

The Role of Information and Communication Technologies (ICT) in Early Childhood Education. Integrating Educational Software into Activity

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Abstract: *The importance of using ICT in education has been highlighted and emphasized in the international literature. The main impact of this is at the level of curriculum design and development. The study is based on the integration of information and communication technologies into current training methods, the essence of which is to rethink the way learning takes place and the roles of the two main educational actors: the teacher and the learner. In this new context, this study aims to provide a theoretical and structural perspective on ICT, as well as the role and weight of different components of the curriculum system in the design of learning programmes based on the integration of ICT in training and assessment activities. It is well known that for pre-school children, the element of novelty that emerges in all activities carried out in the instructional-educational process plays a very important role. The more this element is present, the better their attention and memory are stimulated, enabling them to concentrate better on the tasks at hand. It is now a fact that all children are attracted to computer games and all activities involving their use. In order to maximize the time spent in front of the computer for the benefit of children, and because we have educational software suitable for preschoolers, we have formulated the objectives and hypotheses of this work, based on the premise that the attention of children who use this educational package will have a progress of memory in both quantitative and qualitative analysis.*

Keywords: *information and communication technology; educational software; education; preschool activity.*

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Introduction

As we all know, technology is advancing at a rapid and continuous pace and science is leading and contributing significantly to its development. Therefore, learning capacity is the main responsibility of contemporary schools. In order to develop personalities that respond to the demands of an information society, student learning must adapt to dynamic social and professional needs and environments. These changes can also be seen in society's perception of what 21st century skills, cultural and racial identity and literacy - a core component of which is digital literacy - mean. These major changes at the societal level are no doubt also reflected at the level of formal education. Different forms of ICT are debated, analysed, discussed or simply observed. In the context of implementing ICT-based education programmes, the role of ICT is to be a tool that facilitates learning, supports communication and authentic self-expression, and is integrated into students' educational programmes in a beneficial and effective way. ICT is not a school-specific tool, but can also be integrated into pupils' personal plans. All levels of the education system, from pre-school to university and even lifelong learning, are affected by these changes.

Woodward and Rieth (1997) argue that "technology has come to be seen as a vehicle for organising high quality assessment and reducing the time required to manage the assessment process".

This study is divided into two distinct parts namely:

Part I - Theoretical and methodological aspects of the role of information and communication technology in early childhood education.

In the first part of the study we studied the integration and use of modern educational means, especially information and communication technology, from the professional literature in our country and scientific works of foreign authors.

Cuban (2001) argues that the use of technology in the classroom is less frequent and more limited than expected. Yelland (2003) points out that sometimes the out-of-school environment can be more conducive to learning because children have access to more interesting software and are free to explore and collaborate with others to solve problems. Cuban (2001) reports that teachers tend to view computers as audio-visual devices and use them as props rather than vehicles for defining the teaching and learning process.

Assessment of knowledge and other tests acquired for pre-testing preschoolers' outcomes using educational software for pre- and post-instructional teaching-learning-instructional assessment activities.

Part II - Research on stimulating school progress, attention and memory skills

Part II of the paper presents the results of the research on the influence of the use of information and communication technologies in the teaching-learning-assessment process on preschoolers' attention and memory. This part contains information about the samples used and applied in the research and the groups of subjects who participated in the experiment. At the end of the experiment the conclusions, limitations and recommendations of the whole study are elaborated.

We conducted the research in parallel for the same level of preschool study, the large group (5-6 years old) in two groups in kindergarten no.23 in Bucharest, for a period of one year, 2021-2022.

The aim of this research methodology was to determine the direct impact of the use of preschool-appropriate educational software on students' attention and memory; changes in cognitive development in children who benefited from a software-enhanced treatment program.

Based on the formulated purpose we proposed the following research objectives:

- O1. Evaluate the contribution of educational software in improving the quality of attention;
- O2. Develop, improve the contributions and relationships of educational software and strategies used in the teaching-learning-assessment process;
- O3. Choosing activities that are consistent with the individual psychological development level of preschool children;
- O4. Integration of educational software for activating preschoolers;
- O5. Analysis of the most effective activities offered by the educational software and analysis of their quality.

Research hypotheses:

From the aim and objectives of the research we proposed the following research hypotheses:

1. It is presumed that after the implementation of an intervention program based on the use of educational software adapted to preschoolers, an improvement in the quality of their attention will be achieved.

2. It is presumed that the application of an intervention programme based on the use of educational software adapted to pre-schoolers will lead to a stable improvement in their memory.

3. It is assumed that the use of educational software in the instructional-educational process of pre-school children will positively influence their didactic learning and thus lead to an improvement in their learning outcomes and knowledge acquisition.

Research methodology:

Description of the research groups

The research was conducted in parallel on two groups of subjects - one control and one experimental, each of 20 preschoolers from Kindergarten No. 23, aged 5-6 years, over a period of one school year 2021-2022. The subjects who participated in the research, both those included in the experimental group and those included in the control group, are within the IQ range.

Research methods and instruments:

In order to achieve the objectives and confirm the hypotheses, the research was carried out on the basis of an experiment, using various psychological and pedagogical tests:

a) Methods used in the data organization stage:

Psychological samples:

- Visual Attention Test (from the Neuropsychological Evaluation of Development Battery - NEPSY);
- Test for Auditory Attention (from the Neuropsychological Developmental Assessment Battery - NEPSY);
- The Toulouse - Pieron Concentrated Attention Test adapted for preschoolers;
- The Memory of Numbers Test (from the Neuropsychological Developmental Assessment Battery - NEPSY);

b) Methods applied in the intervention phase:

- ❖ Observation method;
- ❖ Experiment method;
- ❖ Intervention programme based on the introduction of educational software for pre-school children.

c) Methods applied in the testing/ evaluation stage:

- Assessment of knowledge and other acquired tests for preliminary testing of preschoolers' outcomes using educational software for teaching-learning-instructional evaluation activities before and after initiation.
- Given the specificity of the study, psychological tests applied at the beginning of the school year were reapplied at the end of the school year, giving us an indication of the extent to which the experimental group of preschoolers was able to transfer to the new environment acquired using educational software. We are also interested in the extent to which the concepts taught become actionable and how students think independently of the animations they watch and appreciate.
- The psycho-pedagogical experiment consists of applying an independent experimental variable, namely educational software suitable for preschool children, software designed to stimulate school motivation, creativity, initiative and all the mental processes involved in learning.

From the analysis of the final data the following conclusions can be drawn:

The quality of attention improved in both groups of subjects, with above average scores mainly in the experimental group. The information obtained told us that auditory and visual stimuli were associated with emotional factors (animations, vivid colour images specific to early childhood in software applications) and neutral stimuli (static images, neutral colours, etc.). Subjects in the experimental group who participated in the study performed similarly to subjects in the control group on all tests of attention, memory and knowledge applied to the baseline test, and thus could conclude that they started from the same level. Compared to the control students, the experimental students achieved significant results on the final concentration test, and on the quantitative side, the control students showed a slight decrease in the level at which they started.

From the qualitative point of view, the subjects in the experimental group obtained very good results in the final concentration test, recording values above those obtained in the initial test; also in the final concentration quality test, the control group obtained results that were very close to those recorded in the initial test, but they could not observe values indicating progress in concentration quality.

At the beginning of the study, the question of the use of technology in education was raised globally as a question of objectives in general, which showed some of the conditions for achieving the objectives. Then, following an experimental investigation, the approach to the use of ICT in early childhood education was transformed into an operational action.

We propose that in the education of preschool children modern educational means should be used to make real learning possible in activities that preschool children find difficult (rigid thinking, simple expressions and faults, poor imagination, etc.).

On the basis of the usual results, a number of conclusions are drawn, some of which may constitute pedagogical and methodological principles for pre-school teaching:

- Increasing the value of education through digital training of pupils using new information technologies, making teaching a modern and up-to-date process;

- Integrating ICT into education increases its formative educational value;

- Educating pupils with ICT cultivates pupils' ability to learn with audio-visual information;

- Initiating pupils in the use of educational software is valuable and necessary, developing the ability to get the gist of a topic and work with it;

- The pedagogical objectives of the activities, because they were formulated and explained in the form of general goals and in terms of behaviour, proved effective for preschool practice;

- Because of the way the activities were designed and conceived, pre-schoolers were used to integrating knowledge from the software used in the pre-school acquisition system, increasing the effects of using ICT in education.

- The introduction of ICT in education did not affect the learning process but, on the contrary, made it easier to solve some learning problems;

- The results suggest stimulating the use of ICT in pre-school education making the most of technology in kindergarten;

- The use of ICT in education is also a way for kindergartens to respond to the present and future demands of society.

The results obtained by the pre-schoolers in the experimental group confirm the usefulness and effectiveness of using adapted educational software in the teaching process.

Conclusions

The final research data confirm the hypotheses underlying this approach, and namely:

It is presumed that, after the application of an intervention program based on the use of educational software adapted to preschoolers, an improvement in the quality of attention of these preschoolers was obtained...

It is presumed that, after the implementation of an intervention programme based on the use of educational software adapted to pre-school children, an improvement in their memory was obtained.

It is presumed that the use of educational software in the teaching-learning-assessment activity of pre-schoolers has positively influenced their didactic learning and implicitly led to an improvement in their school results.

Through this study, an attempt was made to provide teachers with a useful tool, which, through pedagogical talent and openness to the new, will gain significant value. By introducing ICT into activities teachers can contribute to the achievement of cognitive, affective and psychomotor objectives, and on the other hand teach children how to use technology. Each teacher fulfils his or her role as an educator in relation to technology by being open to the school's relations with all the educating factors in society. This open attitude is expressed by introducing into the activity, whenever its objectives and specifics require it, dynamic images which, through special visual effects, bring into the classroom elements of reality which the pre-school children would not otherwise know. Of course, this requires the teacher to be balanced and selective, to be able to prioritise objectives, to choose the most appropriate teaching aids and to set priorities.

If a child is spontaneously attracted to technology, in the case of education he must be interested in appropriate means for his own development, by shaping the prospects that are open to him. The pupil's learning through modern teaching methods, within the framework of kindergarten conditions, must be participatory, based on internal motivation, on his voluntary and affective engagement in observation, analysis, comparison and interpretation. Moreover, it must be constantly borne in mind that authentic and effective learning must be prospective, which means anticipating future developmental requirements.

In the modern sense, assessment in the pre-school classroom tends to become formative and formative, learner-centred, using traditional and complementary methods. Self-assessment plays an important role in the overall ICT curriculum. Self-assessment involves a transfer of responsibility from the teacher to the pre-schooler, in the sense that the teacher constructs assessment criteria and communicates them to the pupil so that the pupil can optimally assess his/her learning performance. The contribution of ICT to promoting self-assessment in the learning process is major. Self-assessment

tests or other types of tests create the context for the learner to receive direct, corrective feedback, eliminating the negative effects of frontal assessment.

- Assessment is an essential dimension of the curriculum process;
- it is recommended that assessment is based on the use of as many methods as possible, and techniques - both traditional and modern, complementary;

- the aim of assessment is to help pre-school children form an accurate picture the aim of the assessment is to help pre-school children to form a realistic picture of themselves, giving them the opportunity to assess themselves in a fair manner and thus to develop their school knowledge.

In the teaching activity of using a curriculum that integrates information and communication technologies, the criteria for selecting those methods and strategies that favour teaching and facilitate learning are the teacher's way of ensuring the transition from general aims to concrete activity at pre-school level. In this respect, the selection of these methods based on the use of the ICT curriculum should take into account the following criteria:

- ✧ focusing the curriculum on goals that aim to build skills, operational skills and personal attitudes and values;
- ✧ the predominant use of certain teaching suggestions which have the learner at their centre, thus ensuring that the objectives set are achieved as easily as possible;
- ✧ the choice of those contexts with an expressive impact from a psycho-pedagogical point of view for the psycho-individual development of pre-school children.

References

- Cuban, L. (2001). *Oversold and underused: Computers in classrooms*. Harvard University Press, Boston,
https://www.academia.edu/25520848/Larry_Cuban_Oversold_and_Underused_Computers_in_BookZZ_org
- Korkman, M., Kirk, U., Kemp, S. (2005). *Developmental neuropsychological assessment*. NEPSY Management Manual, Cluj-Napoca, ASCR Publishing House,
<https://pdfcoffee.com/manual-nepsy-pdf-free.html>
- Woodward, J., Rieth, H. (1997). A historical review of technology research in special education. *Review of Educational Research*, 4(67), SAGE Publications,
<https://journals.sagepub.com/doi/10.3102/00346543067004503>
- Yelland, N., Marshall, G., Katz, Y. (2003). *Learning in school, home and community: ICT for early and elementary education*. Kluwer Academic, London, England,
<https://www.gettextbooks.com/isbn/9781402073670/>