Functional Knowledge Policy: Analytical Comparison of Digital Competence within Slovak and Irish National Educational Systems

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1. Introduction to functional literacy

Man´s functional literacy involves knowledge, operative capabilities and attitudes necessary for social repletion. In the course of last years, functional knowledge policy has transformed its orientation towards concept of competences.[3] Divergence of national educational systems in content of social inclusion, equity and employability deepens differences within particular nations and results in decreasing development of functional literacy. Information literacy as substantive part of functional literacy and its efficient development is directly proportional to scope of implementation of Information and Communication Technologies (ICT) within particular educational grades. [2], [4] As far as information literacy is mentioned digital competence as its concrete interpretation emerges. Regarding to digital competence conceptions three spheres of digital competence expose:

- Manipulative cognition of ICT
- Data-retrieval and processing
- Communication

Regarding to transformation involving new concept, threat of recession within European education is crucial. International divergence of digital competence within educational systems of European nations deepens social differences of particular nations and decreases the development of appropriate functional literacy ultimately.

1.1 Standardization and its common homogeneity

Content of digital competence focuses on development of one´s knowledge and operative capabilities related to active use of ICT and its potential ordinary. European social legislation defines standardization of digital competence considered as academically aimed towards information literacy development within nations of EU:

- to retrieve, assess, store, produce, present and exchange information;
- to communicate and participate in collaborative networks;
- to understand computer applications;
- to understand of potential risks;
- to understand of creativity and innovation support;
- to be aware of issues around the validity and reliability of information; [1]

Digital competence conception practically accentuates and develops three main fields intent on information, communication and technical support. Regarding to field orientation main interferences of content of particular fields are crucial in process of student cognition, communication and presentation [9].

National Educational Technology Standards for Students (NETS*S) produced by The International Society for Technology in Education (ISTE) in 2007 summarize series of six standards, which practically define student capabilities promoting digital competence integrally by considering of orientation of particular standard (Table 1.). Although it is national standardization designed for U.S. educational policy, its complexity has its justification essentially in global understanding. [6]

Conception	Standardization
ISTE NETS*S	1. Creativity and Innovation
	2. Communication and Collaboration
	3. Research and Information Fluency
	4. Critical Thinking, Problem Solving, and Decision Making
	5. Digital Citizenship
	6. Technology Operations and Concepts

Table 1. – ISTE NETS digital competence conception

2. Analysis of digital competence within National Curriculum

Perceiving tendencies of ICT potential two fields of investigation originate:

- How is the content of digital competence functionally involved within National Curriculum at particular grade?
- What level does the digital competence represent from the point of international comparison?

Analysis of explicitly defined digital competences realized on the base of Primary Curriculum reflects both fields of investigation. Regarding ISTE NETS*S, measure of digital competence implementation within European countries presents notable disproportion of capabilities in specific subjects. Comparison of achievements within Irish and

Slovak primary education verifies individual involvement of digital competence and extends principal reasons of discrepancy.
Slovak National Institute for Education (SPU) and its National Educational Programme invented for the 1-st degree (students aged 6 to 10 years) of primary education (ISCED 1) defines digital competences explicitly within specific subjects of 1-st to 4-th grade (Table 2.). [11] Measure of their implementation allocates limitations mostly in all of programmes of study- Oral Language; Nature and Society; and Human and Values Programme of study above all, where generally defined digital competences within ISCED 1 explicitly represent fragmental apportionment. Mathematics and Data-processing as programme of study represents complete scale of digital competence inclusion, although their explicit definition within subject description manifests development of 4 digital competences (Fig.1).

Programme of study	**Subject**
Oral Language	Slovak Language, Foreign Language
Mathematics and Data-processing	Mathematics, Computer Science
Nature and Society	Natural Science, Geography
Human and Values	Ethics, Religion, Technical Training, Practical Training
Art and Design	Music, Visual Arts
Health and Motion	Physical Education

Table 2. Analyzed programmes of study and their subjects within Slovak educational system

Irish Department of Education and Science and National Council for Curriculum and Assessment (NCCA) in the Primary School Curriculum defines digital competences explicitly within specific subjects of 1-st to 6-th grade (students aged 6 to 12 years) as Table 3.demonstrates. [12] Analytical results present considerably broader spectrum of digital competence implementation within programmes of study. Except of Health & Motion programme, where no digital competence is explicitly defined, all programmes of study and mostly all of subjects mention greater rate of digital competence integration regarding to its development, than Slovak do (Fig.1).

Programme of study	**Subject**
Oral Language	Gaeilge Language, English Language
Mathematics and Data-processing	Mathematics
Nature and Society	History, Geography, Science
Human and Values	Social, personal and health education
Art and Design	Music, Visual Arts, Drama
Health and Motion	Physical Education

Table 3. Analyzed programmes of study and their subjects within Irish educational system

2.1 Slovak and Irish digital competence achievements
Qualitative analysis presents that digital competence is within both (Slovak and Irish) National Curriculums at particular grade functionally involved in different way (Fig.1.). On the scale of ISTE NETS*S standards the demonstration of digital competence disproportion in specific programmes of study is evident. In case of Slovakia, Research and Information Fluency as 3.standard is (within programmes of study) proportionally well-developed digital competence. According to Irish National Curriculum, well-developed standardized digital competences (within programmes of study) are Creativity and Innovation; Research and Information Fluency; and Technology Operations and Concepts (as 1-st, 3-rd. and 6-th standard). However, sufficiency level still proves options for improvement in both analyzed nations.

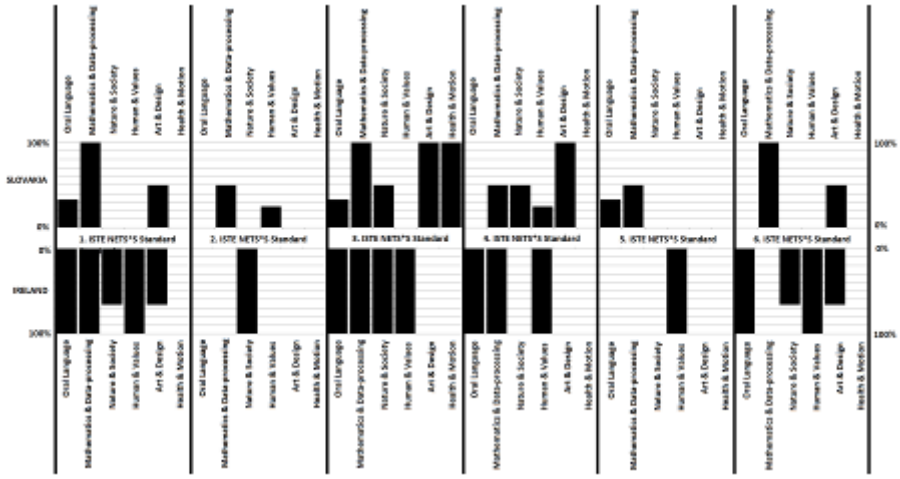

Fig.1. Explicitly defined digital competence within Slovak and Irish educational system

Creativity and Innovation (1-st standard) is concretized within analysed nations disproportionally with externalization to demonstrate creative thinking, construct knowledge and develop innovative products and processes using technology, concretized in student application of existing knowledge for creating of works, producing of ideas and using models and simulations for problem exploration. Communication and collaboration (2-nd standard) concentrates on student usage of digital media and environments to communicate, to work collaboratively, to support individual learning and to contribute to the learning of others. Analytical achievements proved its concretization in form of student communication in order to inform and share ideas effectively by using a variety of media and formats. However, digital competence based on 2-nd standard is (much like in case of 4-th, 5-th and 6-th standard) developed in particular programmes of study fragmentally. Research and Information Fluency (3-rd standard) as a competence with highest rate of implementation and development in both analysed nations is concerned with student application of digital tools to gather, evaluate, and use information. Comparative achievements present standard externalization to develop capabilities to locate, organize, analyse, evaluate, synthesize and ethically use information from a variety of sources. Critical Thinking, Problem Solving, and Decision Making (4-th standard) concentrates on student usage of critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Analytical achievements proved its concretization in form of student development of solution for specific problem by collecting and analysis of useful data, resulting in exploration of alternative options. Digital Citizenship (5-th standard), oriented on student understanding of human, cultural, and societal issues related to technology and practice legal and ethical behaviour was externalized in analytical achievements to develop student usage of safe information and exhibit a positive attitude toward using technology for collaboration and learning. Standard of Technology Operations and Concepts (6-th standard) concentrates on student understanding of technology concepts, systems, and operations. Analytical achievements proved its concretization in form of student effective selection of accurate applications and transferring of current knowledge to learning of new ICT.

2.2 Digital competence in context of analytical comparison

Analytical comparison of both nations (Fig.2.) presents that level of digital competence, explicitly defined within subjects of particular programme of study, differs. Digital competence is according to ISTE NETS*S standards less developed in Slovak programmes of study (level of particular standard is represented by average of all levels of mentioned standard defined within subjects) than in case of Irish programmes of study. Proportional representation of digital competence within particular NETS*S standards has nominal amplitude in case of both analyzed nations. However, level of particular standards demonstrate insufficient level (notably in case of 2-nd and 5-th standard). Level of Research and Information Fluency (as 3-rd NETS*S standard) and demand for its improvement is crucial. Selinger considers search techniques and effective data handling as vital skills which pupils need to be taught if they have to make effective use of the vast information sources which internet provides. [10] As far as student competence to search information effectively is mentioned, level of Critical Thinking, Problem Solving, and Decision Making (as 4-th NETS*S standard of digital competence) comes into attention. Lipman considers Critical Thinking for helping us to avoid thinking uncritically and act unreflectively. [8] In such manner, Research and Information Fluency demands applied thinking primarily to assure valuable information processing and achieve one´s literacy effectively.

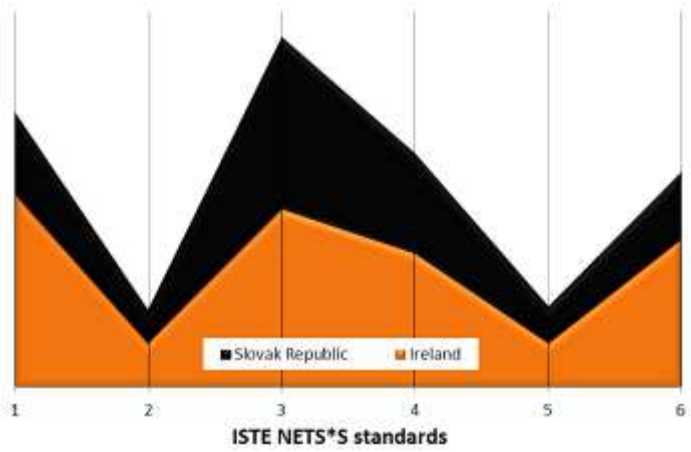

Fig. 2. Quantitative comparison of digital competence defined explicitly within grades 1-4 of primary education

3. Conclusions and Future Work

Regarding to fields of investigation mentioned, results show following conclusions:
- Particular digital competences (explicitly defined) demonstrate disproportion in programmes of study within Irish and Slovak National Primary Curriculums for grades 1 to 4;
- Quantitative comparison represent that level of particular digital competences within programmes of study for grades 1 to 4 differs. However, proportional representation of digital competence within particular NETS*S standards has nominal amplitude.

Interpretation of results presents outline of digital competence implementation problem. Level of digital competences and their insufficient implementation within programmes implicate an unequal educational development, which may result in recession. We consider as crucial to analyze limitations and stimulus of options for digital competence development regarding to ICT implementation into educational process.

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