CONTEMPORARY EDUCATION SHOULD BEGIN IN PRESCHOOL AGE – QUALITY EDUCATION AS A BASIS OF DEVELOPMENT OF EDUCATIONAL, CULTURAL AND HEALTH INSTITUTIONS

Education is an essential tool for promoting a society where every individual has the same opportunities regardless of their status. Access to quality education system guarantees each person better opportunities to enter the world of work and a better quality of life in general. The benefits of an effective education system are extended to the economic development and value creation. A society in which everyone gains access to quality education also benefits from a higher degree of social cohesion. For this reason, education plays a crucial role in all business spheres. It is of vital importance to focus on education not only because of the significant gap with respect to countries that are wealthier and more advanced, but also because of the need to provide better opportunities for young people to be included in the world of work, as well as reducing inequality and driving economic growth. Contemporary education must contribute to promoting better integration of young people in the world of work and improving the use of critical thinking and a full understanding of the reality we live in. The authors want to emphasize one important fact, namely that the bearers of change in contemporary education are not only educators, but also employees of some institutions such as clinical centres, general hospitals, special hospitals, thermal resorts, health centres, cultural institutions and organizations such as libraries, theatres, museums, galleries and cinemas. Furthermore, they want to emphasize the importance of investing in infrastructure, especially when it comes to ICT. They present the research results on the use of ICT in preschools, the place where an individual experience with education for the first time, as well as the research results on the computer programme skills acquired by students at a computer engineering high school.

Two decades ago, as part of his reflection on reform in education, Hentig (1997) emphasized that if we want to have an educational institution appropriate to the times we live in, it must address one of the most important factors that has brought the most important changes to our culture, namely the computer. In fact, a teaching school is based on knowledge that is constantly being enriched, developed and multiplied. That kind of school is characterized by dynamism, creativity, innovation, plurality, professionalism, originality, distinctness, democracy, tolerance and cooperation in action (Šetić, 2009, 245). It is especially

important to raise awareness of the role of educators, teachers, professional associates, principals and practitioners of all kinds as change leaders in education, but we must not forget other sectors too. No changes should be made without them! Their attitudes and experience are key to implementing change. It is important that any school reform or changes in education – primary and secondary schools, but including higher education too – is systematically designed, planned, implemented and stabilized as an open system in education in which all factors grow and learn together "on the go". For example, Bruner (2000, 41) argues that: "What a school teaches and the ways of thinking and "speech registers" it fosters in its students, cannot be isolated from the role it plays in the lives and culture of its students. Because the curriculum is not just about "subjects". The most important school subject that the school studies (...) is the school itself. Most students consider it that way and that determines what impressions they create about it". It is necessary to emphasize the importance of a comprehensive approach to a dynamic education system and the development of a national curriculum from kindergarten to high school, but we must point up that real changes should be designed, planned, implemented and stabilized as an open education system in which all actors cooperate and jointly grow. It is also essential to invest in infrastructure that urgently needs to be modernized and improved.

In recent years, significant efforts have been made in our country to accelerate the process of digital transformation of institutions and to improve teaching practice by introducing ICT in many sectors. Despite that, the analysis we have recently carried out in preschool institutions, as the place of primary education, did not yield positive results. Many institutions are still far from what a modern, contemporary education should be. In view of such results, on the one hand it is necessary to implement measures for technological and educational innovations of institutions and organizations within the system and, on the other hand, to determine educational policies and practices that take into account research results in this sector, with special reference to didactic ICT effectiveness in education. Specifically, "digital education" cannot be ignored nowadays – improving infrastructure to guarantee an appropriate technological approach in organizations and institutions, overcoming the current digital gap that is still punishing part of the society in our country. Not enough attention is being paid to the technological training of employees in terms of digital competences and use of new technologies.

At the pedagogical-didactic level, it is important to point out that "digital education" does not imply a non-selective use of ICT, but requires

an assessment of the situation, i.e. when and how technologies can bring added value based on the best available research evidence.

Technology is changing education as well as it is changing the ways, times and places where individuals learn, meanwhile providing them with support at every stage of their educational journey. On the path to contemporary education, technology empowers students by providing them with learning management tools, making education a relevant element of digital life and preparing them for the future. Thanks to technology and access to resources that go beyond the classroom walls, students are encouraged to become problem solvers, critical thinkers, collaborators and creators. Where technology has been successfully integrated into classrooms, students develop a fondness for knowledge that would accompany them throughout their lives. Teachers always try to adapt teaching to students. Technology can help them reaching new levels of teaching with the aid of longitudinal information, contents, applications and so much more in real time. Educational technology and appropriate devices in the hands of students enable them to be prepared for the careers meanwhile providing them with technical skills needed to succeed in today's world as well as in the world of work in the future. Significant learning experience from STEAM subjects (science, technology, engineering, art and mathematics) can encourage creativity, helping students to apply the acquired knowledge and prepare them for future business opportunities and for jobs that do not exist yet. Specific skills in code development, programming, computing and computer thinking have become common demands from today's workforce in almost all sectors. Through contemporary education, students can acquire those skills and improve their problem-solving and critical thinking skills needed for the 21st century. Thanks to a mental approach and a modern environment, learning-by-doing can be very interesting if designed and integrated with the right technology.

School systems (at all levels) have a complex task of selecting devices and technological models that would help turning the vision of learning into reality. The selection of the devices must be made through the cooperation between different institutions and organizations by assessing the way in which teachers and students use the devices in everyday learning. This is not an easy task, but considerations such as compatible curricula and digital contents, assessment requirements, management options, security features, device functionality and overall costs are key to choosing the right device. A secure and robust IT infrastructure is the basis of a 360-degree learning experience while supporting digital content, protecting key student data, improving

operational efficiency and providing the much-needed security and privacy protection.

Contemporary educational models in various institutions and organizations can help the school system to improve each student's and teacher's experience by adopting a comprehensive approach focused on technology that enables customized learning, efficient and connected classrooms and a powerful and secure IT infrastructure. At the same time, teachers must be adequately trained and supported by professional learning resources and community sectors and must have all IT infrastructure at their disposal. All of this contributes towards achieving a transformative and a sustainable impact on the entire community success.

The question of quality and professionalism of staff (human resources) poses itself and thus, it lies at the heart of the management of cultural organizations. Although it is hard to expect a clear and comprehensive understanding of pedagogy and psychology of work along with other professions from managers in culture, it is necessary to hire external associates as educators or collaborators in the field of operations and then organize additional education or training (Juraković, 2006).

The problem of a human being's education and the confrontation with diverse cultures imposes upon pedagogical research a new rethinking of the relationship between the human being and the culture. This is because the human being's education takes place within and through the culture, the one they need in order to raise themselves and become a dignified and valuable human being. That implies that the human being must be studied and promoted according to what their nature demands. Therefore, it is necessary to modulate the contribution of culture on the basis of how it can act for the benefit of each individual. Not all cultural institutions are equal when it comes to the ability to raise the value of men. In this sense, apparent cultural hierarchies do not possess rational basis. They are the result of economic power relations leading to a pejorative view of the culture by those working with a lower social prestige and extremely reinforce the culture of individuals in power. It is negative to hierarchize cultures that do nothing but implementing the way of life of a particular group and a particular place. By being in contact, different cultures influence each other naturally (Milani, 2000). Cultural institutions (associations, museums, etc.) require, like all other institutions, the introduction of digital databases, the promotion of cultural resources using information systems and the evaluation of existing databases of cultural values. This approach to work primarily implies the training of the existing staff employed in all cultural institutions.

Healthcare institutions are places where top professional work is carried out in practice and the scientific and professional research is carried out. It is also a place where special care is taken to improve the education and the teaching functions of its employees while the teaching itself is given a prominent role as part of its core business. A healthcare organization requires top professionals who are trained for a particular job.

Today's job market is characterized by a constant evolution of professional profiles in terms of skills, qualifications and experience. The lack of qualified staff and the lack of skills specifically matching the demand profile in all work environments are among the main reasons for the existence of a high unemployment rate in certain institutions and healthcare organizations. It is essential to ensure visible growth in investment in human resources and infrastructure in all healthcare institutions (clinical centres, general hospitals, special hospitals, thermal resorts, health centres, health institutes, etc.). It is also necessary to identify new needs in terms of professional profiles and respond to them effectively through education and lifelong learning, as well as with the use of modern technology in work.

The pandemic has forced pupils, students, teachers, headmasters and, last but not least, families to face a major challenge – organizing distance education and learning using digital means. Digital education is based on the assumption that everyone comes into contact with information offered by digital technologies on a daily basis, involving all aspects of everyday life such as family, home, education, work, leisure, health, public utility services and public administration (V. Velički, T. Topolovčan, 2017). After all, we live in a world that will be increasingly focusing on artificial intelligence, which we are already fully immersed in. The digital transformation has been underway for some time now, regardless of whether its onset was experienced by educators, but not by them only. Digital transformation is not delimited by the adoption of technologies only, it also raises deep social, cultural and ethical implications in all business sectors. When referring to educational institutions, the authors mean that contemporary education is needed at all levels, from preschools, to primary and secondary schools and universities, but also at institutions providing adult education and institutions providing lifelong learning. How prominent is the technology in the aforementioned educational institutions? In what manner can ICT support the educational work and teaching of children, young people and adults? It is necessary to start from the very beginning, i.e. at the preschool age, being that the first step in education, which is unfortunately often neglected by the academic research. This is a question that is still in its infancy within the education research of

the youngest and in the coming years it will necessarily have to compete with all knowledge on a qualitative and quantitative level, given that human intelligence especially develops during the first years of one's life while the effects of educational intervention lessen in later stages and over time.

The research was carried out in two institutions at the end of the 2019/2020 school year. In the first part of the research, that authors deal with preschool institutions founded by the City of Pula, namely IP-PU Rin Tin Tin Pula-Pola, DV Mali Svijet and DV Pula. Preschool institutions were chosen precisely because they represent the place where an individual gets their early education and, in that context, there is very little, almost no interest from the research groups to examine how much new technologies are actually represented there. Unlike preschools, high schools are for many the last place of education, regrettably. In the second part of the research, the authors are engaged with the secondary school Zvane Črnja in Rovinj, where students have the opportunity to enrol for the computer technician programme study.

Computing or computer science deals with the study of theoretical foundations of information and computation and their application in computer systems. Throughout a four-year educational programme, students are trained to apply basic computer skills, perform and maintain information systems, use modern tools, work within teamworks, learn problem solving, understand ethics and critical action as well as comprehend the impact of technology on society and the environment.

When referring to preschool institutions, the main assumption is that new technologies are underrepresented. The main problem is that neither educators nor children possess the basic prerequisites for the use of new technologies. Very few groups have a computer, tablet or smartphone at their disposal (Vekić, 2020). The authors conducted the research in the Pula city area, where there are three large preschool institutions, one in Italian and two in Croatian language. The research was carried out through a survey questionnaire in the first half of May. The questionnaire was completed by 69.27 % of educators. This percentage confirms that the selected sample is relevant in all aspects for the study in question.

The following hypothesis are set:

Ho: There is a significant correlation between the ICT available to educators in the institution and the ICT they actually use.

There are other auxiliary hypothesis and they are as follows:

S.H1: There is a significant correlation between the ICT available to children and their use as work support.

X Values	Y Values	X_{Ra}	$X_{Ra} - M_x$	Y_{Ra}	$Y_{Ra} - M_y$	Sum Diffs
8	8	8.00	3.50	8.00	3.50	12.25
7	6	7.00	2.50	7.00	2.50	6.25
6	5	6.00	1.50	6.00	1.50	2.25
1	4	2.00	-2.50	4.50	0.00	0.00
4	4	5.00	0.50	4.50	0.00	0.00
1	1	2.00	-2.50	1.50	-3.00	7.50
2	2	4.00	-0.50	3.00	-1.50	0.75
1	1	2.00	-2.50	1.50	-3.00	7.50

Calculation

R = CoVariance / (X_{Ra} St. Dev. * Y_{Ra} St. Dev.)

Key

X_{Ra} = Ranks of X Values; Y_{Ra} = Ranks of Y Values
$X_{Ra} - M_x$ = X rank minus mean of X ranks
$Y_{Ra} - M_y$ = Y rank minus mean of Y ranks
Sum Diffs = ($X_{Ra} - M_x$) * ($Y_{Ra} - M_y$)

Result Details

X Ranks
Mean: 4.5
Standard Dev: 2.39

Y Ranks
Mean: 4.5
Standard Dev: 2.42

Combined
Covariance = 36.5 / 7 = 5.21
R = 5.21 / (2.39 * 2.42) = 0.901

$r_s = 0.9013$, p (2-tailed) = 0.00223.

By normal standards, the association between the two variables would be considered statistically significant.

Fig. 1.1.1. Sperman' rho test results for Ho correlation
Source: prepared by the author according to the conducted research.

By checking the significance of results, the obtained r/rho value ($r_s = 0.9013$, $p > 0.05$) is higher than the reference value ($r_s = 0.786$, $p > 0.05$) according to the statistical figure for critical Spearman's rho value, which means that a significant correlation was found between ICT available in the institution and the ICT being actually used by educators, the auxiliary hypothesis being confirmed.

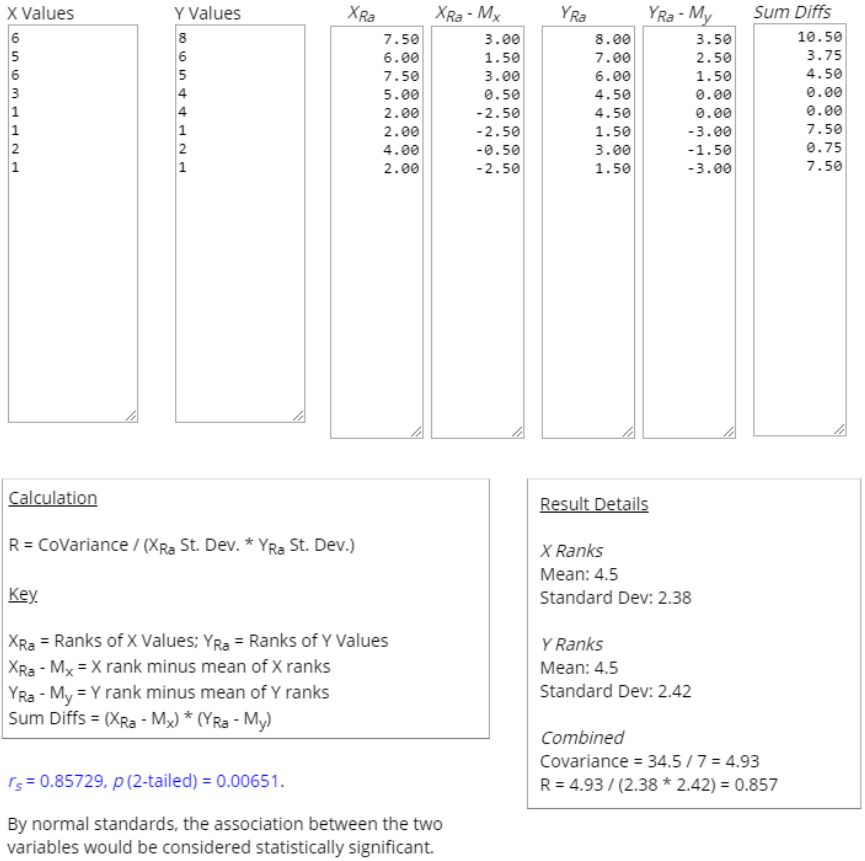

Fig. 1.1.2. Sperman' rho test results for S.H.1 correlation
Source: prepared by the author according to the conducted research.

By checking the significance of results, the obtained r/rho value ($r_s = 0.85729$, $p > 0.05$) is higher than the reference value ($r_s = 0.786$, $p > 0.05$) according to the statistical figure for critical Spearman's rho value, which means that a significant correlation was found between ICT available to children in the group and the ICT being actually used by educators as a support while working with children, the auxiliary S.H.1 hypothesis being confirmed.

Furthermore, the research shows that only 32 % of educators have access to a computer. The 36.54 % of educators have the possibility to connect to the network, while 55.77 % do not have access to the network.

When it comes to new technologies that educators use for everyday work, the 28.85 % of them use a TV and a smartphone. As educators have chosen in previous questions not to have access to a smartphone in the workplace, it is to be assumed that they use the private ones. It is interesting to note that, in this answer, two educators responded they use a Micro computer. The 63.46 % of educators use computers to support their work and 80.77 % of them use private computers for business purposes. Regarding the availability of new technologies intended for children, as many as 34.29 % of educators answered that their children do not have access to any information and communication technologies. The 30.48 % of them has a computer at their disposal, however, a worrying figure is that in the Pula city area there is only one computer ergonomically adapted to children. This questionnaire also confirmed the hypothesis related to the attitudes of educators about the use of new technologies with the youngest. The 74.04 % of educators think that computers are useful in preschool institutions, most educators would give a computer to children aged 6 or older but only for educational purposes. Positive results can be seen in the answer related to education, where as many as 74.04 % of educators believe that education related to new technologies would be useful and necessary. As little as 9.62 % of educators do not want to be educated in the field of new technologies. It can be concluded that the City of Pula should enhance preschool institutions by investing in new technologies and providing educators with quality and affordable education in the sector of new technologies. By acquiring new knowledge, educators would be able to improve their own practice and provide children with new knowledge in a creative and completely innovative way on a daily basis, as that the youngest could contribute to the development of information globalizaton at an early age.

The research was conducted in the period from 20 to 24 May 2019. This period was chosen because until then, first-graders had mostly processed all first-grade material, which is important for conducting testing because the research is based on programming knowledge, ie the subject “Algorithms and Data Structures”. The survey questionnaire consists in outlining in which the programming skills in the C ++ programming language are assessed. The estimated time for solving the questionnaire was 40 minutes. Qualitative and quantitative data processing was performed on the collected data. The following hypotheses are set:

H0: Developed programming skills of high school students, majoring in computer technician, are not in line with the set outcomes of the Vocational Curriculum for acquiring the qualification of computer technician for the subject “Algorithms and Programming”.

H1: There is no significant difference in programming knowledge and skills between lower (first, second, third grade) students and fourth grade high school students. The study population consisted of 78 subjects (N = 78). In the first and second grade, 22 students were examined, in the third 18, and in the fourth 16 students. First grade and second grade accounted for 28.21 % of the total number of respondents.

The third grade accounted for 23.08 % and the fourth for 20.51 % of the total number of respondents. Out of a total of 78 respondents, 6 and 7.69 % of girls and 72 and 92.31 % of boys, respectively, participated in the research. This ratio of girls and boys is justified by the fact that in our society there is still a small representation of women in the technical sciences.

In the last part of the questionnaire, the respondents were asked to solve a test that tested their programming skills. The test is structured according to the teaching units of the Vocational Curriculum for Acquiring the Qualification of Computer Technician from 2017.

Respondents had to solve 11 tasks through the test. Each task had four answers offered, of which one or more answers were correct.

H0: Developed programming skills of High School students, majoring in Computer Science

Technician are not in line with the set outcomes of the Vocational Curriculum for acquiring the qualification of Computer Science Technician for the subject “Algorithms and rogramming”. The third part of the questionnaire “Assessment of programming skills (c ++ programming language)” based its questions on how to cover the basic educational categories of programming skills in accordance with the Vocational Curriculum for the acquisition of the qualification of computer technician. Therefore, for the processing of this hypothesis, the results of all students achieved in the third part of the questionnaire were taken into account as input parameters. In order to be able to assess whether the students have acquired sufficient knowledge in the subject “Algorithms and Programming”, the results were processed separately for each class. For the students to pass the questionnaire, it was necessary to achieve 6 or more points out of a total of 11.

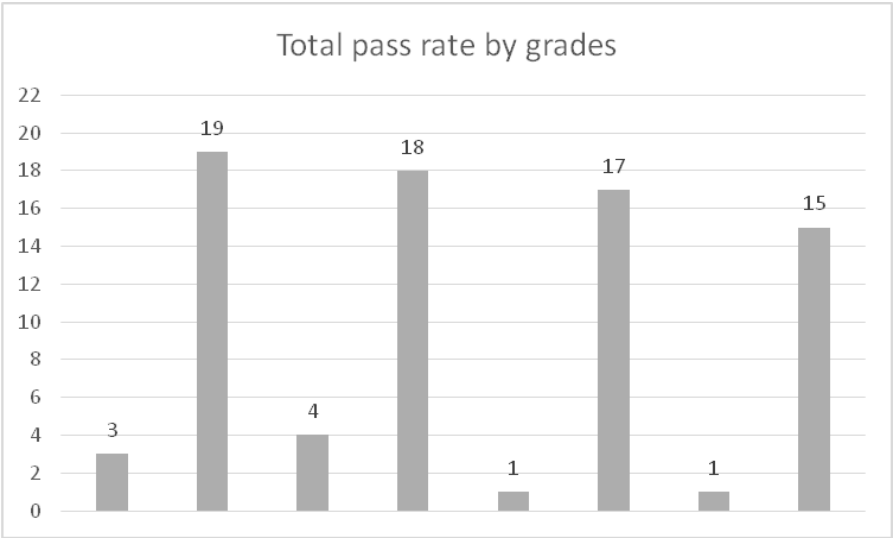

Fig. 1.1.3. Total pass rate by grades
Source: prepared by the author according to the conducted research.

Figure 1.1.3. shows that in the first grade only 3 students (13.63 %) achieved passing, i.e. that 19 students (86.37 %) did not pass. In the second grade, 4 students (18.18 %) achieved transit, i.e. 18 students (81.82 %) did not pass. In the third grade, only 1 student (5.55 %) achieved a pass rate, while 17 of them (94.45 %) did not achieve a pass rate. In the fourth grade, only 1 student (6.25 %) achieved a pass rate, while 15 (93.75 %) did not pass it.

Figure 1.1.4. shows that the total student pass rate is 11.54 % (9 students), or 88.46 % (69 students). Accordingly, it can be said that the development of programming skills of high school students, the direction of computer technician is not in line with the set outcomes for the subject "Algorithms and Programming" of the Vocational Curriculum for the ualification of computer technician. The reason for these results certainly lies in the fact that students do not have properly prescribed or binding literature for learning and practicing programming. In addition, the working conditions of students and teachers are not appropriate (lack of necessary equipment, outdated technology, etc.) and sometimes the teaching is reduced to improvisation of teachers, their personal attitude to the importance of certain teaching materials and individual commitment to the curriculum. Such conditions certainly affect the commitment of the

students themselves. Improving conditions in vocational schools can certainly lead to greater motivation among students, and thus to better results.

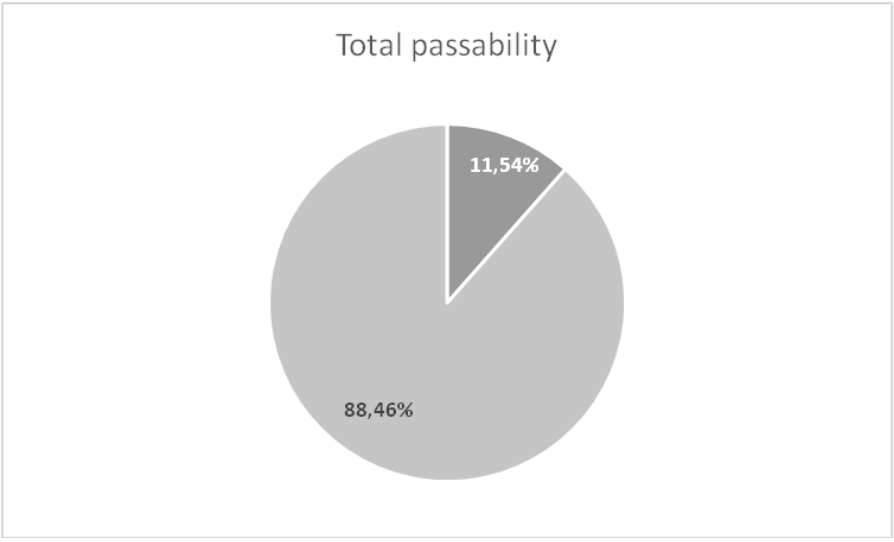

Fig. 1.1.4. Total passability
Source: prepared by the author according to the conducted research.

H1: There is no significant difference in programming knowledge and skills between lower (first, second, third grade) students and fourth grade high school students. Auxiliary hypothesis H1 was tested using the chi-square test. The first input parameter is the sum of correct and incorrect answers for first, second and third grade students, and the second parameter is the sum of correct and incorrect answers of fourth grade students from the third part of the questionnaire "Assessment of programming skills (c ++ programming language"). Students were able to achieve one point for each correct answer, which together, first, second and third grade students could achieve 682 points, while fourth grade students could achieve a total of 176 points. According to statistical tables, the parameter according to which the decision was made was 3.841 ($p < .05$), which means that if X2 (chi-square) is greater than 3.841, the auxiliary hypothesis is rejected. The obtained test results are shown in figure 1.1.5.

Results						
	1-2-3 class	4 class				Row Totals
Correct answers	217 (212.23) [0.11]	50 (54.77) [0.42]				267
Incorrect answers	465 (469.77) [0.05]	126 (121.23) [0.19]				591
Column Totals	682	176				858 (Grand Total)

The chi-square statistic is 0.7585. The *p*-value is .383794. The result is *not* significant at $p < .05$.

Fig. 1.1.5. Shows the result of the Hi-square test for H1
Source: prepared by the author according to the conducted research.

The obtained result X2 = 0.7585 (value less than 3.841) indicated that there is no significant difference in programming knowledge and skills between lower (first, second, third grade) students and fourth grade high school students which means that hypothesis H1 is accepted.

The analysis of the obtained results established that the students of the Secondary School Zvana Črnje Rovinj do not have developed programming skills according to the outcomes of the locational Curriculum for acquiring the qualification of computer technician for the subject "Algorithms and Programming. In addition, the research found that there are no significant differences in the knowledge of lower and final grade high school students, which can be justified by the fact that students have the subject "Algorithms and Programming" in the first two grades on programming.

The school management strategic action plan should be operated as much as possible pursuant to the regulations adopted by the highest state administrative bodies, as well as by independently developing a competitive position towards other school managements as a motivation for encouraging the quality of work. Every school is a specific community, whose management with the headmaster in charge (top manager) should develop their own strategy.

Depending on the needs of the school and its location, special plans and programmes are made in order to:

1. *decorate the school building (interios, exterior)*
2. *increase or decrease the number of employees*
3. *organize and distribute time (lectures, number of teaching hours, free activities, trips...)*

4. combine the school theoretical knowledge with practical work (connecting with organizations in the economy)

5. connect the school with the wider community (cooperation with citizens, nonprofit organizations)

6. specify teaching aids and other equipment

7. set exact learning outcomes (depending on the type of school)

8. encourage gifted individuals, individualize work with special students

9. provide public insight into the work and life of the school community

Think globally and act locally. Each small community is an entity itself and possess a specific cultural identity. According to Juraković, such specific nature is applied to the types of schools and the way they are considered. Although school contents, i.e. plans and programmes may be the same for all schools at the national level, the strategy of their implementation should be adapted in certain segements to the area where the school is located. It is exactly here that the management comes to the fore as the bearer of adjustment between the general and the specific interest. The efficiency of the school managemnt should enable future young professionals to get out from school and enter an environment where they would fit directly into the field of work for which they have beeen trained, with as little preparation as possible. In the light of the foregoing, the school management should take on the dual management consisting of:

- *Inward management* – organizing the educational process with all current liabilities (human resources – teaching staff, teaching aids, work programmes, etc.)
- *Outward management* – connecting the school (students and teachers) with the contents and organizations in the economy

Some schools need a certain degree of autonomy, especially when it comes to vocational careers, due to the fact that each environment recognizes its own potential and has specific needs. A centralized management produces the desired outcomes where young people motivated by their own ambition continue their studies in scientific disciplines where their "higher" knowledge, determined by experience too, could be implemented in the local community and beyond, as professors, MA or PhD, in the service of the professional staff necessary for the community. In addition to regulating school processes, the quality of the local community school management should be mindful of the changes in society, monitor economic development, arrange possible employment for new staff in companies, give recommendations to students, participate in all current school-related events, agree quality and encourage any activity or

innovation of its employees. Encouraging the creativity of employees is important inasmuch as they are in direct contact with students, talk to them and are the most competent when creating new ideas of work within the school or the whole community.

The human and cultural formation of individuals and communities represents a fundamental wealth of society. Actually, they are a category of thought and action and, from the pedagogical point of view, it can propel into a unique research model that reveals the close relationship between theory and practice, between words and concrete life. The idea of the common good also depends on the idea of the person whom it refers to. Culture determine the time and the direction of our overall action as education shapes us for what the world of work expects from us. Contemporary education requires a contemporary environment too. By acquiring new knowledge, educators would be able to improve their own practice and would present new knowledge to children in a creative and completely innovative way on a daily basis. In conclusion, it can be observed that investments in ICT infrastructure and education are still inadequate, such as inadequate is the specific training. Preschools, schools and other organizations and institutions such as clinical centres, clinical hospitals, general hospitals, special hospitals, thermal resorts, health centres along with institutes and cultural institutions such as libraries, theatres, museums, galleries and cinemas, should invest significantly higher fundings in the ICT sector. Globalization, along with its mass market policy, has introduced many changes in our lives. Aware of the turbulent environment we live in, we cannot close our eyes to the upcoming major changes at all levels of social manifestation. The market is all around us and we are part of that market. The future is not before us, but we are already part of it.

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