



Colloquium 4(40)/2020
ISSN 2081-3813, e-ISSN 2658-0365
CC BY-NC-ND.4.0
DOI: 10.34813/31coll2020

SINGAPORE EDUCATIONAL SYSTEM AS SYNTHESIS OF *τέχνη*, HUMANITIES AND SOCIAL SCIENCES. IS IT A PATHWAY FOR FUTURE EDUCATION IN A GLOBALISED WORLD?

**Singapurski system edukacji jako synteza *τέχνη*, nauk humanistycznych
i społecznych. Czy to droga przyszłej edukacji w zglobalizowanym świecie?**

Sebastian Dama
Polish Naval Academy in Gdynia, Poland
s.dama@amw.gdynia.pl
ORCID: 0000-0003-1367-4795

Abstract

Singapore's education system is one of those that was ranked at top educational statistics in a relatively short time, thus becoming a model for other economies, that also base their strength on knowledge and new technologies. However, the uniqueness of this education system is not only in focusing on new technologies, but also in large investments in knowledge and human skills, creating new methods of education, combined with a philosophy that expresses the essence of Singapore's culture and forms of its organisation. This is mainly illustrated by the history of this education system and the current changes, that we can observe in recent years. The presented education system and the achievements it has reached in international measurement of learning outcomes such as TIMSS, PIRLS, and PISA indicate that the development of new technologies does not have to entail a rejection of the humanities and social sciences. Moreover, the ongoing change in the economy in the global space means, that tests and statistics are no longer a true measure of achieving educational success.

Keywords: STEM, STEAM, Singapore education system, Confucian education zone, international student skills research.

Streszczenie

Singapurski system edukacji jest jednym z tych, który w stosunkowo krótkim czasie uplasował się na szczytach edukacyjnych statystyk, tym samym stając się wzorem dla innych gospodarek, które również opierają swoją siłę na wiedzy i nowych technologiach. Jednakże wyjątkowość tego systemu kształcenia nie tylko polega na zwróceniu się ku nowym technologiom, ale również na dużych inwestycjach w wiedzę i ludzkie umiejętności, tworzeniu nowych metod kształcenia, w połączeniu z filozofią, wyrażającą istotę singapurskiej kultury i formy jej organizacji. Obrazuje to przede wszystkim historia

tego systemu edukacji oraz obecne zmiany, które możemy obserwować na przestrzeni ostatnich lat. Prezentowany system edukacji i osiągnięcia, jakie uzyskał w międzynarodowych pomiarach wyników nauczania, tj. TIMSS, PIRLS i PISA, wskazuje, że rozwój nowych technologii nie musi wiązać się z odrzuceniem nauk humanistycznych i społecznych. Ponadto dokonująca się zmiana w gospodarce w przestrzeni globalnej sprawia, że testy oraz statystyki nie stanowią już istotnego miernika w osiągnięciu edukacyjnych sukcesów.

Słowa kluczowe: STEM, STEAM, singapurski system edukacji, Konfucjańska strefa edukacji, międzynarodowe badania umiejętności uczniów.

Introduction

Singapore education system has significantly developed over the last decade and achieved very high positions in international world rankings. It is often presented as a model for individual economies and other education systems. But this phenomenon raises some questions. What is its success? Does achieving the high marks on specific educational levels really can be a measure of success? What is the uniqueness of this education system?

Before trying to answer the above questions, it would be necessary to answer a fundamental one, how was understand education so far, and how to understand it coterporally?

It is commonly assumed, that education: “(...) is all interactions aimed at forming (changing, developing) human life abilities” (Milerski, Śliwerski, 2000, p. 54). However, what should be specified is also the fact that education is a multidimensional activity and processes, that serve the upbringing and education of individuals and social groups (Śliwerski, 2013). From other point of view *The New World Encyclopaedia* also add that education: “Encompasses teaching and learning specific skills, and also something less tangible, but more profound: the imparting of knowledge, positive judgment and well-developed wisdom. Education has as one of its fundamental aspects the imparting of culture from generation to generation, (...) yet it more refers to the formal process of teaching and learning found in the school environment” (Taffe, 2019).

But above aspect touching the education on microsphere. Today the latter also covers the mesosphere and macrosphere, much more than before. Each of these spaces of social life interacts with each other influenced by such phenomena as globalization, where the last one also has undergone to metamorphosis (Cimek, 2016). This manifests itself in the form of global migration (Adams, Kirova, 2011, pp. 1–12), where the global impact is noticeable in the social and educational environment as well (Dama, 2016, pp. 93–112). On the other hand, what is worth emphasizing, globalization was associated with the economy (Cimek, 2016, p. 160) which thus correlates with the change in the global population structure due to the necessity to migrate resulting from the need to optimize the living conditions (Dama, 2016, p. 104).

The Polish educator Z. Kwieciński created dodecahedron of education which shows each of important elements of contemporary education, where he listed such items like: globalization, etatisation, nationalisation, collectivisation, politicization with bureaucratization and professionalisation, socialisation, inculturation and personalisation, upbringing and jurisdiction, and hominization (Kwieciński, 1998, pp. 37–39).

Although in the definitions of education presented above, there is no emphasis on its necessary connection with economics (Bowles, Gintis, 1976, p. 224). This is particularly by evidence the connection with globalization, which manifests, above all, its economic nature.

Another sphere, which also has a huge influence on the shape of education today, is a cyberspace (Pelletier, 2012, pp. 11–25), with its specific system of interactions, strongly linked with the developing IT industry, and as well economy.

Therefore, today education is not only focusing on the developing on children and youth, and their educational environment. The relations between each elements of the educational environment are closely related to each other in every type of social scale and there are stretched over the virtual space, what make education a type of process, which need to be kept with special care in each sphere of the social reality. Hence Singapore educational system, based on international educational rankings does it as one of the best in the world. So, what might be the definition of education, referring to the presented facts? The suggestion for understanding contemporary education can be based on the structure of educational system in Singapore, where in it, it is all interactions in each type of social space, in micro-, meso-, and macroscale, where each entity is aimed to formatting it abilities, skills and competence as an answer for society's and economy needs, now and in the future.

The presented text will try to demonstrate that Singapore's education system really meets the needs of contemporary globalized world, though not without certain mistakes. Nevertheless, the presented description will not cover such important issues as didactics, specific methodologies, communication process, also in classes (Flanders, 1970, pp. 1–28), socialisation and enculturation. It would require an additional description, which is not formally possible in the presented article. Of this reason certain theoretical and philosophical assumptions, history, as well as economic activities and the results of these activities will be presented in specific studies and calculations, made by other researchers and journalist.

The research methodology

The general methodological thought is related to the position of J. de Paris and P. Rosello, to present joint analyses in the presented text to disseminate some better solutions in current education. But also, so as not to miss what is specific, individual and

entangled in the socio-cultural contexts of a given country as presented by F. Hilker, B. Holmes, E. King, H. Noah, and M. Eckstein.

The presented work is not to be, however, a typical work in the field of comparative pedagogy, but a description of a specific system of education and its impact on the shape of education in a global and probable future dimension. Moreover, presentation of mentioned above educational system is intended to present, that it is necessary to keep the conjunction between the technical knowledge and its humanistic and social representation, but without rejection of the last one.

For this reason, attention is drawn to M.E. Sadler, as one of the founders of contemporary comparative pedagogy. Therefore, in the article will be presented issues related to:

- a) not only to what happens outside the school, but beyond – what happens outside its environment and may affect its functioning;
- b) the practical advantages of comparative studies of foreign education systems, which enable a better understanding of one's own educational system (Pachociński, 2007, p. 15).

The strongest emphasis will be placed on those two above factors.

Nevertheless, the research structure proposed by G.Z.F. Bereday regarding the choice of problems, clashes, data interpretation, hypotheses of their verification and drawing conclusions, albeit without any juxtaposition, as in comparative pedagogy (Pachociński, 2007, p. 27).

However, just like in the thoughts of B. Holmes, the phrase will not be put on the history of education, especially a specific country, in this case Singapore, but also on the issue of ideology, functioning of specific institutions [local and global relations not only to education – S.D.]. Due to its specificity, in relation to the natural environment or geographic position, as postulated by the author of *Problems in Education. A Comparative Approach* (Cowen, Kazamias, 2009, p.150).

It is worth further emphasizing the remark made by H. Noah and M. Eckstein, namely regarding the concepts used in education, the availability of data and the selection of cases (Pachociński, 2007, p. 63).

The whole article and its results are based on analysis of results of other researchers, but with using analytical induction for interpretation formal-logical and logical-symbolic dimensions of described researches (Znaniński, 2008, p. 25). Here is also used an ontogenetic analysis for reading the theoretical-objective level of described research analyses (Znaniński, 2008, p. 309). Where the first analytical tool will help to find and concrete abstraction by generalization. The second tool will be helpful to describe the static laws by analyzing specific systems. The first will present specific ideas in history and philosophy related to education in the Singapore education system. The second one will present specific data, which correspond to the theoretical content presented earlier.

In addition to the above items, the Internet will also be an important research tool, but in some respect to the individual stages of such study (Troszczyński, 2016, pp. 88–96). This part of the research procedure will serve as a source of information that, after appropriate analysis, will be presented as data complementary to content of the text. Moreover, by conducting research via the cyberspace is possible to guarantee the quality of performed analysis by using appropriate research tools, by which the quality of this analysis can be guaranteed (Stachura, 2016, pp. 174–179).

Outline of Singapore's education system from historical point of view

The development strategy of the Singapore economy was based on the economical ideas of R. Prebisch,¹ where the economy of this Asian state was focused on reduction of dependents from imported goods (Boom, 2008, p. 81). The system was called Import Substitution Industrialisation (ISI). The strategy of this country economy turned out in Export Oriented Industrialisation (EOI) which was supported by B. Balassa and the World Bank. At 1970s this small Asian country has a new trend in expanse its economy.²

The other important element of the success of this country's education was an immigration policy, which between 1947 and 1957 helped to rose the Singapore population (King, 2016, p. 82). This gave an opportunity to create specific staff base and school environment. Instead starting out bilingual teaching, was another one factor, which has radically changed Singapore's marginalised position in the world, both in economics and in education. That helped to make this country a marketplace. But one of the ways took by colonial authorities in the 1950s was given to this "city-state" independence, so as to stop the influence of Chinese communism (King, 2016, p. 34).

But even before independence, in 1963, the first universities were established, i.e. the National University of Singapore (1905), Raffels Institutes (1823), and Anglo-Chinese School (1866). But the strategic decision was made in 1965, where the authorities of this Southeast Asian country decides to develop industrial economy and its military capability (King, 2016, p. 81).

The most spectacular for this country education system was time from 1959 to 1965, when government decided to transform the education system in a Five-Year

¹ He was one of the creators, and follower, of the structural theory in the economy (Prebisch-Singer hypothesis). His idea was, that peripheries should export much more good to have this same level value of industrial exports. When the development of the technology may help to save the profit. Since 1956 R. Prebisch started to criticise protectionism and Import Substitution Industrialisation (ISI), and started to support economic cooperation between developing countries through trade (Dosman, 2008, pp. 396–397).

² As R. King points out, only East Asian countries tried to meet the standards in education set by Singapore i.e. China (Shanghai), South Korea, Hong Kong, and Taiwan (King, 2016, p. 1).

Plan, which should boost not working pervious education system. The priority was to start free primary education and:

- a) equal treatment for each stream of education (Malay, Chinese, Tamil, and English);
- b) establish the Malay language as a national;
- c) focus on the subject like: mathematics, science and technical science as an important for Singapore's economy (King, 2016, p. 82). Despite many efforts and plans, the Singaporean education system has collapsed.³ That is why the deputy minister of Singapore Goh Keng Swee in 1978 made some another huge changes. The decline of education system related to poor proficiency in the English language, high education wastage, and ineffective bilingualism. A problem was also, that rapid social and economic changes do not provide learning opportunities for Singaporean students. That time there was a need to make the education policy much more flexible for students, because about 85% of them did not speak English at home. Because of this was created the „Goh report”, which supposed to counteract with rigid and uniform curriculum, cater the differences in adoption capabilities and rates of learning among students, and neutralise the lack of long term planning and inaccuracies in curriculum (Goh, 1979). The organisational changes in effectivities in Ministry of Education (MOE) were a base for New Education System (NES). Thanks to that, efforts were made to avoid the mistakes of the earlier assumptions of the functioning of education in this country, which was to significantly stabilize its functioning and to get to the emerging new challenges in the world economy.

In 1981 the Second Industrial Revolution started, which related to new way for education system. For that reason the minister mentioned above focused on two important elements:

- d) following by attractiveness for Multinational Corporation (MNC) which invested in:
 - high-technology operations;
 - promotion of science and technology by activities in research and science development.

However, the number of engineers was taken up by multinational corporations, who started to dominate in manufacturing sector at that time. That was a plan of Singapore government to close technological gap and develop the industrial sector (Boom, 2008, p. 90). But new technologies, science, and modern trends correspond with cultural origins [as well as use of the mother tongue – S.D.] and traditional and

moral values, which was emphasized by T. Tan Keng Yam, the former minister of Singapore education in 1985–1991 (Boom, 2008, p. 94).

Having a proper economy and population of people was a good point to start building the education system, which used trained workforce, to support the development of the country.

Singapore educational system was not only built by its government, but by previously existing here British colonisation (Rasheed, Saat, 2016, p. 178),⁴ which started the contemporary education system, and helped to modernize the content of educational system to the future global changes (Boom, 2008, p. 80).⁵ The most important element of it was the English language. All what might be used to develop the mentioned above education system was used by Lee Kuan Yew. Another significant steps taken by him were investments, which also continued the rule of successive prime ministers of this Asian “country-state”. Essential in this undertaking was the use of one of the most valuable potentials of Singapore – people (also at the expense of infrastructure – C.G. Boom).

Another important element was focusing on technological development, what happened through implementation the STEM (Science, Technology, Engineering and Mathematics) education model. However, in the 1990s, the people of Singapore, created education system, noticed that STEM could lead to too narrow education, which is why the emphasis was put on education in the field of humanities, arts and sports. This process continues, with attention to the stimulation of creativity and entrepreneurship. Then was created STEAM (Science, Technology, Engineering, Art, Mathematics). The change from STEM to STEAM was made in 2006 by G. Yakmann as another way [framework – S.D.] for teaching (Yakmann, 2008, pp. 6–21). That way it was continued by other institutions and visionary, who wants to add art as important element for engendering education. One of the people who popularised this type of education was J. Maenda, the former president of Rhode Island School of Design (Burry, 2020). After that change, STEAM, as educational framework, became popular and begun to spread in the Europe and rest of the World.⁶

³ The most important issue resulted from the taken over, not well planned, colonial British education system, which did not put the pressure on the development of technical and vocational skills, which were necessary for Singapore education system at that time.

⁴ A person who started education in Singapore was Sir Thomas Raffles, who founded the Singapore Institution [Raffles Institution – S.D.] in 1823. At that time there were Malay, Chinese, Tamil and English schools. Only in last two the English language was being used, where in the first one learning was for free. In second missionaries, who led the class, charged fees.

⁵ Inspiration for the Singapore education system was the levels of the education ‘O’ level and ‘A’ level, which was introduced with some modifications and considering the average higher level of education.

⁶ At the link map shows organisations and STEAM activities across Europe (see System 2020 (2020), <https://system2020.education/the-map/> (access: 02.09.2020).

Another meaningful element for education in Singapore was Enhanced Performance Management System (EPMS), which had to improve the work of teachers, and to bind them with the school and schooling community. But this system was not so successful as MOE planned (King, 2008, p. 78). That is why there was created another special plan, which was to give teachers a special salary for better achieving the educational targets. This idea stated from 1996. Not only salaries were important to achieve goals mentioned above, but also offers of various scholarships, courses, awards and presentation of good examples of teachers in public and media (Bob, Kong, 2008, pp. 100–103).

What also gave a special support for realizing the educational reforms was its holistic purpose for educating children and youth.⁷ This type of teaching was supposed to prepare future generations to have an opportunity to work in the emerging liquid society (Palese, 2013, pp. 1–2). For this reason, MOE took two directions of action. In 1997 the ‘Thinking School, Learning Nations’ (TSLN) which was created for developing student’s creative thinking and willingness to learn. And in 2005 ‘Teach Less, Learn More’ (TLLM) was created, which had to strengthen students’ creative learning and critical thinking (King, 2008, p. 79).

Currently Singapore has an open immigration policy, which is linked with the cryptocurrencies (Geeddie, 2017). One of examples of this is designed project called: „Citizenship-by-investment”. It is a program created by Henley & Partners, when for a certain amount, by investing in certain local economic ventures, is possible to obtain a citizenship in a given country.⁸

But Singapore is not just about economics. It is also philosophy, which made a foundation for the whole social and educational environment for this “city-state”.

The philosophical view of Singapore educational system

Usually, some authors attribute to the Singapore educational system as pragmatism (Tan, 2019, pp. 121–135). But there is some difference between practise and pragmatism in philosophical point of view. Practicality focuses on achieving specific goals for a particular individual, or group to the benefit of each party. For pragmatism, it is important to achieve certain goals, but for benefit of the operating individual, or group.⁹ Singapore's philosophical thought would be closer to its practical, than to a pragmatic approach.

⁷ The same holistic framework also took the Shanghai and Honk Kong education system.

⁸ Here are presented some investments which allow to get citizenship in Singapore (see Henly & Partners (2020), *Living in Singapore – An Overview* <https://www.henleyglobal.com/residence-singapore-overview> (access: 16.11.2020).

⁹ Apart from the etymological explanation (see more: Dama, 2017, pp. 251–252) pragmatism was associated with theory of truth (W. James, J. Dewey) which was a tool for efficient and effective operation for a social group or individual, where in the Western European

The understanding of practicality is closely related to the Confucianism, in Singapore from 1990 the government of this “city state” propagate the “Asian Values”, which have a background in the thought of Confucius. Therefore L. Kuan Yew propagated the idea of *junzi* (chi. 君子)¹⁰ which in English translation means ‘gentleman’, but the social background for this world is different in each culture sphere. In Chinese culture and in the countries where it occurs, it is related to the mentioned above practices which are related with community.¹¹ In English speaking cultures and influenced by English philosophy it has specific cultural meaning (Box, 2019, pp. 10–16). For Confucianism *junzi* is the highest performer, a person who doing different things in the best possible way, a master in his field. In China and other countries around these one, including Singapore, were propagated some thinkers like: Mencius, Xunzi, Zhu Xi and also politicians, teachers, scientists who disseminated the thoughts and practices of Confucianism till contemporary times. Such countries are called: *Confucian education zone*, *Confucian cultural sphere*, *Confucian education zone*, *Confucian model* (Tan, 2019, pp. 2–3).

Although Confucianism is not a religion, but it implicates the Confucian society, where the whole social life is organised around the Confucian thoughts, and what is important in this place thought are not implemented in straight way, but as a synthesis to the tradition (Tan, 2019, pp. 2–3).

Hence this thought system appears as political, philosophical, and cultural structure. Whereas political action propagated Asian values as: upright leaders, recognition of society before the individual, importance of family and elders in society, and the

culture it was presented in a distributive way. Contrary to the understanding of social group and action in Confucianism.

¹⁰ But important is also the meaning of each character, where „君” means: ‘sovereign’, ‘monarch’, ‘ruler’, ‘chief’, ‘prince’ and word „子” means: ‘offspring’, ‘child’, ‘fruit’, ‘seed of’ ‘terrestrial branch’ (see MDBG Chinese Dictionary, *Junzi*, <https://www.mdbg.net/chinese/dictionary?page=worddict&wdrst=0&wdqb=junzi> (access: 07.09.2020). However, without the cultural and philosophical context this world create predication similar to Western European culture.

¹¹ One of the contents of Confucianism teaches: „Walking with *junzi*, serving the community (Tan, 2019, p. 1). But in social structure exist different types of communities (without referring to their form of dimension – S.D) which in their content focussing on the good of the individual and all. Z. Bauman list tree types of community: ‘εκκλησία’ [ekklesia], ‘αγορά’ [agora] i ‘οίκος’ [oikos]. The first type of community relates to the common sphere, the second to common-private sphere, and the third one to the private sphere (Zybała, 2005, pp. 4–9). Nowadays εκκλησία (see more: Jurewicz, 2015, p. 273) has its religious connotation [in the Western European sense – S.D.] and meaning of this word does not match to that part of societies which represents the open model. Hence it would be difficult to refer to the contemporary understanding community in it Chinese understanding. Moreover, a globalised reality for most of the existing types of social groups in the world brings to understand meaning of the community as αγορά, presented by Z. Bauman with its local influences in relation to specific social relations.

emphasis on education with appreciation from the values and attitudes mentioned above. Consequently in speeches contemporary Singapore politicians refer to “modern Confucianism”, which implicate such values as: benevolence, filial piety, integrity, and humility (Tan, 2019, p. 5). Above values are closely related with education and still developing economy of this Southeast Asian “city-state”.

In schools’ classes with “Confucian philosophy” were conducted in all upper secondary schools, and also a Confucian ethics (together with specific language teaching in particular school – S.D) until 1989 as a Religious Knowledge (RK). Currently situation has changed and some thought of this Chinese “philosopher” were modified to subject called “Character and Citizenship Education” (CCE). Also, Confucian values are designed for future generations in programs such: *Our Shared Values, Singapore Family Values, Singapore 21 Vision* (Tan, 2019, p. 6). Namely, in this programs are present values like: harmony, meritocracy, incorruptibility (Tan, 2019, p. 6) which can be found in education program called *National Education Messages*. One emphatic element of dissemination of Confucianism in Singapore education is critical thinking. The meaning of this word is closely linked, as C. Tan wrote, with Chinese word *li* (chi.禮) what means: ‘gift’, ‘rite’, ‘ceremony’,¹² but it basically means all human activities. However, the meaning of that word is much more broader and it cannot be associated with some religious connotations, as it sometimes understood in Western European culture (Tan, 2016, pp. 3–4).

But it is moot point what kind of contribution has teaching of Confucianism and practicing it on the results of Singapore students in educational researches like PISA, TIMMS, and PRILS.

Nevertheless, Confucianism may correlate with economic development of this “city-state”, because this way of thinking put a huge emphasis on practical dimension of education and his way of teaching (Nakamura, 1991, pp. 233–246).

The economic system of Singapore in relation to its philosophical values

Economy is the most important element of social structure in the contemporary social structure of societies. For that reason education cannot exist without this element of social reality. But even such based of mathematic and complicated calculations type of knowledge and sphere of existence can be shaped by the factors of a cultural nature. In the general overview in a past was a difference between Asian and European employment system (Dore, 1973, pp. 264–279). Today the differences are also seen, but the culture of managing, production and employment system are much more multicultural than previously (Pearson, Entrekin, 2001, pp. 79–92).

¹² MBDG Dictionary, *Li*, <https://www.mdbg.net/chinese/dictionary> (access: 15.09.2020).

Singapore economy is one of the biggest in the world. Hence there is a huge expenditure on different elements of social structure and its development. Per capita nominal Gross Domestic Product (GDP) in this Southeast Asian country in 2019 was in the first 10th of the World. In compiled statistic by International Money Fund (IMF), World Bank (WB), and United Nations (UN). In each statistic it was 63.987 USD (International Money Found, 2019), 65.233 USD (The World Bank, 2019), 62.721 USD (United Nations, 2019). That gave this Asian country a privilege to spend its financial resources on other elements of social structure, where education deserves on special distinction.

Specially for creating the development for Singapore economy were established institutions such as: Development Bank of Singapore (DBS), Central Provident Fund Board (CPF), Economic Development Board (EDB), Singapore Airlines (SIA), Port of Singapore Authority (PSA), Housing Development Board (HDB). These institutions took responsibility for the success of Singapore economy and also education, where these particular social spaces were strongly related to each other in the name of the above mentioned Confucian philosophy.

The high level of Singapore's developed economy also allows for high global spending on education. Where education is one of the most important, in this economy, next to healthcare and infrastructure. In 2018 the largest expenses were spent on infrastructure 20 billion S\$, on education 12.8 billion S\$ and 10.2 S\$ on healthcare. It means 16% of GDP spend on education (Tan, 2018). Where in OECD (Organisation for Economic Co-Operation and Development) countries, at that time, the average amount of expenses on education was 4.5% (Fleming, 2018) of GDP (Ramchandani, 2018). Chart below presents expenditure on education in years 2000–2019.

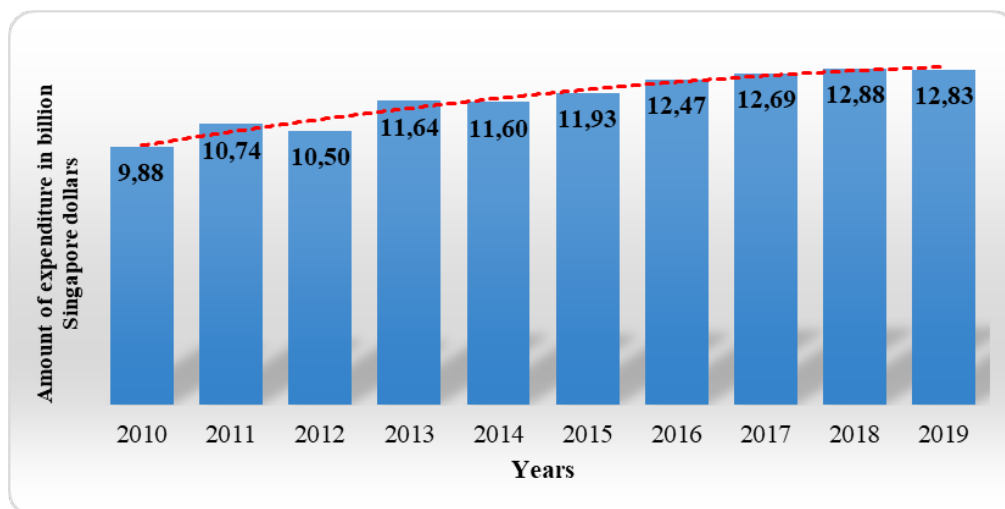


Fig. 1. Government expenditure on all levels of education in Singapore from 2009 to 2019 in S\$
Source: Statista (2020).

As it can be seen for almost 10 years, the trend of spending on education in Singapore was increasing. But in 2019, expenses were lower by 0.5 billion S\$. That year, this country recorded the smallest increase in GDP since 2009 (Curran, 2019). One of the reasons for this bad economic situation was the economic war between China and the US. However, local analysts are also predicted a lower growth of 0.5 trillion in 2020, or more than 2.5 trillion at 2019. But finally in 2020 this “city-state” contracted to 7.0% GDP, what was an improvement from 13.3% contraction in the second quarter (Subhani, 2020).

The other important point which is related with spending on education, are funds intended for teachers for their work. In this area Singapore system of education is also at the forefront of countries allocating their resources for this purpose. Compared to Italy and Finland, teacher’s salaries are relatively high, which was described by the Singapore authorities as fair. The number of teachers in this Southeast Asian country in 2018 was 56.033 (MOE, 2019) both female and male [apart from other employees, management and schools collaborating entities – S.D.] at all levels of education. Their time of work is longer (52 hours per week), than teachers in other countries in the word and closely to time of work of teachers in New Zealand (51 hours per week). However the public points of working hours for teachers in Singapore were at level of 45.33 per week, what was opposite to the presented above opinions of teachers (GTSI, 2018). The average salary at lower secondary level in minimum wage in 2019 was 49.629 USD and maximum was 85.700 USD (OECD, 2019), where in this Asian country the amount was 59.218 USD (Pay Scale, 2019) which meant 17% higher form the lowest average teacher’s salary in OECD countries, where the difference between average maximum OECD salary and in Singapore was 31%. In the latter teachers spend around 40% of their time with student. The rest of time is planned on research, lesson planning and organising time for students with special needs, who are not covered by ongoing planned time (Rushe, 2018).

What should be emphasized is that, that teachers plays an essential role in education system in this “city-state” country. Otherwise the way they carry out their educational tasks, set their goals and lead their private life also affects their work, which translates into the quality of education. Hence in 2018 and previous years this country was one of these places where teacher as occupation was treated with respect (Wood, 2018) and exceptional esteem (Pisa, 2017). But the economy not only support education as a institutions, not only teachers, but also students.

From primary to tertiary education level in OECD countries in 2018 spend 10.500 USD a year on education institution to educate each student. Where, at individual levels of education, these results were as follows: at primary level 8.600 USD per student, at secondary level 10.000 USD per student and 15.700 USD at tertiary level (OECD, 2018). Where in same year in Singapore it was at primary level of education 8.847 USD,

at secondary level 11.442 USD and at tertiary level it was 13.073 USD per student.¹³ But education here in common circulation is not free, which additionally intensifies the effect of total amount of money invested in education in this country.¹⁴ As it is explained the high scholarships allows to study outside the country. By contrast, wages higher than the national average keep promising graduates as teachers.

For this reason, from the economic point of view teacher's situation in this country give them opportunity the good realisation of education program, also allows them a sense of high social status. The same applies to pupils and students. But the whole thing is completed by the fact that ontological structure is inherent form it realisation through economic structure. The most important thing is, how in this case, the structure of Singapore's education system looks like, especially through specific indicators and implementation of educational programs.

The general overview of structure of education system in Singapore

In Singapore as in other countries in the world exist a specific for its culture and economy system of education. As it was presented above, years from 1978 to 1990 and the reforms made at that time gave, featured in this publication this "city-state", an economic and educational success. All presented reform contributed to create contemporary one of the most effective education system in the world. On average the children spent about 10 years in school¹⁵. This country education system created a new form in 2008 and introduced it in 2015. The duration of secondary education scheme is from 4 to 6 years. While at the third-level of education the duration of course depends form course and include the Bolognian Process with bachelor degree and master degree. If the student wants to continue his/her education, it is possible to start a doctoral studies. The duration of each stage of education system in this country shows as follows: I) preschool: a) pre-school playgroup (3–4 years); b) kindergarten (4–6 years). II) primary educational system (6 years): a) secondary educational system (4–6 years); b) privately funded school (4–6 years); c) specialized independent school (4–6 years); d) express (4–6 years); e) normal academic (4–5 years); f) normal technical (4 years); g) specialized schools (3–6 years). III) post-secondary educational system (4–6 years): a) polytechnic foundation programme (1 year);¹⁶ b) the direct entry scheme (1 year);¹⁷

¹³ The currency conversion was made based on the exchange rate on 09/12/2020, which was 1 USD = 1.35853 SGD.

¹⁴ But the peculiarity are the free regional schools, technical, higher vocational schools, which also do not differ in the quality of education from the others (Project Syndicate Polska, 2018).

¹⁵ The primary education generally takes up six years, four or five of secondary education. Duration of education in junior college is two years.

¹⁶ The Polytechnic Foundation Programme (PFP) is diploma-specific foundation program conducted by the polytechnic over two academic semesters for students who have

c) junior colleges (2–3 years); d) institute of technical education (2–3 years); e) arts institutions (3–6 years); f) polytechnics (2–3 years); g) universitates (2–5 years); h) doctorate (2–5 years). IV) special educational system: 1. primary level (6 years); a) special education; 2. secondary level (4–5 years); b) special education schools (Teck Chee et al., 2015). But in Singapore also exist the K-12 educational system, from 2012, which is as well public and international (Dickinson, 2020). This system consists of 11 and 12 grades. The score at the ‘O’ Level exams gives the admission to junior colleges, which prepare students for a tertiary level of education at a University (NMC, 2012).

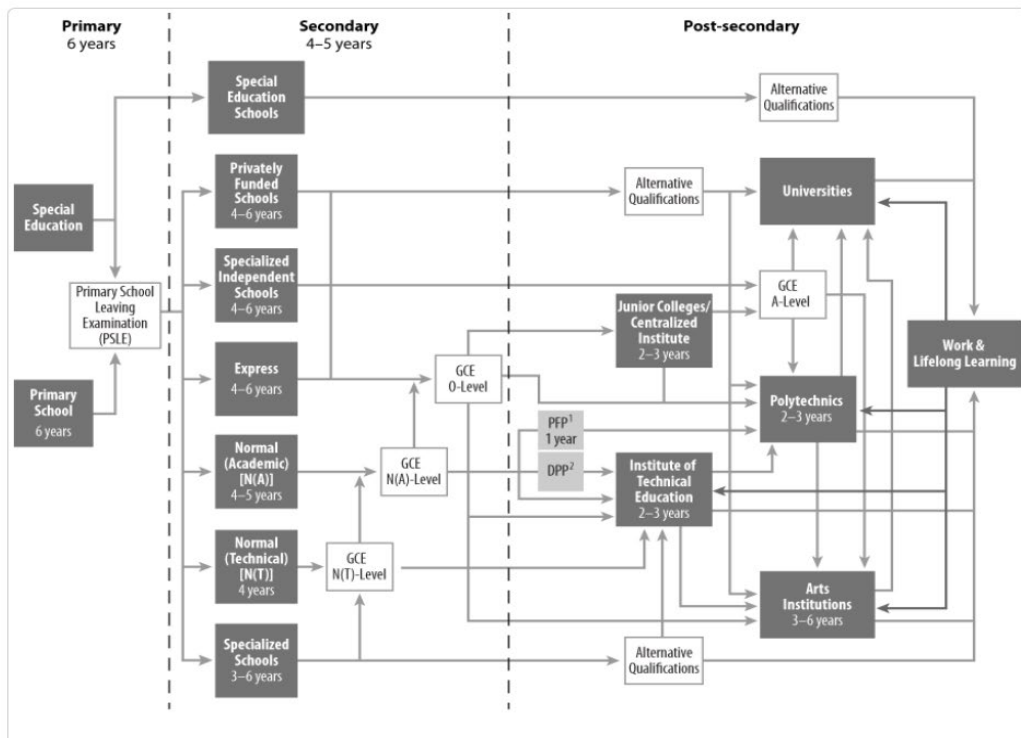


Fig. 2. The structure of Singapore education system¹⁸

Source: IEA (2015).

completed Secondary Normal Technical School. Students after completed PFP may start directly into the first year of similar diploma course at polytechnic (Teck Chee et al., 2015).

¹⁷ The Direct-Entry-Scheme to Polytechnic Programme (DPP) is a through pathway to polytechnic for those of the students, who have completed Secondary Normal Technical School. Moreover the students who complete a two-year Nitec program at ITE and attain qualifying Grade Point Average (GPA) scores may be guaranteed a place in a polytechnic diploma course based on their Higher Nitec course (Teck Chee et al., 2015).

¹⁸ The diagram do not consist the pre-school level and the doctoral studies.

In 2018 in Singapore there were 356 schools¹⁹ and 428.773 pupils with average 32.4 number of children in class at primary education, and 165.347 with average 33.8 number children in class at secondary education (MOE, 2019). In junior college²⁰ there were 29.012 students with average number 23.0 of learners (MOE, 2019). All these schools are public or supported by the government. The number of private schools are less and the average number of pupils in class was 28. In 2018 there were in both female and male 17.877²¹ students with 1.964 teaching staff. The difference between number of pupils in public and private schools was 89%.

At the post-secondary level of education 175.555 students were enrolled in 2018. In this Southeast Asian country, at that time there were 6 national universities (MOE, 2019). There were also Private Education Institutions (PEI) which offered External Degree Programmes (EDP) with undergraduate and graduate degrees in number of 16. Universities has also their partners known as Singapore Institutes of Technology, which were 9 in the Singapore (SIT, 2020). Also, in the “city-state” there were 5 polytechnics (MOE, 2019) and 15 junior colleges (Statista, 2019).

The most popular courses at the third-stage of education in different popular fields of knowledge, students chose usually ITE classes, which offers the knowledge of Engineering, where were 8.639, in Business & Services 7.762 and in Electronic & Infocom Technology 6.432 enrolled students (Statista, 2019) with total 28.367 enrolled, and of which 13.421 graduated. From Lassale and Nafa Courses the most popular was Design & Applied Art with 2.200 enrolled students and Fine & Performing Arts 1.090 with total 3.778 enrolled students of which 1.001 graduated. At Polytechnic was enrolled 70.985 students with 22.614 graduated. At the Universities there were 70.690 enrolled students of which 16.823 graduated. The most popular courses were Engineering Sciences 17.656 with enrolled students of which 4.380 graduated, Humanities & Social Sciences 12.973 with enrolled students of which 2.920 graduated and in Business & Administration where was enrolled 9.018 students and where 1.884 graduated. What is interesting is that, at University less popular was Education, than on Polytechnic. At the first one was 549 enrolled students from which 283 graduated.

The most popular type of third-level educational institution were polytechnics, where the most popular field of study was Engineering Science 20.645 enrolled students, Business & Administration 14.164 enrolled students and Information Technology where there were 8.538 enrolled students. Also, on polytechnic in Singapore is possible to study Education [which was also mentioned above – S.D.] where in 2018 was 1.989 enrolled students of which 332 graduated. The percentage difference between students studying technical majors and humanities, and social science was

¹⁹ In this number of schools are all primary, secondary and mixed level schools.

²⁰ This type of school offering courses for two years beyond high school.

²¹ This type of school is offering education at secondary, or junior college level, which also educate pupils who have special education needs and believe in Islam religion.

24.6%, what can be seen as an effect of Second Industrial Revolution. However, the difference between attending humanities and social studies, and those related to the natural sciences cannot be seen as significant.

An important element of the education system in Singapore is the creation of good communication conditions. Hence, a relevant element is learning and practicing the use of English in native languages, i.e. Mandarin and Tamil. It was one of the factors that helped to expand education in this country, both internally and externally.

It was one of the reasons why the Nanyang Technological University as one of the youngest universities in the world (it was established in 1991 – S.D) was on third place (Gray, 2018) in 2017 with changing its position from 2012 by three places, in the world ranking of universities. The second reason of the success of this university can be linked to the development of the economy, where in 2018 it was the second most competitive economy in the world after the USA (Swift, 2018). However, economic achievement alone will not be enough to raise the level of education to a world class. As it has been shown before, meaningful changes were made, in economy itself, in planning, but also in adoption specific philosophy, communication functions as well as the organisation of social life and society, which was ready to adopt specific goals and start implementing them. Based on these elements, it was possible to create an education system that over time reached the heights of educational statistics.

Some of the achievements of Singapore education system

The achievements of the Singapore education system are widely discussed in the world. For some, they are admirable, for others questionable, and for the rest not acceptable at all. Nevertheless, they allow to verify the philosophy and social practice of this country culture, the prism of which is education. Some of the achievements of this educational system are usually presented on the base of different educational programs, which measure students' progress in acquiring specific skills, which research is based on tests or activities that students are required to complete in a specific program, or studies. The first measurement was carried out in 1964 in which 11 countries took part. It preceded TIMSS and was called First International Mathematics Study (FIMS) same as Second International Mathematics Study (SIMS) (Brown, 1996, pp.193–212). The most famous research conducted today in which this Asian country joined at various times were held in the years from 1995 till 2019.

The PISA (Programme for International Student Assessment) is an international study organised by OECD for 15 old year school pupils in three following subject: mathematics, science, and reading in indefinite scale. The most of the PISA's methodology is similar to TIMSS (Trends in International Mathematics and Science Study) on which a big influence has the U.S. National Assessment of Educational Progress (NAEP). The reading part of PISA was inspired by the IEA's (International Associa-

tion for the Evaluation of Educational Achievement), which is known as PIRLS (Progress in International Reading Literacy Study). It measures using the knowledge to solve some real life problems and use the education in lifelong learning. Moreover, this study measures students in innovative domains. Between 2012–2015, there has been a significant change – students, except reading, mathematical and science tests had to present how they solve problems together. In 2018 the other innovative domain was a global competence. That was a change for which the Singapore educational system was ready, because it still teaches the humanities and social sciences, and do not rejected them as planned in 1990. This Asian country at the first time took part in PISA measurement in 2009 and then in: 2012, 2015, 2018, as well as will take part in 2022.

The TIMSS is an international measure and compare of pupils' school achievements in four and eight class. The International Association for Measuring School Achievements which organising this test is based in Amsterdam. This study is one with the longest tradition. It was conducted in years: 1995, 1999, 2003, 2007, 2011, 2015, and 2019. TIMSS examines student's level of knowledge in mathematics and science. The framework for measuring skills consider mathematics and science curricula in different countries. In the measure take part the whole classes, parents, teachers of mathematics and science and school principals, who fulfil the questionnaires. Described here this "city-state" participated in TIMMS in: 1995, 1999, 2003, 2007, 2011, 2015, and 2019.

The PIRLS is the International Study which measure the Progress in Reading Proficiency. It is coordinated internationally by the IEA. The main subject of research is reading in terms of literacy experience [reading literary text – S.D.] and reading to obtain information [reading utility text – S.D.]. The test is intended to ten-year-olds. The Singapore participated in PIRLS from: 2001, 2006, 2011, 2016 and will take a part in 2021.

Based on the achievement on mentioned above researches The McKinsey & Company described this Southeast Asian country as "sustained improver" and "great". Also, other schooling systems got a "great" mark and these were: Hong Kong, South Korea, Saxony, and Ontario. Only eight achieved a mark „good" and rest from „fair" to „poor" (Dimmock, Young Tan, 2015, pp. 161–163). Similarly the World Economic Forum (WEF) have included Singapore as one of the education models of the future (WEF, 2019). The table below presents the results of the above described international measuring students skills researches.

Table 1. Research results of the Singapore educational system in the international educational competitions

YEAR	PISA			TIMSS		PIRLS
	Mathematics	Science	Reading proficiency	Mathematics	Science	Reading proficiency
1995	–	–	–	1	1	–
1999	–	–	–	1	2	–
2000	–	–	–	–	–	–
2001	–	–	–	–	–	15
2003	–	–	–	1	1	–
2006	–	–	–	–	–	3
2007	–	–	–	2	1	–
2009	2	2	3	–	–	–
2011	–	–	–	1	2	4
2012	2	3	3	–	–	–
2015	1	1	1	1	2	–
2016	–	–	–	–	–	2
2018	2	2	2	–	–	–
2019	–	–	–	NDA	NDA	–

Source: (King, 2016, pp. 7–8, OECD [2015; 2018]; TIMSS [1995]; IEA [1999; 2001, 2003, 2006, 2007, 2015; 2016], CKE [2011]).

But also the criticism increased against PISA and TIMSS measure methods, which provide to limited cognitive horizons, which are based on neoliberal political ideas and economic ideology. As it may be seen the above tests evaluate: reading, mathematics skills [mathematic abstraction – S.D.], and science [practical use of things – S.D.]. For PISA this was needed for enabling analysis and rational and effective thinking. In turn TIMSS test this type of knowledge which is common in all teaching programs. Also during the test about 4.5% of pupils are excluded for intellectual and functional disabilities, or limited language prominence. Moreover not transparent is the selection to the test, where the rules of selection exist. There is also a problem who is a PISA test student. Professor S. Kreiner of the University of Copenhagen believes that the measurements made are unreliable and irrelevant²². While Norwegian educationist S. Sjøberg said: „The concerns of PISA are not about ‘Bildung’, or liberal education, not about solidarity with the poor, not about sustainable development etc. – but about skills and competences that can promote the economic goals of the OECD” (Sjøberg, 2007, p. 209).

²² He also claimed: “Most people do not know that the students taking part in PISA (2006) do not respond to any reading item at all”. The Professor referred to the situation of omission in PISA test, where half of the students have not been tested for reading. He found that only 40% of student were tested on 14 of 28 reading questions. That is way only 10% of the students took part in PISA 2006 and been tested on all reading questions (King, 2016, pp. 21–22).

In response to the necessary changes in education, which appeared in the above-made measurements, Singapore is going to resign from school exams. Students will not learn how to pass subsequent test, but will develop their social competences such as the ability to cooperate, critical thinking [in the form typical for Confucian education zone – S.D.], solving complex problems and paying more attention to personal development. Therefore schools in this country will reject pupils rivalry and test-taking, which will no longer be a learning objective. It will also disappear average grade and reporting the results in statistics.

Hence a profusion such as banker, engineer, doctor, actor, artist, and sportsman will be treated equally. The changes in this “country-state” education system will be continued until 2023. Also the exams for primary years 1 and 2 were abolished in 2019 (Wood, 2018a). But the changes were also visible in the international educational researches like PISA, what was shown above. It results mainly from changes in the labor market, which will even more consist of services. By 2022 this change is expected to 42% of business entities around the globe, as the World Economic Forum report shows (WEF, 2018).

To a large extent, this metamorphosis is also dictated by the development of science, especially in the field of artificial intelligence (AI), which is to be one of the elements of the modern economy. However, it is unable to cope with the problems of emotions and considering the functioning of specific philosophical systems. Hence, large IT companies employ people who are educated in these areas of knowledge i.e. philosophers, artists, psychologist etc. (Rees, 2018). Moreover quartz CPU increased the efficiency of support programs and this is associated not only with greater efficiency, but also with fewer errors (Wright, Beck, Debnath et al., 2019). In 2019 the impact of AI on the global economy was 0.5%. However it is estimated that by 2035, the results of the use of the last one in the world economy, may double its the efficiency. Moreover the AI will create a new virtual workforce referred as ‘intelligent automation’, which will be able to solving problem and self-learning [based on the self-solved problems – S.D.]. The world’s economy will also benefit on diffusion of innovation, what in addition affect different sectors of economy and will create a new revenue streams (EPRS, 2020).

Therefore, it remains to follow how education in Singapore will continue its development. Will it still be a successful as it has been so far, or will there be any other country, or culture that will defeat the Asian “city-state” in its achievements? It may also turn out, that the existing ranks will no longer be measurable, then the newly formed economy will have to be created and it will be necessary to create a different, or altogether change the system of evaluating educational results. An important conclusion is the fact that education has to change due to the development of artificial intelligence, and thus the economy, which keeps changing. On the one hand, it is necessary to open up to new technologies, on the other, to methods. But the correct solu-

tion would be to synthesis of both, combining with currently existing methods as far as possible.

Findings

The presented example of Singapore's education system indicates that the perception of education should be holistic. Philosophy is extremely helpful in this. However, it is not only area of social life that will contribute on the functioning of education.

In this perspective, the way of thinking is also important. The above example showed, that that way is conjunction. Previously in the Western European culture the world τέχνη [téchne] was not simply limited in meaning only to action relating to certain practical activities, but also had it theoretical (Jaeger, 2001, p. 388) and art dimension (Dunnem, 1997, pp. 19–20). It is generally accepted that after Positivism the meaning τέχνη was separated form its theoretical meaning and associated with the natural science.²³ The conjunction was rejected on account of alternative (Dama, 2017, pp. 251–261). This was perfectly illustrated by the example of education in Singapore, which not followed the path of Japan (Grove, 2015). It did not reject the humanities and social sciences, but tried to keep them in a certain limit. The conjunction between science and humanities, and social sciences has been preserved. Such action was a kind of anticipation in the later facts, where the development of economy, new technologies, and artificial intelligence exceed people's expectations.

Singapore as a state, economy, and education system has also succumbed to strong global factors, aligning its entire operation with goals of international corporations (MNC), but they left the door open to further shape of education.

For this reason, significant changes in the economy and in education have not only contributed changes in the education system in this South Asian country, not only in other parts of the world, but also they are noticeable in the change of the education model, which one of the effects was change STEM into STEAM.²⁴

²³ Although it can be said that earlier, in the Middle Ages, which can be expressed in works of R. Bacon, or P.P. de Maricourt (see more: Dama, 2017, p. 254).

²⁴ It should be empathized that cyberculture (Bell et al., 2007) has so far been one-dimensional and does not take into account the difference between individual entities, whether from the ontological, or phenomenological point of view. For this reason, it is important that in contact with other subjects, including especially in technical education, each individual element of the interaction was treated as an object [excluding such factors like: the content of the educational environment and related content of aesthetic, praxeological and creative nature – S.D.] and not as a subject. Until now, communication in this type of education was dominated by monolithic, not a pluralistic model of human thinking, which was directed to objects, not subjects, who in fact are members of a specific social, or educational relationship. This applies to issues to specific systems of thoughts, which are shaped by specific individuals, or social groups living in a specific culture (see J. Peregrin, *Philosophy of Logical Systems*, New York and London: Routledge 2020) and also by specific individuals

This Asian “city-state” and its education system, apart from the aforementioned factors i.e. economy, philosophy, and sociological issues owes its success to its geographic position and its size, in which carrying out specific reforms is much easier than in a larger size, from geographic and administrative point of view (Golding, Golding, 1975, pp. 345–358).

An important element that allows the Singaporean education system and its economy to such develop is a merit-based system, which allows these with great abilities to develop and climb on the social ladder, but also preppers them to act in the public service, what is in the line with the idea of Confucian thought.

Summarizing and answering the question at the beginning of the text, it should be noted, that the education system of that Asian country, as it can be read above, is successful, which was reflected in its position in the global rankings of few international students skills research, which examine students achievements in specific competences, combining also with specific skills and attitudes. However, in this respect, some criticism was spread, not only for this country’s education system itself, but also about the tools that were used for these measurements.

Nevertheless, this Asian country with uniqueness described above, not only kept its position, but also adopted to new conditions, trying to respond the needs of the global economy. Thus, it also managed to maintain its path of education development, which was expressed in conjunction of education in the space of the new technologies, as well as in social sciences and the humanities. In this respect, it maintained the possibility to not only developing education in connection with the needs of economy, but also meet the needs of social life. In this way giving contemporary education a new dimension.

In the longer term, the education system in presented educational system will be subjected to further tests, especially in connection with the development of new technologies and artificial intelligence. Although an example of Singapore shows how to deal with certain difficulties and how to adapt its education system to the ever-changing living conditions in a globalized world. Hence, it is a path for education in the future, but if some country would like to adapt to it, it is necessary to customize, to the local economic, geographical and social possibilities of the particular country.

On the other hand, from the ontological point of view, presented educational system of this small Asian country, with its flexibility may become future model of education through the globe. And it will be its real success.

and social groups living in difference cultures (Nakamura, 1991) what was also discussed earlier by F. Znaniecki in the content of the “humanistic coefficient” (Znaniecki, 1922, pp. 32–34).

REFERENCES

1. Adams, L.D., Kirova, A. (2011). *Global migration and Education. Schools, Children, and Families*. New Jersey: Lawrence Erlbaum Associates.
2. Bell, D., Loader, B.D., Pleace, N., Schuler, D. (2004). *Cyberculture. The Key Concepts*. London and New York: Routledge.
3. Boom, G.C., Gopinathan, S. (2008). Education in Singapore. Developments Since 1965. In: B. Fredrikson, T. Lee Peng (Eds.), *An African Exploration of the East Asian Education Experience*. Washington: The World Bank.
4. Bowles, S., Gintis, H. (1976). *Schooling in Capitalist America. Educational Reform and Contradictions of Economic*. New York: Basic Books.
5. Box, M.A. (1990). *The Suasive Art of David Hume*. New Jersey: Princeton University Press.
6. Brown, M. (1996). FIMS and SIMS. The First Two IEA International Mathematics Surveys, Assessment in Education. *Principles, Policy & Practice*, 3(2), pp. 193–212.
7. Burry, M. (2020). *Why Art Was Added to Science, Technology, Engineering, and Math Education*. <https://www.nymetroparents.com/article/how-stem-became-steam> (access: 10.08.2020).
8. Chor Boon, G., Sing Kong, L. (2008). Making Teacher Education Responsive and Relevant. In: L. Sing Kong, G. Chor Boon (Eds.). *Towards a Better Future. Education and Training for Economic Development in Singapore since 1965*. Washington: The World Bank.
9. Cimek, G. (2016). *Podstawowe problem geopolityki i globalizacji*. Gdańsk: Athenae Gedanenses.
10. CKE (2011). *TIMSS and PIRLS 2011*, <http://wartowiedziec.pl/attachments/article/12316/Raport%20ko%C5%84cowy.pdf> (access: 21.08.2020).
11. Cowen, R., Kazamias, A.M. (2009). *International Handbook of Comparative Education*. London-New York: Springer.
12. Curran, E. (2019). *Warning Shot to World Economy as Singapore Slumps, China Exports Drop*. <https://www.bloomberg.com/news/articles/2019-07-12/singapore-s-economy-contracts-sharply-as-manufacturing-slumps> (access: 07.12.2020).
13. Dama, S. (2016). The nomadic educational environment with reference to Polish emigration in Limerick in Ireland. *Zeszyty Naukowe Gdańskiej Szkoły Wyższej*, 16, pp. 93–112.
14. Dama, S. (2017). Τέχνη jako wyraz symbiotycznego braku w humanizmie na podstawie dziejów kultury zachodnioeuropejskiej. In: J. Sobota, G. Pacewicz (Eds.). *Filozofia, namysł, krytyka, IX* (pp. 251–261). Olsztyn: Instytut Filozofii.
15. Denning, P.J., Tedre, M. (2019). *Computational Thinking, Cambridge-Massachusetts*. London-England: The Mit Press.
16. Dickinson, M. (2020). *Private K-12 Schools. Top reasons to send your child*. <https://www.owis.org/blog/private-k-12-schools-top-reasons-to-send-your-child> (access: 04.12.2020).
17. Dimmock, C., Young Tan, Ch. (2015). Explaining the Success of the World's Leading Education Systems. The Case of Singapore. *British Journal of Educational Studies*, 64(2). DOI: 10.1080/00071005.2015.1116682
18. Dore, R. (1973). *British Factory-Japanese Factory. The Origins of National Diversity in Industrial Relations*. Los Angeles: University of California Press.
19. Dosman, E.J. (2008). *The Life and Times of Raul Prebisch 1901–1986*. McGill-Queen's Montreal: University Press.
20. Dunnem, J. (1997). *Back to the Rough Ground. "Phronesis" and techne in Modern Philosophy and in Aristotle*. Indiana: University of Norte Dame Press.

21. European Parliament Research Service (2020). *Economic impact of artificial intelligence (AI)*. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI\(2019\)637967_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI(2019)637967_EN.pdf) (access: 16.09.2020).
22. Flanders, N.A. (1970). *Analysing Teacher Behaviour* (Addison-Wesley series in education). MA: Addison-Wesley Pub. Co.
23. Fleming, S. (2018). *These countries spend the most on education*. <https://www.weforum.org/agenda/2018/10/these-countries-spend-the-most-on-education/> (access: 12.09.2020).
24. Fletcher-Wood, H. (2018). *Education in Singapore. 7. The secret of Singapore's success*. <https://improvingteaching.co.uk/2018/02/10/education-in-singapore-7-the-secret-of-singapores-success/> (access: 16.09.2020).
25. Geeddie, J. (2017). Singapore's first cryptocurrency cafe launches but regulators sound warnings. *Independent* <https://www.independent.co.uk/news/business/analysis-and-features/singapore-cryptocurrency-cafe-first-open-ducatus-cashless-payments-regulators-a8124691.html> (access: 15.09.2020).
26. Goh & Education Study Team (1979). https://eservice.nlb.gov.sg/item_holding.aspx?bid=4082172 (access: 12. 08.2020).
27. Golding, M. P., Golding, N. H. (1975). Population policy in Plato and Aristotle. *Arethusia*, 8(2), pp. 345–358.
28. Gray, A. (2018). *These are the world's best young universities*. <https://www.weforum.org/agenda/2018/01/these-are-the-worlds-best-young-universities> (access: 15.09.2020).
29. Grove, J. (2015). *Social sciences and humanities faculties 'to close' in Japan after ministerial intervention*. <https://www.timeshighereducation.com/news/social-sciences-and-humanities-faculties-close-japan-after-ministerial-intervention> (access: 14. 08. 2020).
30. Henly & Partners (2020). *Living in Singapore – An Overview*. <https://www.henleyglobal.com/residence-singapore-overview/> (access:16.11.2020).
31. Holmes, B. (1965). *Problems in Education. A Comparative Approach*. New York: Humanities Press.
32. IEA (1999). *TIMSS, 1999 International Science Report*. https://timssandpirls.bc.edu/timss1999i/pdf/T99i_Sci_01.pdf (15.08.2020).
33. IEA (2001). *PIRLS 2001 International Report*. https://timssandpirls.bc.edu/pirls2001i/pdf/P1_IR_Ch01.pdf (access: 21.08.2020).
34. IEA (2003). *TIMSS 2003 International Science Report*. <https://www.iea.nl/publications/study-reports/international-reports-iea-studies/timss-2003-international-science> (access: 15.09.2020).
35. IEA (2006). *PIRLS Progress in International Reading Literacy Study*. https://timss.bc.edu/PDF/PIRLS2006_international_report.pdf (access: 21.08.2020).
36. IEA (2007). *TIMSS 2007 International Science Report*. https://timssandpirls.bc.edu/TIMSS2007/PDF/T07_S_IR_Chapter1.pdf (access: 15.08.2020).
37. IEA (2015). *TIMSS 2015 International Reports*. <http://timss2015.org/#/?playlistId=0&videoId=0> (access: 15.09.2020).
38. IEA (2016). *Distribution and Reading Achievement*. <http://timssandpirls.bc.edu/pirls2016/international-results/pirls/student-achievement/pirls-achievement-results/> (access: 21.08.2020).
39. International Money Found (2019). *Report for Selected Countries and Subject*. <https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/weorept.aspx?pr.x=50&pr.y=11&sy=2019&ey=2019> (access: 12.09.2020).
40. Jaeger, W. (2001). *Paideia formowanie się człowieka greckiego*, trans. M. Plezia and H. Bednarek. Warszawa: ALETHEIA.
41. James, W. (2000). *Pragmatism and Other Writings*. Introduction and notes by G. Gunn. New York: Penguin Books.
42. Jurewicz, O. (2015). *Słownik polsko-grecki*. Warszawa: Sub Lupa.
43. King, R. (2016). *Singapore Educational System. Myths and Reality*. Perth: Insight Press.

44. Kwieciński, Z. (1988). Dziesięciościan edukacji (składniki i aspekty — potrzeba całościowego ujęcia). In: T. Jaworska, R. Leppert (Eds.). *Wprowadzenie do pedagogiki. Wybór tekstów*. Kraków: Impuls.
45. MDBG, Chinese Dictionary (2020). *Junzi*. <https://www.mdbg.net/chinese/dictionary?page=worddict&wdrst=0&wdqb=junzi> (access: 07.09.2020).
46. MDBG, Dictionary (2020). *Li*. <https://www.mdbg.net/chinese/dictionary> (access: 15.09.2020).
47. Milerski, B., Śliwerski B. (2000). *Pedagogika. Leksykon*. Warszawa: PWN.
48. Ministry of Education – Singapore. (2019). *Education Statistics Digest 2019*. https://www.moe.gov.sg/docs/default-source/document/publications/education-statistics-digest/esd_2019.pdf (access: 15.09.2020).
49. Nakamura, H. (2019). *Ways of Thinking of Eastern Peoples. India, China, Tibet, Japan*. revised English Translation edited by P.P. Wiener. Delhi: East-West Center Press.
50. New Media Consortium (2012). *Technology Outlook. Singaporean K-12 Education 2012-2017*. <https://files.eric.ed.gov/fulltext/ED595214.pdf> (access: 05.12.2020).
51. OECD (2015). *PISA 2015 Results in Focus*. <https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf> (access: 15.09.2020).
52. OECD (2018). *How much is spent per student on educational institutions?* <https://www.oecd-ilibrary.org/docserver/eag-2018-21-en.pdf?expires=1600356325&id=id&acname=guest&checksum=BA366BCC7FD34AF45D9E7DD5AB7C49F5> (access: 15.09.2020).
53. OECD (2018). *PISA 2018, Insights and Interpretations*. <http://www.oecd.org/pisa/PISA%202018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf> (access: 13.08.2020).
54. OECD (2019). *Indicator D3. How much are teachers and school heads paid?* <https://www.oecd-ilibrary.org/sites/d39d7757-en/index.html?itemId=/content/component/d39d7757-en> (access: 14.09.2020).
55. Pachociński, R. (2007). *Pedagogika porównawcza. Podręcznik akademicki*. Warszawa: Żak.
56. Palese, E. (2013). Zygmunt Bauman. Individual and society in the liquid modernity, *Springer Plus*, 2 (1), 199, pp. 1–4. DOI: 10.1186/2193-1801-2-191
57. Pay Scale (2020). *What Am I Worth? Average Secondary School Teacher Salary in Singapore*. https://www.payscale.com/research/SG/Job=Secondary_School_Teacher/Salary/54f34f25/Singapore (access: 14.09.2020).
58. Pearson, C., Entrekın, L.(2001). Cross-cultural value sets of Asian managers. The comparative cases of Hong Kong, Malaysia and Singapore. *Asia Pacific Journal of Human Resources*, 39(1), pp. 79–92.
59. Pelletier, C. (2012). New technologies, new identities of learners and teachers in Cyberspace. In: R. Land, S. Bayne (Eds.). *Education in Cyberspace*. New York: Routledge.
60. Peregrin, J. (2020). *Philosophy of Logical Systems*. New York and London: Routledge.
61. Pisa, K. (2017). *Who are the world's most valued teachers?* <https://edition.cnn.com/2017/10/04/health/teacher-pay-and-status/index.html> (access: 12.09.2020).
62. Project Syndicate Polska (2018), <https://natemat.pl/blogi/projectsyndicate/139145,tajemnica-sukcesu-singapuru> (access: 15.09.2020).
63. Ramchandani, N. (2018). *Singapore Budget 2018. Ministers to spend S\$80 billion*. <https://www.businesstimes.com.sg/government-economy/singapore-budget-2018/singapore-budget-2018-ministries-to-spend-s80-billion> (access: 12.09.2020).
64. Rashed Abidin, Z., Saat, N. (Eds.) (2016). *Majulah! 50 Years of Malay/Muslim Community in Singapore*. London: World Scientific.
65. Rees, T. (2018). *Why tech companies need philosophers – and how I convinced Google to hire them*. <https://www.weforum.org/reports/the-future-of-jobs-report-2018> (access: 15.09.2020).

66. Rushe, D. (2018). *The US spends more on education than other countries. Why is it falling behind?* <https://www.theguardian.com/us-news/2018/sep/07/us-education-spending-finland-south-korea> (access: 10.09.2020).
67. Singapore GTSI Statistic (2018). *Global Teacher Status Index 2018*. <https://www.varkeyfoundation.org/media/4856/gtsi-singapore-chart-findings.pdf> (access: 14.09.2020).
68. Singapore Institute of Technology (2020). *Overseas University Partners*. <https://www.singaporetech.edu.sg/about/overseas-university-partners> (access: 15.09.2020).
69. Siuda, P. (ed.). (2016). *Metody badań online*. Gdańsk: Wyd. Nauk. „Katedra”.
70. Sjøberg S. (2007). PISA and “Real Life Challenges”. Mission Impossible? In: S.T. Hopmann, G. Brinek, M. Retzel (Eds.). *PISA zfølge PISA — PISA According to PISA*. Berlin: LIT.
71. Śliwerski, B. (2013). *Czy edukacja to to samo co oświata?* <https://sliwerski-pedagog.blogspot.com/2013/04/czy-edukacja-to-to-samo-co-oswiata.html> (access: 27.08.2020).
72. Statista (2019). *Number of Junior Colleges and Centralised Institutes in Singapore from 1970 to 2018*. <https://www.statista.com/statistics/865485/singapore-number-of-pre-university-schools/> (access: 15.09.2020).
73. Statista (2019a). *Government total expenditure on education in Singapore from 2010 to 2019*. <https://www.statista.com/statistics/624666/government-expenditure-on-education-in-singapore/> (access: 07.12.2020).
74. Subhani, O. (2020). *Singapore GDP shrinks at slower 7% rate in Q3 as economy starts to recover*. <https://www.straitstimes.com/business/economy/singapore-economy-rebounds-by-79-in-q3-from-previous-quarter-year-on-year-gdp-down> (access: 08.12.2020).
75. Swift Todd, J. (2018). *Revealed: Most Competitive Economies In The World, 2018* <https://ceoworld.biz/2018/10/22/revealed-most-competitive-economies-in-the-world-2018/> (access: 7.12.2020)
76. System 2020 (2020). <https://system2020.education/the-map/> (access: 02.09.2020).
77. Taffe, E. (2019). Education. In: *New World Encyclopaedia*. <https://www.newworldencyclopedia.org/entry/Education> (access: 28.08.2020).
78. Tan, A. (2018). *Singapore Budget 2018. Spending needs to grow in healthcare, infrastructure, security and education*. <https://www.businesstimes.com.sg/government-economy/singapore-budget-2018/singapore-budget-2018-spending-needs-to-grow-in-healthcare> (access: 12.09.2020).
79. Tan, C. (2016). A Confucian Conception of Critical Thinking. *Journal of Philosophy of Education, 51(1)*, pp. 3–4, DOI: 10.1111/1467-9752.12228
80. Tan, C. (2019). *Comparing High-Performing Education System. Understanding Singapore, Shanghai, and Hong Kong*. Abingdon: Routledge.
81. Teck Chee, M., Ying Chin, T., Yoke Loh, M., et al. (2015). *Singapore. Overview of Education System*. <http://timssandpirls.bc.edu/timss2015/encyclopedia/countries/singapore/> (access: 16.09.2020).
82. The World Bank (2019). *GDP per capita (current US\$)*, <https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/weorept.aspx?pr.x=50&pr.y=11&sy=2019&ey=2019> (access: 12.09.2020).
83. TIMSS AND PIRLS (1995). *Highlights of results*, <https://timssandpirls.bc.edu/timss1995i/HiLightB.html> (access: 27.08.2020).
84. United Nations (2019). *Basic Data Selection*, <https://unstats.un.org/unsd/snaama/Basic> (access: 12.09.2020).
85. Wood, J. (2018). *This is where teachers are most (and least) respected*. <https://www.weforum.org/agenda/2018/12/teachers-where-most-and-least-respected> (access: 12.09.2020).

86. Wood, J. (2018a). *Children in Singapore will no longer be ranked by exam results. Here's why.* <https://www.weforum.org/agenda/2018/10/singapore-has-abolished-school-exam-rankings-here-s-why> (access: 15.09.2020).
87. World Economic Forum (2018). *The Future of Jobs Report.* <https://www.weforum.org/reports/the-future-of-jobs-report-2018> (access: 15.09.2020).
88. World Economic Forum (2019). *Schools of the Future. Defining New Models of Education for the Fourth Industrial Revolution.* http://www3.weforum.org/docs/WEF_Schools_of_the_Future_Report_2019.pdf (access: 15.09.2020).
89. Wright, K., Beck, K.M., Debnath, S., et al. (2019). Benchmarking an 11-qubit quantum computer. *Nature Communications.* <https://www.nature.com/articles/s41467-019-13534-2> (access: 15.09.2020).
90. Yakman, G. (2008). *STEAM Education. An overview of creating a model of integrative education.* https://www.academia.edu/8113795/STEAM_Education_an_overview_of_creating_a_model_of_integrative_education (access: 02.09.2020).
91. Znaniecki, F. (1922). *Wstęp do socjologii.* Poznań: Wydawnictwo PTPN.
92. Znaniecki, F. (2008). *Metoda socjologii.* Warszawa: PWN.
93. Zybala, A. (2005). Inny świat jest możliwy. *Obywatel*, 2(22), pp. 4–9.