

TECHNOLOGY-BASED DECISION MAKING IN INCLUSIVE EDUCATION

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ABSTRACT

Technology-based decisions in education are made on a daily basis. For some students, inclusive education is impossible without assistive and adaptive technologies. A study was conducted using the method "focus groups with one moderator". The discussions explore the decision-making process for technology-based learning and the advantages and disadvantages of technology-based learning. The method provides an opportunity for individual and group intellectual and praxeological reflection on the discussed issues. The reflexive processes in the respondents allow to deduce the levels of their digital competence. The qualitative research was conducted with 65 inclusive teachers from secondary school and high school. The teachers participating in the study were selected according to a basic criterion: to make technology-based decisions for the implementation of inclusive processes in school.

The main aspects for future analysis are mobility, accessibility, functionalities of technologies, application of the model of technology-based learning in inclusive education and factors that influence the decision-making process for choosing different spaces of technology-based learning. By making technology-based decisions the respondents create conditions for self-reflection about the application of technologies for the implementation of the processes of inclusive education. Reflexive analysis for technology-based decisions leads to increased intellectual, personal and praxeological reflection in the respondents. As a consequence of the increased manifestations of reflection in the respondents, conditions are created for personalized teaching and personalized learning in students, and personalized learning in turn paves the path of inclusive processes.

Keywords: *inclusive education, intellectual reflection, level of digital competence, technology-based decisions, praxeological reflection.*

Introduction

Decision-making in education happens almost every hour. In the conditions of distance learning in an electronic environment, decision-making is mainly related to their technological nature. The question how teachers

make technological decisions for the implementation of inclusive education remains. The mechanism of making technology-based decisions for inclusive education may be different, but begins with identifying the problem and the desired end result, continues with identifying variations and alternatives according to existing conditions and factors of influence, making a choice of many alternatives and solutions is a fact. As Mescon (2016) notes: “decision-making as a process is characterized by being time-consuming and implemented in several stages. Stages of preparation, adoption and implementation of the decision are separated. The decision as an act of choice implies the choice of alternatives in operational mode. The decision as a result of a choice is a prescription for action” (p. 193).

Technology-based decisions for inclusive education can be considered in several aspects of elections:

- choice of technologies in the process of their purchase, for use in the educational process, and in the administration of the academic status of the students;
- choosing certain technologies for teaching certain learning content in an accessible way for all students;
- selection of certain learning technologies according to the individual profiling of the students and the personalized learning.

The existence of choices is not enough to implement a technology-based decisions. Asaul, Knyaz and Korotaeva (2007) note that “practice shows that even well-designed decisions often turn out to be unfulfilled due to an unsettled control system” (p.5) and the implementation of the decision. The specificity of technology-based decision-making is related to the knowledge and mastery of the functionalities of technological devices and electronic resources, and their effective use for the implementation of inclusive processes and for supporting the various educational needs. Technology-based education decisions intertwine the corporate level of decision-making on the necessary and effective technologies for administration and training of students / including assistive and adaptive technologies / on the one hand and on the other hand, the individual level of the teacher for decision making according to personal preferences and competencies, his teaching style and the learning styles of his students, risk-taking and responsibility for the use of certain technologies in the learning process.

In this context, according to Ribeiro (2016), when making scientifically validated technology-based decisions, the total cost of ownership of technology of the school organization, the organizational vision of the school, effective funding, the academic impact of technology on student learning should be taken into account. Technology-based decision making is related to data-driven decision-making. In this context, technology-based decision-making should be timely, accessible, and have capacity.

In recent years, research specifically on data-driven decision-making for inclusive education has predominated in the scientific literature (Mandinach et al., 2006; Datnow and Hubbard, 2016; Filderman and Toste, 2017; Schildkamp, 2019; Pagan, Magner & Thibedeau, 2019; Mandinach & Schildkamp, 2020; Wilcox et al., 2021), but there is relatively little research on technology-based decisions for inclusive education and technology-based decisions based on or related to data-driven decision-making. But, as Mandinach and Schildkamp (2020) note: “In no way is the use of data a panacea or the sole source of information to inform practice. Educator experience and professional judgement count, but must be used in conjunction with data, especially now that understanding students has become more complex. This means that the data use field needs to move from neo-behaviorism and cognitivist perspective on data use to a more social-cultural paradigm. The focus should be continuously adapting instruction in the classroom and beyond, to facilitate and optimize students’ learning processes, taking into account learners’ needs and individual characteristics” (p. 7).

At the same time, there are many scientific studies related to the separate use of individual assistive or adaptive technologies mainly for students with special educational needs (SEN), and with the development of technology increases the opportunities for their application in the educational process for inclusion of all students.

The success of inclusive education, especially in a pandemic, depends on the technology-based decisions of teachers and parents, as well as the students themselves. For some students, inclusive education is impossible without assistive and adaptive technologies, even in terms of attendance training in the university. In the necessary conditions to conduct distance education, every teacher faces making technology-based decisions, especially for the realization of the process of inclusive education.

According Harteis et al., (2008), Earl and Louis (2013), Vanlommel, Gasse and Petegem (2017) a significant “part of teachers’ decisions have an effect on pupils’ educational trajectories, yet we know little about how teachers make decisions” (p. 81). The conceptual framework for the present study is study the process of making technology-based decisions in the process of inclusive education. At the same time, technology-based decisions about inclusive education are based on the amount of data that teachers have about different technologies, their functionalities and the opportunities they provide to students for their achievements and progress. The focus is on the following aspects of research:

- what technology-based decisions teachers make about inclusive education?;
- how to make technology-based decisions for inclusive education – rational, emotional, intuition and experience, with what reflection?

Method

For the purposes of the scientific research, the “focus group” method has been applied. It is applied to focus groups of teachers implementing inclusive processes, examining the process of making technology – based decisions for inclusive education, determinants of different types of technology-based decisions for inclusive education, and analysis of the challenges and benefits of technology-based decisions making for inclusive education.

The model of “focus groups with one moderator” is selected. The method provides an opportunity for individual and group intellectual and praxeological reflection on the discussed issues.

Period of conducting

The research is conducted in the period 22.11.2020 – 22.01.2021.

Participants in the study

Participants in the study are 65 teachers: 35 from secondary school and 30 from high school stage of education. The selection of the participants in the research was made according to three criteria: application of inclusive processes in the educational process, making technology-based decisions with inclusive character in the educational process and critical analysis of the implemented technology-based decisions for inclusion by teachers. Since the participation of the respondents is on a voluntary basis, but in compliance with the specified selection criteria, the two groups / from secondary school and from high school stage of education / are counterbalanced by the number of participants. The age of the respondents varies from 28 years – 53 years for participants from secondary school and 32 years – 62 years for participants from high school. However, these age parameters reflect the demographic picture of the teaching profession in Bulgaria. In secondary school, teachers are younger than high school teachers.

The study was conducted in a distance format via an electronic platform Google meet in the virtual classrooms. A preliminary survey was conducted for recruiting respondents with questions about age, professional experience in inclusive education, using technologies in the educational process and making technology-based decisions about inclusive processes in school.

The activity in the focus groups follows the standard stages: preparatory, informational, contact, discussion, concluding. The duration varies from 1.30 hours to 2.30 hours in the individual focus groups. The same scenario is worked in all groups. 5 main topics were discussed:

- what digital devices teachers and their students use?
- what are the functionalities of the digital platform through which they work?

- how they make decisions about the choice of learning resources and what decisions they make?
- what decisions they make to work with students from the focus groups of inclusive education?
- what decisions they make to assess students' school performance?

In the course of the focus group's work, additional questions are asked, parrying the deviation from the main topics. Basically each focus group chose the methods of decision making "brainstorming" and/or the "Delphi" method.

Results

The data from the preliminary recruitment of the respondents is shown in Table 1.

Table 1. Data from recruiting respondents

	Age of the respondents	Professional experience in inclusive education	Use of technology in the learning process	Making technology-based decisions for inclusive learning processes
1. Teachers from the lower secondary stage of education	28 years – 53 years	from 3 years to 31 years	yes – 100%	yes – 100%
2. High school teachers	32 years – 62 years	from 3 years to 40 years	yes – 100%	yes – 100%

As it can be seen from Table 1. the determination of the respondents meets the criteria for forming focus groups, namely criteria for professional experience in the process of inclusive education, for using educational technologies and for making technology-based decisions for inclusive learning processes.

Based on the data from the recruitment, 6 focus groups have been separated, as 3 of the focus groups are from teachers from the lower secondary stage of education, and 3 from the focus they are from teachers from high school. The structuring of the focus groups is realized according to a leading criteria: age of the respondents: 28–35 years – 2 focus groups; 35–45 years – 2 focus groups; 45–62 years – 2 focus groups. The age of the respondents was chosen as the leading criteria for structuring the groups, because the lower age of the respondents implies a higher interest in technology, higher digital literacy and higher digital competence.

Secondary school teachers were more active in the discussions. They identified the following as key factors for technology-based decision making: mobility, accessibility, functionalities of technologies for inclusive education.

High school teachers pointed out the following factors: student motivation, interactive and innovative methods in the virtual classroom for inclusive education.

The determining factors differ probably because in the high school stage, the work of students in a virtual environment does not encounter any difficulties. Even sometimes students have more knowledge about the functionality of digital platforms than some teachers.

Undoubtedly, student motivation, interactive and innovative methods in the virtual classroom also influence decision-making in secondary school teachers.

Technology-based decisions in both groups of teachers find it difficult to develop different learning resources with digital technologies and different models of teamwork.

In the course of work of the focus groups, each group made an analysis of situations for technology-based decisions regarding defining the purpose of making technology-based decisions, deriving criteria for making technology-based decisions, information provision of making technology-based decisions, elaboration of variants for making technology-based decisions and evaluation of the developed variants. Each group analyse foundation for making technology-based decisions, their impact on inclusive processes in the inclusive educational environment. Respondents from both groups find it most difficult to define criteria for assessing technological decision-making for inclusive education..

During discussions on the 5 basic questions, the respondents presented answers, summarized in several spaces for technology-based decision making: criteria, way of decision making and implementation of decisions in action / in implementation/.

Respondents from both groups mainly use the digital platforms that the school has chosen, ie. technology-based decision-making is corporate, not personal. Focus groups aged 28-35 mainly use other digitalplatforms, and the use of mobile applications by the respondents is shown in Figure 1., as the data are summarized for the individual focus groups.

All respondents say that they know all the functionalities of the digital platforms they use. Focus group respondents, who use other digital platforms besides the one chosen by the school where they teach, note that due to disapproval of certain functionalities they also use other digital platforms.

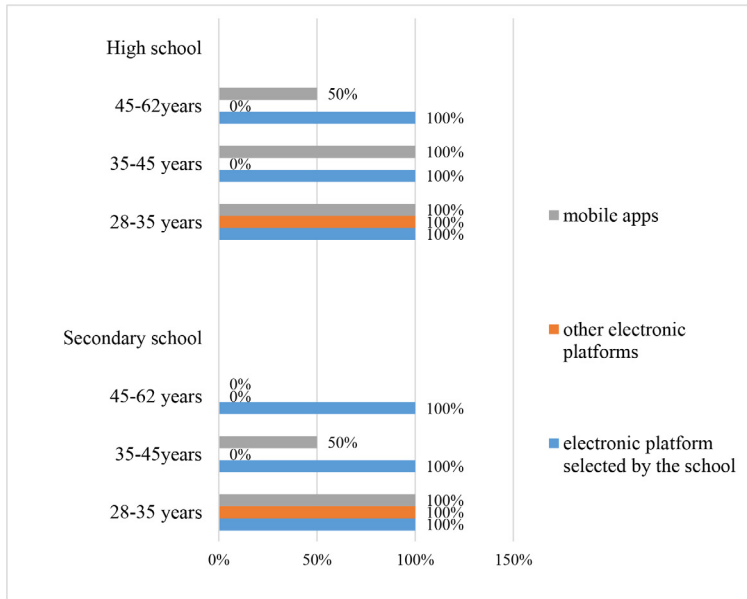


Figure 1. Using mobile apps and digital platforms

Focus group respondents who use mobile applications noted that they made these choices because:

- their students prefer to use mainly smartphones from the digital devices and so the teachers adjust the learning process to the technological preferences of the students.;
- they themselves prefer to use smartphones;
- mobile applications offer different functionalities than those of electronic platforms.;
- they have learned from colleagues about mobile applications that are attractive and interactive for the learning process;
- they can customize the learning process.

Respondents from the six focus groups shared in the discussions that they make technology-based decisions about learning resources after testing the learning resource. Usually, 50% of the respondents from the focus groups receive information from their own searches, 83.33% of the respondents from the focus groups receive information from colleagues, from parents /50% of the respondents from the focus groups/ or from students /33.33% of the respondents/. In the discussions, the respondents note that for students with low school achievements or for students with SEN effective technological solutions and actions are related to:

- the use of digital worksheets /100% of respondents from the focus groups from the lower secondary stage of education/;

- educational games /100% of respondents from the focus groups from the secondary school stage of education and 33.33% of respondents from the focus groups from the high school stage of education/;
- work in a group with peers /100% of respondents from the focus groups /.

In the discussions, respondents from all focus groups analyze and share technology-based decisions, followed by effective application in the learning process to comply with accessibility requirements when creating digital resources. Accessibility is displayed in the direction of size and line spacing of text; the color background of presentations; clear and consistent structuring of the learning content; inclusion of pictures, charts, diagrams to the text for a higher level of visualization of educational content.

All respondents from all focus groups /100% of respondents/ derive experience from technology-based decisions and actions related to active learning of students using the functionalities of digital platforms.

Respondents from all focus groups use the forms for questionnaires and quizzes, for surveys and text assignments and thus implement a formative assessment for different students according to their individual profile. These technology-based decisions are crucial for inclusive education because they are related to the needs but also to the strengths of the students.

A special focus in the discussions is the making of technology-based decisions for the use of adaptive and assistive technologies in the learning process. In four of the focus groups, respondents noted that they had to make similar decisions due to the needs of students with SEN. Respondents say that students use adaptive devices and therefore in the teaching process it was necessary to make technology-based decisions and implement them to change the availability of digital resources. An example is a change in the design of the taught curriculum to provide access to digital resources, as well as interactive communication with students. In three of the focus groups, specific models of delivery of e-learning content with separate worksheets / developed together with a resource teacher / and joint teaching with a resource teacher are indicated. In the other focus groups, there was no need for new inclusive practices in distance learning in a digital environment, but shared technology-based decisions implemented for created learning designs in digital format and simplified user interface. Digital learning designs are very easy to manipulate and transform according to the needs of the individual student, even when using a digital device with additional adaptive devices.

In the course of the focus groups, each group made an analysis of the situation for technology-based learning, defining the purpose of the technology-based decisions, deriving criteria for technology-based decisions, information provision of the solutions, elaboration of variants for solutions and evaluation of the developed variants.

Discussion

The focus group method worked best for the respondents – teachers aged 28-35, who make frequent daily technology-based decisions not only for the educational process, but also for their daily functioning. These two focus groups bring out the most shared, aware and interpreted information about different digital platforms, digital devices and digital resources, which take into account the preferences, interests and strengths of their students. In fact, these two focus groups not only implement technology-based decisions, but also put decisions into action for inclusive education. They carry out activities based on technology-based decisions and in the context of a fair treatment of students' achievements in relation to their potential.

In the groups aged 45–62 years, answers and opinions are often found, which are evident to appear as a result of purposeful self-cognitive reflection at the time of the discussion in the focus group, but these opinions and answers were not realized before. Each respondent and each group carried out a reflective process by analyzing their personal technology-based decisions and representing them to the focus group in the context of inclusive education. In the focus groups of 35 to 45 years, there are both assessments of technology-based decisions in education and life, and a process of self-knowledge about these decisions through the prism of the information provided and discussions in the focus group.

In the process of conducting the focus groups, intellectual and praxiological reflection are realized, ie. each respondent and each group reflects and analyzes the technology-based decisions taken and the activities performed as a result of the decisions. An intellectual reflection or comprehension of the dichotomous connection of taken technology-based decisions and their application for inclusive processes in education is carried out. During the focus groups, praxiological reflection or internal dialogue is realized during the presentation of the implemented activities for inclusive education as a result of technology-based decisions with assessment of their effectiveness.

In reflective analysis, focus groups present the creation and use of digital resources refined according to the needs, culture, interests and strengths of each student in the classroom. The shared emphasis of technology-based decisions made by respondents to students' strengths rather than deficits sets out the fundamentals of inclusive education. The joint teaching and development of digital worksheets together with a resource teacher can definitely be defined as inclusive practices for students with SEN. Although these inclusive practices are shared in only one of the focus groups, the respondents present a praxiological reflection on the taken and implemented technology-based decisions in this context.

Technology-based decisions for inclusive education shared by respondents from all focus groups can be interpreted both quantitatively as the number of digital platforms, digital resources and digital devices, and qualitatively as educational, emotional and social relationships and reflective analysis, and subsequent behavior. Making technology-based decisions for inclusive education involves identifying problems and needs and conceptually choosing from possible alternatives. In this context, technology-based decision making can be attributed to area of competence 5.0. of the European Reference Framework and DigComp 2.1 for digital competence. Area 5.0 Problem solving includes solving technical problems, identifying needs and technological responses, creative use of digital technologies and identifying gaps in digital competence. According to the Common European Framework of Reference for Teachers – DigCompEdu (Redecker, 2017), the respondents in the study can be said to have mastered the first two stages – Newcomer (A1) and Explorer (A2), which absorb new information and basic digital practices are being developed; as well as the two stages – Integrator (B1) and Expert (B2), in which they apply, expand and reflect their digital practices. For all respondents, the survey did not provide enough data to claim that they are at the highest levels – Leader (C1) and Pioneer (C2), where they transfer their own knowledge, criticize existing practice and develop new practices. The implemented new inclusive practices in three of the focus groups for joint teaching with a resource teacher for students with SEN using the functionalities of an digital platform for a separate group of resource teacher – student with SEN have been implemented in technology-based decisions. It can definitely be argued that when it is necessary to make technology-based decisions by respondents to implement inclusive education, respondents based on their own experience, competencies and pedagogical intuition responsibly and timely make these decisions and apply them in the educational process. Rethinking and structuring new technology-based decisions according to students' needs is an intellectual reflection on their own knowledge and experience, a praxiological reflection on e-learning and a personal reflection on their own professional competence.

Conclusions

Making technology-based decisions for inclusive education is a complex process that requires knowledge of both technology-based learning and the strengths and needs of students in the inclusive classroom. Important for making technology-based decisions are the pedagogical experience and pedagogical intuition of teachers, their professional and especially digital competence. The need for the implementation of technology-based decisions in the educational process provokes reflexive analysis in the respondents and

increase their intellectual, personal and praxiological reflection. In turn, the stimulated reflection on technology-based decisions applied to inclusive practices provokes the search for new inclusive technology-based decisions for students and to realize their own professional significance. In this context, technology-based decisions and their application in practice contribute to the implementation of inclusive education in an digital environment and personalized learning for each student according to his individual profile, which reflects individual preferences, interests, levels and potential for development and learning.

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