support</li> <li>• <b>Finance/Accounting</b> tracks performance</li> </ul>

**Figure 3.** Types of non-technical jobs in IT companies

It is also necessary to have a basic understanding of IT and be able to work with office products, mail and be a confident computer user, while working as a non-technical specialist. Therefore, knowledge of IT is an obligatory skill for all specialists (Kazis, 2005).

One of the specifically chosen module of the program is cybersecurity. In 2020, the shortage of specialists in this area amounted to 3.5 million [Jobs].

Due to the specificity of the sphere, information security is not taught in Russian schools. However, through this promising area of knowledge, several important tasks can be obtained, such as raising students' awareness, increasing their knowledge and providing basic professional education, as well as socialization through participation in various competitions.

### 3. Results

In section, a two-year educational program for children is proposed. It consists of two stages: the first stage is devoted to basic knowledge and mastering skills in various IT disciplines. During the second year, students will be able to choose training programs that meet their interests. During the second stage, students will have an opportunity to choose a specialization and deep their knowledge in topics they find the most interesting.

One of the main goals of the given program is to create an extracurricular activity that would accumulate best practices of education and their application to the specific orphanage environment The Table 1 illustrates learning program curriculum and its educational purposes.

Learning program curriculum consists of the following modules:

- Graphics and design;
- Computer science basics;

- Programming;
- Cybersecurity.

**Table 1.** Learning program curriculum

Module	Content	Educational purposes	Social purposes
Graphics and design	Presentations, websites	Basic skills on design	Team work on a website project
Computer science basics	Booolean algebra, Computational technologies, Algorithms	General knowledge in computer science	General knowledge in computer science
Programming	Variables, loops, arrays and data structures	General knowledge on prgramming	Team work on a project
Cybersecurity	Cryptography, data analysis,	Basic professional education	Participating in conferences, Catch The Flag (CTF) competitions

### 3.1 Inclusive education and computer science

Inclusive education allows bringing an isolated social group into society (Nilholm&Göransson, 2017). Participating in IT activities, students can obtain the following benefits:

- Becoming acquainted with the professional community through competitions;
- Expanding horizons;
- Communicating with children living in families.

Building a community, first inside the orphanage, and then outside it, might have a positive impact on the development of social skills in children living at orphanages. IT is a rapidly developing field in which communities can keep in touch via the Internet. Participation in competitions, conferences and performances at outdoor venues will allow children to meet the professional environment.

### 3.2 Evaluation of results

The given study has a qualitative approach. The main goals are to increase the social skills of children at the orphanage and provide them with useful knowledge. To begin with, the following methods can be considered in purpose of evaluating students' proficiency.

- Standard assessments (tests, essay appointment, research work and examination);
- Competitions;
- Final project.

Classical assessments allows to evaluate the knowledge of children and are designed to provide teachers with information about difficulties that students are experiencing during education, in order for teachers to be able to adjust the learning program. The purpose of the

competition is to increase students' interest in the subject. Competitive activities can be a part of the final assessment, presented in a gamified way. Furthermore, in addition to competitions between the students of the orphanage, it is proposed to arrange team competitions (or online competitions), where children from orphanages could participate together with children from outside. These activities will expand their circle of social connections (Ainscow et al., 2016).

The final assessment includes the website creation activity, during which students will work together. The common activity will allow them, on the one hand, comprehensively think of a complex project and acquire skills that can be useful for their future career, and on the other hand, to work in a team and develop their soft skills (Ainscow et al., 2016).

As for the socialization of students, the assessment of this factor will be carried out by several parameters:

- Acquisition of soft skills while working on joint projects;
- Meeting new people and expanding social ties outside the orphanage.

### **3.3 Technologies used**

The given course will include usage of utilities for creating graphical objects (Figma, Power Point, Miro), basic website constructors (Tilda), cybersecurity utilities, programming languages (Python). All lectures will be presented in the format of presentations and long reads, so that children will be able to revise the learning materials. Third-party resources on online problem solving and surveys taking (such as Kahoot) will also be included.

Moving forward, the curriculum on cybersecurity will be given as one of the less common topics in the school curriculum.

- Problems that the module covers:
- Making students interested in studying area;
- Specific knowledge acquisition: hard skills (mathematics, encryption, application of computer science);
- Socialization: the ability to work in groups;
- Individual work: study of tools and approaches to cybersecurity;
- Teamwork: explaining topics to peers and the ability to present information.

The Table 2 below lists the areas of knowledge being studied, as well as the main objectives of studying the modules.



**Table 2.** Topics on Cybersecurity module and its purposes

Topic	Main purpose
Confidentiality, integrity, accessibility. Resources: information and money Approaches to cybersecurity	Better understanding of a subject and specific knowledge
Privacy: Encryption algorithms, basic algorithms, public and private key	Students involving
Cryptography Competition	Socialization: team competition
Cyber threats and vulnerabilities, malware and antiviruses	Rising awareness
Regular expressions and automation of work	Better understanding of a subject and specific knowledge
Basics of Windows OS: Registry, folders, executable files	Better understanding of a subject and specific knowledge
Phishing: types of fraud, awareness	Rising awareness and self-protection
Fundamentals of computer networks: network connections, hardware, nmap utility	Better understanding of a subject and specific knowledge
Network setup in virtual machines, network activity and working with Sandbox	Practical skills
Powershell: diagnostic commands, scripts for automation	Better understanding of a subject and specific knowledge
Catch the flag competition	Socialization: open team competition

### 3.4 Research problems

Despite the practical orientation of the program, children may react negatively to additional academic load. Perhaps there will be a lot of resistance on their part to working together, because socialization is traumatic and frightening for them. In addition, the extra training activity can cause a negative attitude, even despite the attempts of the teachers to create as many engaging activities as possible (Walker&Ovington, 1999). Another factor is the different ages of students (children of different ages live in orphanages, it is impossible to create a class only consisting of high school students). However, it seems possible to achieve good understanding of the program usability and applicability during the actual education (Considine et al., 2014).

## 4. Conclusion

Despite the large amount of open sources on the Internet, educational institutions such as orphanages still suffer from lack of information. This problem remains significant due to lack of communication of pupils with the outside world and the inability to develop their knowledge in the same way as children with families do. In addition to this, the educational programs in orphanages aim to provide basic education, which leads to the fact that graduates



finish their education at secondary schools and rarely receive higher education. An additional problem of teaching orphans is lack of socialization.

To solve the problem, it was proposed to choose the most popular and sought-after field of activity - computer science, and teach it as an extra curriculum subject. The main emphasis is put on computer science and such popular specialties within IT as design, programming and cybersecurity. These disciplines were chosen because of their high prevalence at the job market. The program solves several tasks at once: raising awareness about the possible job opportunities and professions, as well as acquiring skills for real work. Altogether, joint activities will allow children to work in a team and increase their socialization.

Possible further steps in the development of the project are collaborations with universities, bringing teachers and creating specific courses for orphanage students in order to increase their interest of studying, and further admission to universities.

Since one of the problems of building such a program is a lack of teachers with specific knowledge, one of the goals is to create a training course that could be provided by teachers with a major in computer science and mathematics. The task of such development is to build a methodology for teachers. This problem can be solved by creating open training materials published on the Internet. Thus, it is possible to make the course scalable and deliver useful knowledge to a large number of students.

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