

THE STATUS OF DIGITAL COMPETENCE IN THE CURRICULA FOR HIGH SCHOOL AND SECONDARY VOCATIONAL EDUCATION

Svetlana Pandiloska Grncharovska^{1*}, Fadbi Osmani¹

¹ Faculty of Pedagogy, University of Tetova, RNM

*Corresponding author e-mail: svetlana.pandiloska@unite.edu.mk

Abstract

The development of new ways of communication and solving educational tasks through distance education is becoming a reality. The literacy for the 21st century introduces a new set of knowledge, skills, and attitudes that are required for a successful and quality life. Hence, traditional literacy (reading, writing and calculating) recently incorporated digital literacy as well. Training students in basic ICT skills is considered one of the objectives to help them acquire digital competence. In this regard, the purpose of our research is to analyze the goals, teaching methods and activities and the manner of evaluating students' achievements in the informatics curricula for high school and secondary vocational education, and their impact on the development of digital competence. The descriptive method with all its modalities dominates in the research, that is, analysis of the condition, comparison and generalization. Based on the results, it can be observed that the objectives stipulated in the informatics curriculum correspond to the knowledge and skills stipulated within digital competence, and also the envisaged teaching methods, forms and activities of the teacher and the students have a motivating effect on students. The results do not suggest the conclusion that the individual today must be capable of using technology, to access the needed information and to be able to identify and use the needed information from the multitude of information. Therefore, the recommendation is to stimulate the development of digital competence through the content of other subjects as well.

Keywords: curricula, informatics, digital competence

1. Introduction

Today's education has been facing numerous challenges. One of them is undoubtedly the changing role of schools and teachers as the sole transmitters of information. The development of new ways of communication and solving educational tasks through virtual pedagogy, distance education, and open education is becoming a reality.

Today, the individual must be capable of using technology to access the necessary information and be able to recognize and use the necessary information on the multitude of available data. Hence, it arises that traditional literacy (reading, writing, and computing) has recently incorporated digital literacy as well. The literacy for the 21st century introduces a new set of knowledge, skills, and attitudes required for a successful and quality life. Sometimes this leads to conflicting views. Namely, some believe that the learning process should be based on general theoretical foundations that should be the point of departure of all learning directions set by the teacher. According to this opinion, the open learning process would be based on a better approach to existing resources and a better presentation of important facts and sources of knowledge.

Others emphasize the importance of learning as a result of social interaction and focus on the student. In this case, the key factor in any type of learning is to build student autonomy and power through an understanding of knowledge. And knowledge with understanding mainly rests on active

project-based discovery and learning. The reality is somewhere in between. (European Commission, 2003)

2. Digital competence in the curricula and teaching programs

Training students in basic ICT skills is considered one of the goals for students to acquire digital competence. However, there is still no consensus on how this competence should generally be treated in a school curriculum. Some policies are focused on computer literacy while others are more comprehensive and include education for all media.

In addition, the use of digital media also affects the activities at a micro level i.e. in the classroom and improves communication between teachers and students, and in some cases, it even replaces the teacher. The analysis shows that the changed methods of work can motivate even the students for which all other methods have been unsuccessful.

The justification for technology integration is based on its ability to open the classroom to other learning opportunities that exist outside the school or to expand the learning offer. The use of a computer must encourage the individualization of the instruction, thus improving the quality of learning. Students are usually delighted and accept to learn the course materials in electronic form. Each student processes the assigned topics at a pace that he/she finds appropriate, and repeats and researches in his/her way.

Active student participation sometimes imposes a digression from the curriculum content, which implies a different timetable and rhythm than the teacher-student presentation.

It is becoming increasingly clear that ICT is not a substitute for "face to face" education. Teachers should combine ICT-based group work and collaborative learning, school activities and independent distance education activities. This requires additional resources at many levels.

The shift from a teaching process to a learning process adds new requirements in the education system, such as the provision of better services for the professional guidance of students, thereby considering different learning styles and different levels of abilities.

Current curricula are often considered obstacles to ICT integration because the content of a specific discipline can either be taught without ICT or is incompatible with the multidisciplinary approach that ICT strives for. ICT is more compatible with the approach of recent curricula developed in the instructions for the subject of natural sciences than the disciplinary approach that prevails in most curricula. Teachers, managers, and political leaderships are looking for evidence that investing in ICT is worthwhile and brings better learning outcomes. However, such evidence is difficult, maybe even impossible to provide. To obtain a convincing comparison between teaching with the application of ICT and traditional teaching, it is necessary to identify all decisive factors and point out the impact of each. There are many variable elements in the learning situation, and it is almost impossible to identify the effect of each possible interaction.

The advantages that explain the success of ICT include the fulfilled real needs and demands of students and teachers, as well as the increased learning effects due to increased motivation and high-quality resources.

On the other hand, the indicated weaknesses include lack of funds or inflexible use of funds, lack of coordination between individual actors and a clear vision at the national level, the need to develop teacher competencies, as well as the absence of stimulating assessment and external evaluation. (European Commission, 2003)

It is important for students to acquire technical skills, but even more importantly, to acquire digital competence and become critically aware of how media and digital technology influence the way they learn, think, create and express themselves. The participants in the educational process need to be trained to deal with changes, uncertainty, and innovation. The increasing complexity of today's schools, classrooms, and learning environments suggests the need to understand educational activities in different new ways, and to develop new analytical models and practices of how educational activities can be organized.

3. Research design

The descriptive method dominates in the research, namely, analysis, comparison and generalization of the curricula have been performed.

The goal of the research is to determine to what extent the informatics curricula for gymnasium education and secondary vocational education are in the function of the development of digital competence.

Within this framework, an analysis was performed regarding the goals, the teaching methods and activities and the manner of assessing the achievements of the students in the subject of informatics and their impact on the development of digital competence.

Hypotheses:

General hypothesis: The informatics curricula enable the development of digital competence.

H1: The prescribed goals of the subject of informatics stimulate the development of digital competence.

H2: The prescribed teaching methods and activities of the teacher and the students stimulate the development of digital competence.

H3: The prescribed manner of assessing student achievement stimulates the development of digital competence.

A dependent variable in our research is the level i.e. the degree of development of digital competence. Independent variables include: the type of secondary school, and secondary education curricula and teaching programs.

4. Results and discussion

Informatics as a compulsory subject in gymnasium education is taught only in the first year, while in secondary vocational education, this subject is taught in the first and second year as a compulsory subject for all educational profiles and vocations.

However, in the field of natural sciences and mathematics in high school education, the subject of information technology is offered as an optional subject in the second year, while the subject of programming languages is optional in the third and fourth year. This means that in the field of natural sciences and mathematics in gymnasiums, theoretically students have the opportunity to study the contents in the field of information and communication technology in all four years. However, we will confine this analysis to the subject of informatics, because it was studied as a compulsory subject by all respondents.

The objectives, but also the contents of the subject of informatics for the first year are completely the same for gymnasium and secondary vocational education. In this context, it is envisaged that students who successfully master the curriculum will be able to: work on a computer and use a computer during instructions in other subjects, to use ready-made computer programs,

to further study informatics and use computers in the school, in higher education institutions or for self-education by using literature on information technology.

On the other hand, the objectives of the subject of informatics in the second year of secondary education focus on the acquisition of knowledge and skills by the student in order: to know the advantages of information technology in the society and social life, to know the rights for the protection of software products, to use multimedia hardware systems and multimedia software, to know about databases, database applications, to use computer applications in sketching, product planning, and design, to use project presentation applications, to prepare prospectuses, manuals, tutorials, and other printouts, to design web pages, to publish web pages on the Internet, to develop a professional attitude aimed at quick and successful incorporation of information activities into the companies.

What can be observed in the determination of objectives is that because the subject of informatics is taught as a compulsory subject in secondary vocational education, students in vocational schools have the opportunity to become familiar with several contents of this subject that favor the development of digital competence. Of course, this does not exclude the possibility for gymnasium students to choose the offered optional subjects and thus to adopt contents that favor digital competence within all four years of secondary education.

From the analysis it can be observed that the goals stipulated with the informatics curriculum for the first and second year correspond to the knowledge, skills and attitudes stipulated within digital competence.

Teaching methods and activities

The use of the following teaching methods and forms has been envisaged within the informatics curriculum: demonstration, discussion, team teaching, problem-solving within the vocation, an active demonstration by students, preparation of simple projects. The main activities of the teacher include: speaking, discussion, explaining, providing instructions, demonstration, asking questions, organizing group work and project guidance, evaluating assignments and registration. Furthermore, the specific activities foreseen for students include: observation, reading, exercising, finding relationships and legalities, independent learning, checking, discussion, application, group and independent observation.

All of this leads us to the conclusion that the stipulated teaching methods, forms and activities of the teacher and the students have a motivating effect on the students and contribute to the achievement of better learning outcomes and the development of digital competence, overcoming cultural barriers and development of cognitive skills encouraged by digital information such as observation, visualization, system access and information processing.

Assessment of students' achievements

Regarding the assessment of the students' achievements, it is foreseen to perform assessment continuously throughout the entire school year based on the students' practical qualification according to the requirements of the program and the mastery of theoretical knowledge. The valuation of the students' ability to practically use a computer will be performed by monitoring the execution of the foreseen exercises for each thematic unit, and for the theoretical part, by default, with one knowledge test in each semester.

5. Conclusions and recommendations

The adoption of contents in the field of information and communication technology as a basis for the development of digital competence is not only a means to present existing content through new media, but also to introduce new learning paradigms. It changes the relationship within the learning institutions. In this way, students are taught to behave as citizens where scientific progress poses great challenges.

It is increasingly acknowledged that the main challenge in the development of digital competence is not the equipment, but the valuation-assessment the creation of conditions that will contribute to the efficient realization of the educational goals providing of conditions to the efficient achievement of the growing needs of students. The purpose of school is not knowledge itself but the expectation that what will be learned in school, also will be applied in life.

As a result of this research, we recommend the following interventions in the informatics curricula:

- Providing better vertical and horizontal connections between the curricula contents.
- The emphasis should be on the student and the learning process.
- The monitoring and evaluation of the quality of education should be focused on measuring the level of realization of educational outcomes.

By using technology, an individual today must be capable to access the necessary information in the multitude of available data, and to know how to recognize and utilize the necessary information.

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