

DATA LITERACY OF SECONDARY SCHOOL TEACHERS: THE COMPETENCE-BASED APPROACH

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ABSTRACT

This study analyses the changing role of data literacy for general education teachers in the digital age, and highlights the need for educators to be attentive to the feedback data generated by various educational platforms and the emergence of data literacy as a crucial competency. Recognising the importance of data literacy in a variety of domains, it highlights the challenges that teachers face in using data for effective teaching, as teachers play a crucial role in data-driven learning, and make informed pedagogical decisions based on data interpretation and analysis. The study aims to analyse the theoretical foundations, highlighting the implications of data literacy for teaching practice and the quality of education. It concludes that effective and equitable education in the digital era requires the inclusion of teachers' data literacy skills, and the promotion of a broader public understanding of the interaction between data, education and student outcomes.

KEY WORDS: *data literacy, competence, secondary school teachers.*

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Introduction

The digital age is considered to be an age of chaos, where technology and the tools we use change and shape the way we think. Many of the processes previously addressed by learning theories can now be transferred to or supported by technology (Siemens, 2005). Every education system aims to ensure the best possible quality of education services. In the Unesco Education 2030 programme adopted in 2016, it is planned to ensure that by 2030 educators will use information and communication technologies (ICT), and will have the appropriate technological skills to use ICT in their work, to create and use feedback systems for good teaching.

Feedback data is generated on various platforms, and smart education generates large amounts of data, enabling better teaching and more effective development, but in the context of the digital age, it is necessary to evaluate the received data more carefully (Schüller, 2020; Cui, Zhang, 2022). In order to transform data into knowledge about actions and the ability to act according to the principles of control and responsibility, data literacy emerges as a competence that allows individuals to solve real problems by using, analysing and interpreting data that measure essential phenomena, and is necessary for understanding complex phenomena (Schüller, 2020).

Digital data can provide teachers with powerful tools to help them explore pedagogical practices (Dyckhoff et al., 2012). However, by providing data, technologies do not provide information about how the learning process is going, how the curriculum, content, etc, should change (Volungevičienė et al., 2019). The teacher must interpret these indicators, reflect on them, and decide how these data should be used and

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analysed for monitoring learners, improving the teaching/learning process, and developing the curriculum (Berg, 2001; Dyckhoff et al., 2013; Mertler, 2021). This emphasises the aspect of human decision-making: the perception of information, decision-making based on data, and the implementation of a certain action/intervention based on it (Dyckhoff et al., 2013); i.e. it promotes a human-centred approach to data, which in turn raises the need for data analysis and data literacy skills (Buckingham Shum et al., 2020).

Research suggests that human-centred learning analytics need to be developed to make learning analytics attractive to teachers and learners (Buckingham Shum et al., 2020). This approach is based on the premise that the design of learning analytics tools must not only include effective technological and pedagogical solutions, but also consider a wide range of contextual and human factors, to answer how and why they will be used, and who will do it, and in what context. In addition, these tools must be developed for the benefit of users, but not imposed by IT designers or educators. The focus of the discussion should be on the need to understand, involve and support teachers, the key stakeholders in the teaching process in everyday educational practice, responsible for the development and management of students' learning processes in real time.

According to researchers, teachers need to be able to 'access a variety of data sources on learners (e.g. demographics, attendance, motivation and home circumstances) to contextualise students' learning behaviours and achievement and reduce the potential "bias" of traditional educational solutions' (Baker, Hawn, 2021). However, researchers argue that teachers need to have a certain level of data literacy, which means 'the ability to turn information into practical knowledge and practice in collecting, analysing and interpreting all types of data, as well as to implement certain pedagogical actions based on such analysis' (Mandinach, Gummer, 2016, 14). Data literacy skills include the ability of teachers to: understand what data is needed to solve a particular problem, to collect this data, to understand the presentation of (student) data, and the feedback provided by learning analytics tools based on this data, and to base their decisions to provide better assistance to students.

Hence, data literacy is becoming a hot topic in open data initiatives, statistics, coding, and other related fields, but the focus is often on the skills and abilities needed to manage and use data, and data literacy goals remain instrumental work-related functions (Van Audenhove et al., 2020). As educational institutions increasingly implement digital learning environments and information systems, it becomes possible to store and analyse various types of data, and digital formats provide additional opportunities to process and present data. For teachers, whose profession requires the constant updating of knowledge, the use of data is still a complex area: data needs to be turned into information, and information needs to be turned into meaningful solutions, which in the future will help teachers create better experiences for students in order to achieve their academic growth. In the field of education, the development of new technologies promotes continuous change, so data literacy is considered one of the main aspects of teachers' professional development (Cui, Zhang, 2022). However, there is a need to understand what knowledge and skills constitute data literacy, in order to empower teachers to be able to properly use data in their day-to-day practice. These steps are important for the ultimate goal of achieving the expected changes in students' learning behaviours that will improve the quality of teaching.

The aim of the article is to analyse the theoretical foundations and concepts pertaining to teachers' data literacy within the framework of general education schools. The role of data literacy in the digital age is disclosed, with an emphasis on its implications for teaching practices, professional development, and the overall quality of education.

Hence, the objectives of the article are:

1. To define the concept of data literacy.
2. To analyse competence-based approach to data literacy.
3. To expound teachers' data literacy competence following the competence-based approach.

Methods used: theoretical analysis of scientific literature and education-related documents.

1. The concept of data literacy

In today's world, more and more data is being collected, a large amount of which is called big data, and it is characterised by high speed and variety. Big data sets are difficult to process, analyse or control in a traditional way. Big data is characterised by the three aspects mentioned above: volume, variety and velocity. Volume refers to the large amount or increasing amount of data; variety to the type or heterogeneity; velocity is the speed at which large amounts of data can be reached. At this point, the description of the data can be expanded and supplemented with valence, certainty, variability and value (Baig, Shuib, Yadegaridehkordi, 2020). Data can be structured or unstructured, and presented in a variety of ways: text, numbers, graphics, images, sound. In order to analyse data, the ability to manage data or data flow is required (Downes, 2022).

Two types of data are constantly collected in the education system: personal data and process data. Personal data refers to any information attributable to an individual, while process data describes any information collected through a user's interaction with software, such as clicks or time spent performing an activity, viewing material, etc (Erstad et al., 2023).

With the increase in the amount of data, data literacy has emerged as a means of extracting meaningful information from data (Cui, Zhang, 2022). Data literacy is defined as the ability to manage, understand and critically evaluate the abundance of data in an age of high technology and networked information. Data literacy is also related to information and statistical literacy (Athanases, Bennett, Wahleithner, 2013), but information literacy is a set of skills in which individuals are able to recognise when information is needed and are able to find, evaluate and use it effectively, while statistical literacy involves choosing statistics, definition and use in a chosen context (Schield, 2004), and an understanding of statistical terminology and the ability to practically apply statistical methods to data sets (Henderson, Corry, 2021). However, these different literacies are important for achieving data literacy (Fig. 1).

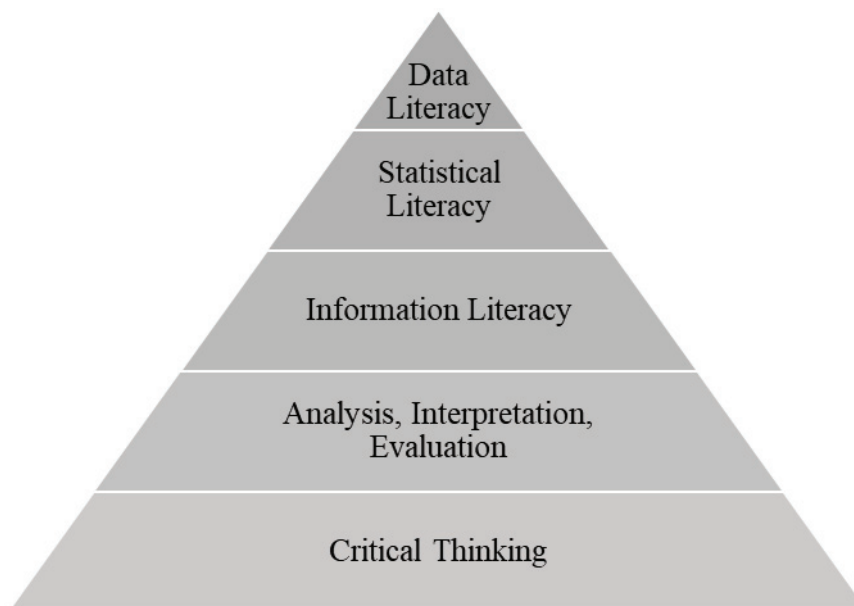


Fig. 1. Components of data literacy

Source: Ghodoosi et al., 2023.

Statistical literacy is not always separated from data literacy. While both phenomena involve the study of data and statistics and their results, statistical literacy is limited to skills in obtaining data, while data literacy seeks the ability to make decisions and make an impact based on data. Data literacy not only includes the

ability to critically evaluate data, but also includes the ability to formulate questions, systematically collect and organise data, use appropriate tools to analyse and visualise results, and draw conclusions (Athanasēs, Bennett, Wahleithner, 2013) related to the development of hypotheses, problems determination, the interpretation of data, the determination of courses of action, planning, implementation and monitoring. Four elements are important in making meaningful decisions based on data: data exploration, considering the purpose of the data; data management, which includes obtaining and storing appropriate data; use of data, its analysis and interpretation to achieve a goal; and reflection and improvement, which refers to examining each element to consider the effectiveness of achieving goals (Gummer, Mandinach, 2015).

Data literacy is the intersection of quantitative thinking, which is defined as the ability to apply mathematical principles to everyday problems using critical thinking and logic, and data science. Although the characteristics of these phenomena are different, the results are similar; but the development of both areas can help the other area, thus increasing data literacy. In the natural sciences, quantitative thinking includes the ability to understand numerical information in graphs, tables, equations and descriptive statistics, and to express coherent logical thinking about quantitative information. Data science in education is a newer movement with motivations and goals similar to those of quantitative thinking. It is an interdisciplinary field that involves analytical programming that aims to extract patterns and useful information from a wealth of data. Adding an authentic context to both of these domains, meaning content knowledge in a given domain, results in data literacy (Kjelvik, Schulthesis, 2019).

Several components of data literacy can be distinguished: setting goals, collecting data, analysing data, interpreting data, and taking educational action. Educators use the above-mentioned components to make data-based decisions. Goal setting involves thinking about the reasons for using the data, and setting a measurable goal. Subsequently, hypotheses or questions about the root causes of the problem are raised, which would reveal the purpose of using the data. Being data literate also means being able to collect data, which is then analysed by organising and prioritising data, and using statistical methods. The obtained results are interpreted, turning the data into information in order to draw conclusions (Kippers, Poortman et al., 2018).

Although there are various definitions of data literacy in scientific literature, they all have similar elements: important real-life context, critical thinking, data research process, problem formulation, data collection and analysis, interpretation and decision-making. The circumstances in which data literacy is required may vary, but the basic aspects are similar across domains. Individuals with data literacy skills are able to:

- interpret and analyse both quantitative and qualitative data presented in various sources;
- use this information for informed thinking and decision making.

Currently, data literacy education is inconsistent, neither systematic nor official. An important aspect of data literacy training is assessment, which aims to measure skills development and progress, to provide valuable feedback for teaching and learning (Cui et al., 2023).

To sum up, the current state of the data literacy concept is marked by inconsistency, and lacks systematic and official frameworks. As education systems increasingly rely on data, teachers equipped with data literacy skills are better positioned to navigate the complexities of the digital age, fostering a dynamic and responsive learning environment for the benefit of their students. Standardising and formalising data literacy education is essential for ensuring that teachers across various domains can confidently and competently integrate data into their pedagogical practices.

2. The competence-based approach to data literacy

Competence is understood as having or learning cognitive abilities or skills that help to solve certain problems, as well as the related motivation, act of will and social preparation, and the ability to successfully and responsibly solve problems in changing situations; it is not only knowledge and the ability to apply it, but also the desire to do so. Therefore, data literacy is seen as a key competence for digitisation and the global knowledge society in all sectors (Schüller, 2020) and increasingly drawing conclusions from data and

making decisions based on them, this competence is called life competence, the manifestation of which can fluctuate (Papamitsiou et al., 2021).

In many fields, including education, activities are captured digitally and become linked to data sources, but this data function is not new. The following ideas are considered new ideas about data: digitisation permeates all areas of life; big data is accumulated during all processes; data analysis can be automated using algorithms and artificial intelligence to predict and manage economic, political and social processes and human behaviour in real-time, leading to increasing calls for the development of new kinds of literacies such as algorithmic literacy, coding literacy or data literacy (Van Audenhove, Van den Broeck, Mariën, 2020).

The competence approach to data literacy allows for extracting several sub-competencies (Fig. 2).

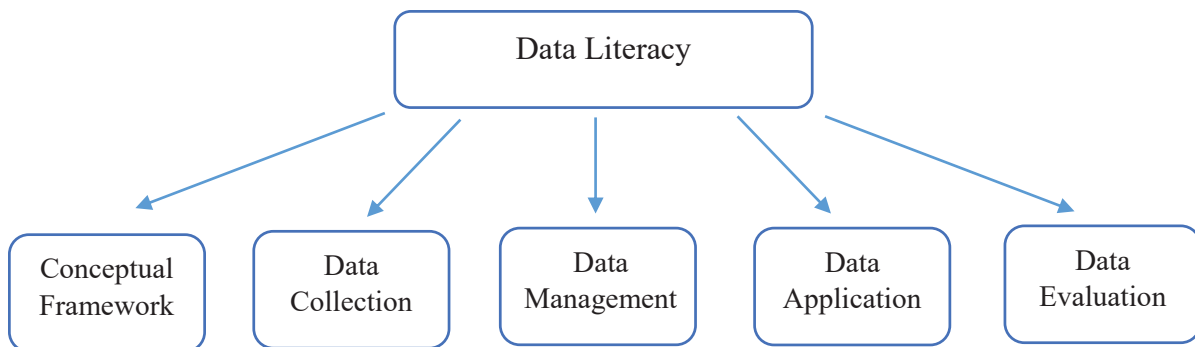


Fig. 2. The competence-based approach to data literacy

Source: Ghodoosi et al., 2023.

The conceptual framework is understood as an introduction to data, and data collection implies data discovery and collection, as well as evaluating and ensuring the quality of data and data sources (Ghodoosi et al., 2023). Data management includes the activities of receiving, storing, processing and maintaining data related to generated and collected data. It incorporates a variety of functions that work together to ensure the accuracy, availability and accessibility of data (Stedman, 2022). Data application is understood as critical thinking, data culture, data ethics, the citation of data, the sharing of data, and the evaluation of decisions based on data. Data evaluation as a concept includes data tools, data interpretation, the visualisation and presentation of data, as well as data driven decision making (Ghodoosi et al., 2022).

Data can help teachers to explore pedagogical practices by collecting, analysing and visualising relevant data (Dyckhoff, 2012). However, by providing a summary of the data, it does not provide information about how the learning process is going, and how the curriculum and content, etc, should change (Volungevičienė et al., 2019). The teacher must interpret these indicators, reflect on them, and decide how the data should be used and analysed for monitoring learners, improving the teaching/learning process, and developing the curriculum (Berg, 2001; Dyckhoff et al., 2013; Mertler, 2021). Therefore the competence-based approach to data literacy emphasises the aspect of human decision-making: the perception of information, decision-making based on data, and the implementation of a certain action/intervention based on it (Dyckhoff et al., 2013); i.e. it promotes a human-centred MA approach (Human-Centred Learning Analytics Approach) (Buckingham Shum et al., 2020).

In order to raise the qualifications of specialists, the focus is on digital literacy skills, but the improvement of the application of data analysis methods and the improvement of data literacy are not taken into account. An educator with data literacy competence should be able to collect, analyse and communicate information and data in a way that informs and makes decisions at all stages of the educational process. It is agreed that the development of teachers' data literacy competence is sporadic and insufficient. Poor data analysis and conclusions create the potential for ill-informed decisions that can affect students. Although a large amount

of data reaches teachers, the development of this competence is focused on the ability to solve technical problems, and too little attention is paid to a critical, ethical and personal approach to data management in education (Papamitsiou, 2021).

To conclude, the framework for a competence-based approach to data literacy, as illustrated in Fig. 2, underscores the multifaceted nature of this competence. In the educational context, data can empower teachers to enhance pedagogical practices through collection, analysis and visualisation. However, the true value lies not just in summarising data, but in the interpretation, reflection and decision-making process. The human-centred learning analytics approach becomes crucial, emphasising the importance of human decision-making in utilising data for monitoring learners, improving teaching and learning processes, and shaping the curriculum.

3. The data literacy of secondary school teachers in a competence-based approach

Teachers are an important group that needs to develop data literacy if data-driven learning is to be pursued (Hachmeister, Weiß, Theiß, Decker, 2021). The education sector is not a unique sector when it comes to data generation. In education, a lot of data is obtained in the preparation of courses, teaching and the organisation of learning activities. With data, teachers can see students' academic performance and learning patterns, and provide immediate feedback to students. Timely constructive feedback motivates and creates a positive need for results. Also, the improvement of the education sector depends on technology, and large-scale administrative data can help to manage various educational problems (Baig, Shuib, Yadegaridehkordi, 2020).

In order to create, support and maintain a culture of data use in schools, both the administration of the educational institution and teachers need to acquire knowledge about data-oriented decision-making. In the decision-making process of teachers' work, the need not only to define students' results, but also to take into account formative assessments, descriptions of interests, activity assessments, attendance data and other aspects, becomes apparent, as this reveals the teacher's ability to combine various data sources in order to make quality pedagogical decisions in the educational process. Teachers access data in different forms, and the use of multiple forms of data represents a shift from the conceptualisation of assessment literacy to a more complex conceptualisation of data literacy that relies on the ability to understand data in conjunction with standards, disciplinary knowledge, curriculum knowledge, an understanding of pedagogical content, and student learning and the concept of development (Harris, Schramm-Possinger, 2021). Teachers are increasingly required to justify their decision making and choices. Data literacy helps teachers understand how and for what purpose standardised test data and diverse information can be used. As teachers collect and reflect on data, they can interpret and make sense of the evidence, and translate it into instructional actions to achieve student outcomes (McDowall et al., 2021).

Data literacy skills encompass a range of abilities essential for teachers, including identifying relevant data for addressing specific challenges, gathering the necessary information, interpreting data representations and feedback related to students, and utilising these insights to enhance support for student learning. Studies indicate that many educators face deficiencies in data analysis skills, and struggle to apply the findings of analysis effectively in their teaching practice. Additionally, teachers often encounter difficulties in setting clear objectives, collecting relevant data, and devising interventions aimed at achieving those objectives (Mandinach, Gummer, 2016).

According to Michos, Schmitz and Petko (2023), the successful implementation of data-driven teaching and learning analytics tools depends on teachers' practices. There are several factors that determine teachers' use of data: teachers' beliefs, effectiveness and ability to work with educational data, and access to data-providing technologies, the availability of data systems, the time devoted to data reflection, and educational institution management. It is noted that from the beginning of their careers, teachers become responsible for the established requirements to use various data sources about learning and/or the assessment of their professional progress. According to Dunlap and Piro (2016), the components that positively influence teachers' attitudes towards data use have been identified:

- Collaborative relationships: when analysing data together with colleagues, greater trust is observed, data is socially constructed, formal and informal learning networks are formed, and critical dialogues related to effective learning are emphasised;
- Knowledgeable resources: a number of educators are worried about large amounts of data, so even though they have access to data, educators do not use it. Educators would be assisted by specialists with expertise in the field of data, or more experienced colleagues could provide the desired legitimacy.
- Step-by-step protocol: a consistent protocol for working with data is needed, following which pedagogues could learn more successfully to make data-based decisions.
- Link to classroom teaching: linking the results of data analysis to teaching is important for effectiveness, and therefore requires a selection of strategies based on the results of data analysis.

According to researchers, teachers require a specific degree of data literacy, which entails the capacity to convert information into actionable insights and practices. This involves the skills of gathering, analysing, and interpreting various forms of data, and subsequently utilising this analysis to inform pedagogical decisions. Data literacy in education merges the fundamentals of data analytics with pedagogical theory and practice, and educational content, and an understanding of student learning processes. In essence, it enables educators to translate data analysis into effective instructional strategies tailored to individual student needs. ‘It combines the essence of data analytics with educational theory and practice, educational content, and understanding how students learn’ (Mandinach, Gummer, 2016, 14). In teachers’ practice, data literacy and data-driven decision making take the form of problem identification, collecting, managing and organising high-quality data, and data transformation into information, which allows the transformation of information into decisions, and then the evaluation of outcomes. The process differs between experienced teacher-users and beginners. A beginner will notice that there is a problem, but may have difficulty identifying appropriate data sources, using data ethically, selecting the right types of data or accessing them through technology, display a lack of data analysis skills, find it difficult to make the link between data and the educational impact, have no understanding of the needs of learners, exclude the importance of the context, and assume a decision is final and that there is no need for a follow-up or for the interactive cycle of inquiry. An experienced teacher will identify the situation, take into account the context, identify and select reliable data sources, and distinguish the quality of the data, and is able to organise and manage data, knowing the importance of ethical and responsible protection of data, and understands that decisions will have consequences for education and that there is a wide range of possible pedagogical decisions in the education process, makes a decision and returns to the original goal, and monitors teacher and student performance (Beck, Nunnaley, 2021).

During the last decade, the paradigm shift from accountability-based education to continuous improvement in education has focused on the appropriateness of data use in a given sociocultural context. Teachers must be able to ‘access multiple sources of data about learners [e.g. demographics, attendance, motivation and home environment] to contextualise student learning behaviour and achievement and reduce the “unfairness” of algorithm-based educational decisions’ (Baker, Hawn, 2021). To address representational and measurement bias, researchers say ‘to increase equity, we [researchers] need to help teachers understand how to collect “better data” while maintaining adequate proportions of all interest groups and ensuring that key variables are not inherently biased’ (Baker, Hawn, 2021, 14). As was pointed out by Holstein et al. (2019), one of the essential factors for increasing fairness when using educational algorithms is research-based ‘higher-quality’ datasets.

In conclusion, data literacy empowers teachers to set specific goals, collect relevant data, analyse it effectively, and predict interventions to enhance student outcomes. However, research indicates a prevailing lack of data analysis skills among teachers, impeding their ability to apply data results in practice. The successful implementation of data-driven teaching and learning analytics tools hinges on teachers’ practices, influenced by factors such as beliefs, effectiveness in working with educational data, access to technology, time devoted to data reflection, and institutional support.

Conclusions

The concept of data literacy encompasses the ability to manage, understand and critically evaluate data. As data collection in education involves both personal and process data, teachers must develop data literacy skills to extract meaningful insights. Data literacy education, however, lacks standardisation, and its assessment is essential for systematically measuring the development of skills. In the context of secondary school teachers, data literacy becomes paramount for navigating the vast amount of data generated in education. Teachers' ability to set specific goals, collect and analyse data, and use it to inform decisions, directly influences the quality of education. However, there is a noticeable gap in teachers' data analysis skills, hindering their effective application of data results in practice.

A competence-based approach to data literacy emphasises the multifaceted nature of this skill, recognising it as a key competency for the digitisation era. The framework presented in Fig. 2 highlights the various sub-competencies involved in data literacy, emphasising human decision-making in utilising data for effective teaching and learning practices.

The successful implementation of data-driven tools depends on teachers' practices, influenced by factors such as beliefs, effectiveness in working with data, access to technology, and institutional support. Teachers are increasingly responsible for using various data sources, and their attitudes toward data use are positively influenced by collaborative relationships, access to knowledgeable resources, step-by-step protocols, and a clear link to classroom teaching. Teachers must understand how to collect better-quality data, while maintaining fairness and avoiding inherent biases. The paradigm shift towards continuous improvement in education emphasises the appropriateness of data use in a given sociocultural context.

In conclusion, research on teachers' data literacy is essential in the modern educational landscape, where data-driven decision-making and technology integration are increasingly prevalent. The avenues outlined for further research offer insights into understanding and enhancing teachers' data literacy skills. Assessing current practices, exploring contextual factors, investigating professional development interventions, and examining the impact on student learning are just a few areas ripe for exploration. Additionally, understanding the role of technology, collaborative learning communities, teacher beliefs, policy, and cross-cultural perspectives, can inform the development of effective strategies to promote data literacy among educators. By delving into these research avenues, scholars can contribute significantly to improving educational outcomes through better data-informed teaching practices.

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BENDROJO UGDYMO MOKYKLŲ MOKYTOJŲ DUOMENŲ RAŠTINGUMAS: KOMPETENCIJOMIS PAGRĮSTAS POŽIŪRIS

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Santrauka

Skaitmeniniame amžiuje technologijoms keičiant mąstymą (Siemens, 2005), daugelį procesų galima technologizuoti. Kiekvienai švietimo sistemai siekiant užtikrinti kuo geresnę švietimo paslaugų kokybę, vykdam 2016 m. UNESCO priimtą programą, akcentuojamas informacinių technologijų integravimas į mokyimo praktiką. Švietimui tampant vis labiau skaitmenizuotu, pradedami generuoti dideli kiekiai duomenų, leidžiantys patobulinti mokyimo procesą, vis dėlto juos reikėtų vertinti kritiškai. Siekiant transformuoti duomenis į žinias apie veiksmus ir gebėjimą veikti laikantis kontrolės bei atsakomybės principų, išryškėja duomenų raštingumo, kaip kompetencijos, būtinybė, leidžianti asmenims spręsti realias problemas naudojant, analizuojant ir interpretuojant duomenis, kuriais matuojami esminiai reiškiniai, leidžiantys suvokti kompleksinius reiškinis (Schüller, 2020).

Straipsnio tikslas – išanalizuoti teorinius pagrindus ir koncepcijas, kurios susijusios su mokytojų duomenų raštingumu bendrojo ugdymo mokyklose. Objektas – duomenų raštingumo vaidmuo skaitmeniniame amžiuje, akcentuojant jo svarbą mokyimo praktikai, profesiniam tobulėjimui ir bendrai švietimo kokybei. Uždaviniai: apibrėžti duomenų raštingumo sampratą; išanalizuoti kompetencijomis pagrįstą požiūrį į duomenų raštingumą; atskleisti mokytojų duomenų raštingumo kompetencijos svarbą. Taikyti metodai: mokslinės literatūros, dokumentų analizės.

Duomenų raštingumas, kaip kompetencija, apima kritišką duomenų valdymą, supratimą ir vertinimą, tai leidžia pedagogams analizuojant sudėtingus duomenų rinkinius gauti naudingų įžvalgų. Prie duomenų raštingumo prisideda įvairūs gebėjimai, šios kompetencijos esmė – duomenų pavertimas prasmingais sprendimais. Kadangi duomenų raštingumas nestandartizuotas, tai reikėtų vertinti sistemingai. Pedagogai turėtų gebėti valdyti dideles duomenų apimtis ir naudotis duomenimis kaip pedagoginės praktikos tobulinimo priemone juos interpretuodami, veikdami ugdymo kokybę nustatydami tikslus, analizuodami ir priimdami sprendimus. Kompetencija pagrįstas požiūris į duomenų raštingumą pabrėžia daugialypį jo pobūdį ir žmogiškąjį veiksnį priimant sprendimus, informacijos sintezę į veiksmingas intervencijas, tačiau pedagogams trūksta duomenų analizės įgūdžių, kas trukdo praktiškai veiksmingai juos panaudoti, etinių duomenų naudojimo principų išmanymo, mažinančio duomenų naudojimo šališkumą. Sėkmingas duomenų pagrindu sukurtų priemonių ir

sprendimų taikymas priklauso nuo mokytojų praktikos, kurią veikia įsitikinimai, prieinamumas ir institucinė parama.

Nors mokymosi analitikos priemonių kūrėjams svarbu suprasti mokytojų, mokinių ir mokymosi procesus, didesnis dėmesys turėtų būti skirtas mokytojų duomenų raštingumo įgūdžiams. Mokytojai turi mokėti interpretuoti tų priemonių sugeneruotus duomenis ir derinti juos su savo pedagoginėmis žiniomis, kad edukacinė praktika būtų naudinga. Duomenų raštingumo įgūdžiai apima tokius mokytojų gebėjimus, kaip antai supratimą, kokių duomenų reikia sprendžiant konkrečią problemą, juos surinkti, suprasti (mokinių) duomenų pateikimą ir grįžtamąjį ryšį, kuriuos teikia mokymosi analitikos priemonės, šių duomenų pagrindu ir grindžiant jais savo sprendimus teikti mokiniams veiksmingesnę pagalbą. Tyrimai atskleidė, kad mokytojams dažnai trūksta duomenų analizės ir jos rezultatų praktinio pritaikymo įgūdžių, gebėjimo išsikelti konkrečius tikslus, tam būtinų duomenų rinkimo ir intervencijų numatymo. Mokslininkų teigimu, mokytojai turi būti pasiekę tam tikrą duomenų raštingumo lygį, kuris reiškia gebėjimą informaciją pritaikyti praktiškai, renkant, analizuojant ir aiškinant visų tipų duomenis bei šios analizės pagrindu atliekant tam tikrus pedagoginius veiksmus. Tai susieja duomenų analitikos esmę su edukacijos teorija ir praktika, ugdymo turiniu ir supratimu, kaip mokiniai mokosi.

Nors kūrėjams, kuriantiems mokymosi analitikos priemones, svarbu suprasti mokytojų, mokinių ir mokymosi procesų pobūdį, didesnis dėmesys turėtų būti skiriamas mokytojų gebėjimams dirbti su duomenimis.

PAGRINDINIAI ŽODŽIAI: *duomenų raštingumas, kompetencija, bendrojo ugdymo mokytojai.*

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