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Editor's Foreword

In his book *Bioenergetics*, Albert Szent-Györgyi, quoting Schopenhauer as an epigraph to a chapter, stated that "Research is to see what everybody has seen and think what nobody has thought." This quotation provides an apt introduction to our journal *Educa*, as it encapsulates the essence of rigorous scholarly inquiry. The journal emphasizes the continuous investigation of observable phenomena, where only researchers with keen insight and a strong foundation of prior knowledge can interpret them in novel ways. Such inquiry involves a sustained process of questioning "Where? Why? How can these results be interpreted?" ultimately leading to the generation of new findings, ideas, theories, and practices that either address existing problems or provide a foundation for further research.

In this context, the 18th issue of *Educa: Journal of Education, Science, and Culture* presents to its readers eleven original research papers that contribute new knowledge, address existing challenges, stimulate further inquiry, and, ideally, provide a foundation for future studies and innovations. The authors represent diverse disciplines, including biology, psychology, pedagogy, geography, medicine, economics, sociology, and sports, offering distinctive insights into their respective fields of investigation. Equally significant, though adopting a different approach, are eight review papers that synthesize and critically evaluate various topics, providing valuable resources to guide subsequent research endeavors.

All papers published in this issue of the journal have undergone a double-blind peer review process by independent experts in their respective fields, ensuring fairness for authors and focusing solely on the quality and scientific contribution of the research. I would like to express my sincere gratitude to all reviewers, both domestic and international, for their expertise, constructive suggestions, meticulous corrections, and their valuable time.

I would also like to extend my appreciation to my colleagues - the editorial secretary, publishing coordinator, language and technical editor - for their sustained efforts, dedication, and commitment in preparing the journal for publication and ensuring its accessibility in scientific databases. Special thanks are due to the members of the domestic and international editorial board, whose support and guidance have been indispensable to the production of this issue.

In the coming years, our journal will continue to publish papers from both multidisciplinary and interdisciplinary fields, providing a platform for established researchers to disseminate the results of their valuable work, as well as for emerging scholars who are beginning to establish their presence in the scientific community. Our ongoing objective is to further enhance the quality of published papers and to integrate the journal into leading academic databases.

Finally, I wish to express my profound gratitude to all authors who have chosen *Educa: Journal of Education, Science and Culture* as a venue for their research and have contributed to shaping their academic and professional journeys. I sincerely hope that, in the future, you will continue to place your trust in our journal and share your knowledge

with us and our readership, as it is through your contributions that our journal exists and thrives.

Mostar, December 2025

Editor-in-Chief
Dr. sci. Sanja Merzić, associate professor

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Original scientific papers

Population structure of the Balkan golden loach (*Sabanejewia balcanica*) from the Sava River Basin and ecological characteristics of the habitat

Alen Bajrić, Edina Hajdarević, Isat Skenderović

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: For the purposes of this study, 98 specimens of the investigated species were collected from 8 locations (rivers) in the northern part of Bosnia and Herzegovina. The total body length values were measured and distributed into 11 length classes with a variation range of 0.5 cm. The percentage distribution of weight classes was analyzed based on body mass measurements. All specimens were categorized into five weight classes, each with a range of 0.5 g. The composition of ichthyofauna at the studied sites was represented by five families: Cyprinidae, Nemacheilidae, Cobitidae, Percidae, and Cottidae. At the studied locations, a relatively uniform composition of zoobenthic communities was observed. Along the valleys of the rivers and streams from which *Sabanejewia balcanica* specimens were collected, floodplain forest communities of alder, willow, and poplar from the *Alnetea glutinosae* class were present.

Determining the population structure characteristics of this species and the basic ecological features of the habitats in which it resides in the territory of Bosnia and Herzegovina will serve as the foundation for understanding the vulnerability of its populations, as well as a starting point for further research.

Keywords: *Balkan golden loach, Sava, Sabanejewia, habitat*

INTRODUCTION

Sabanejewia balcanica inhabits the upper or middle reaches of smaller rivers and streams, living solitarily, being active at night, and burying itself in the sandy or gravelly substrate during the day. It feeds on the bottom, primarily consuming algae, small invertebrates, and decaying detritus. Under exceptional conditions, it can be found in muddy and silty bottoms, though it prefers shallow, clean, and clear waters, with temperatures reaching up to 20°C (Mrakovčić et al., 2006).

As its name suggests, the Balkan golden loach is endemic to the Balkan Peninsula, and according to Mrakovčić et al. (2006), this species is found in Eastern and Southeastern Europe, from Bosnia and Herzegovina, Croatia, and Romania to Poland, Ukraine, and Russia. Kottelat & Freyhof (2007) report that this species has a distribution in the tributaries of the Danube and Aegean basins. Based on available data, the species is found in the waters of Bosnia and Herzegovina in the Black Sea basin rivers, specifically in the middle reaches of the Bosna River, Vrbas, and some other streams (Sofradžija, 2009). In neighboring Croatia, it inhabits the Kupa River, the middle course of the Sava River, the Una River, and the lower course of the Drava River (Mrakovčić et al., 2006). According to a distribution map of this species by Simonović (2006), it can be found in Serbia from the central to its southernmost parts. In Slovenia, this species inhabits the

Pesnica River and watercourses around Celje and Ljubljana, the middle course of the Sava River, Krka, and Kupa rivers (Šumer & Povž, 2000; Povž et al., 2015). The Balkan golden loach was first found in the waters of Montenegro (Marić & Milošević, 2010), specifically confirmed in the Lim River. In North Macedonia, it is present in the Vardar River (Grupčić & Dimovski, 1976), and in Greece, it has been recorded in locations such as Lake Dojran and the Evros River (Economidis & Nalbant, 1996). The species has been documented in Slovakia (Koščo et al., 2008) with a relatively wide distribution in rivers such as Uh, Laborec, Ondava, Topla, Latorica, Bodrog, and Tisza. Additionally, its presence has been reported in the waters of the Czech Republic (Bartoňová et al., 2008).

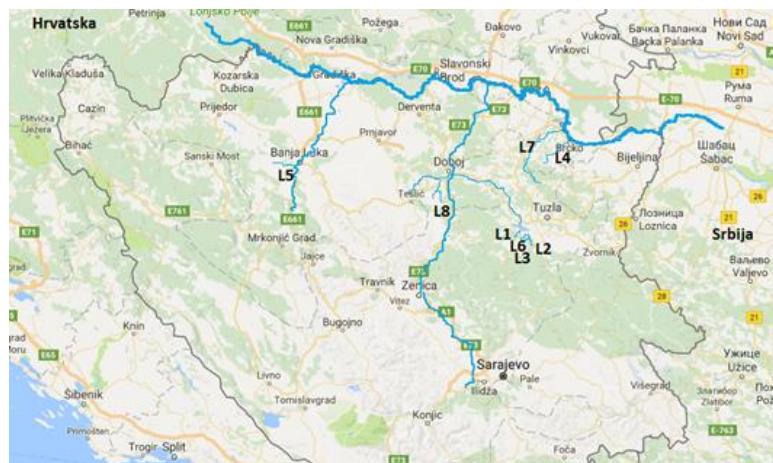
According to the project for creating the Red List of Endangered Plants, Animals, and Fungi in the Federation of Bosnia and Herzegovina, in the section related to the Red List of Fauna, it has been concluded that *Sabanejewia balcanica* is a vulnerable species (VU), although there is insufficient data on its population characteristics to determine the exact degree of its endangerment.

Determining the population structure characteristics of this species and the basic ecological features of the habitats in which it resides in the territory of Bosnia and Herzegovina will serve as the foundation for understanding the vulnerability of its populations, as well as a starting point for further research.

MATERIAL AND METHODS

For the purposes of this study, 98 specimens of the investigated species were collected from 8 locations (rivers) in the northern part of Bosnia and Herzegovina. Additionally, the basic ecological aspects of the studied locations were analyzed. The collection of specimens from the studied area was conducted with the approval and permit of the relevant ministry, and the fish sampling was carried out using electrofishing methods. Laboratory processing and determination of the specimens and collected material from the studied locations were conducted in the Zoology Laboratory of the Department of Biology at the Faculty of Natural Sciences and Mathematics in Tuzla, with the assistance of appropriate identification keys (Kottelat, Freyhof, 2007; Kerovec, 1986).

Figure 1. Studied locations (modified Google Maps map)



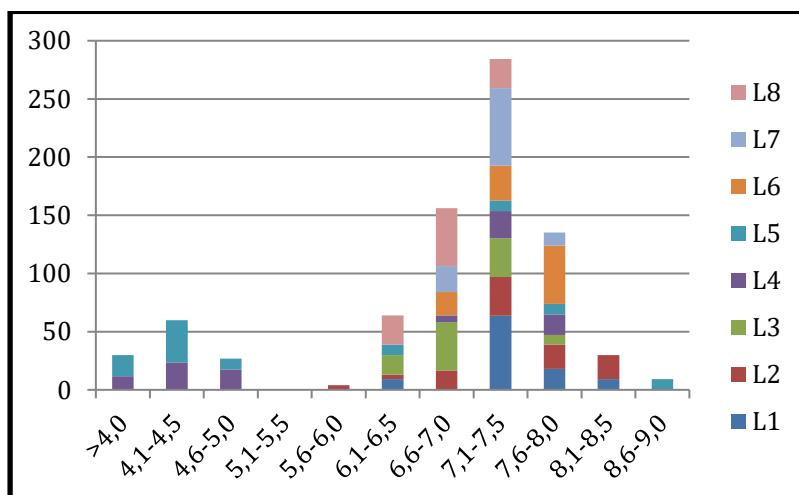
The research was conducted at eight locations (Figure 1). These are the river locations: Turija (L1), Gostelja (L2), Oskova (L3), Brka (L4), Suturlja (L5), Suha (L6), Tinja (L7), and Trebačka (L8). The rivers Tinja and Brka are direct tributaries of the Sava River, while the rivers Turija, Gostelja, Oskova, Suha, and Trebačka belong to the Sava River basin through the catchment area of the Bosna River, and the Suturlja River is part of the Sava River basin through the catchment area of the Vrbas River.

RESULTS

Length structure

The measured values of total body length were distributed into 11 length classes with a variation range of 0.5 cm. The smallest value of this parameter was placed in the class >4 cm, up to the largest length class of 8.6 to 9.0 cm (Graph 1). Specimens from the Turija location were categorized into classes ranging from 6.1-6.5 cm to 8.1-8.5 cm, with the highest number of specimens (63.63%) belonging to the 7.1-7.5 cm class. Specimens from the Gostelja location were categorized into classes from 5.5-6.0 cm to 8.1-8.5 cm, where the largest number of specimens also belonged to the 7.1-7.5 cm class (33.33%). Regarding the Oskova location, the majority of specimens belonged to the 6.6-7.0 cm length class (41.66%), and their lengths varied from 6.1-6.5 cm to 7.6-8.0 cm. Specimens from the Brka location showed a length range across six age classes, from >4 cm to 7.6-8.0 cm, with the highest number of specimens belonging to the 4.1-4.5 cm class (23.52%) and the 7.1-7.5 cm class (23.52%). Specimens collected from the Suturlja location were categorized into seven classes ranging from >4 cm to 8.6-9.0 cm, with the largest number found in the 4.1-4.5 cm class (36.36%). The Suha River location was characterized by specimens categorized into classes from 6.6-7.0 cm to 7.6-8.0 cm, with the largest number of specimens (50%) belonging to the 7.6-8.0 cm class. As for the Tinja location, specimens were categorized into classes from 6.6-7.0 cm to 7.6-8.0 cm, with the highest number (66.66%) belonging to the 7.1-7.5 cm class. Specimens from the Trebačka location belonged to classes from 6.1-6.5 cm to 7.1-7.5 cm, with the highest number of specimens (50%) belonging to the 6.6-7.0 cm class.

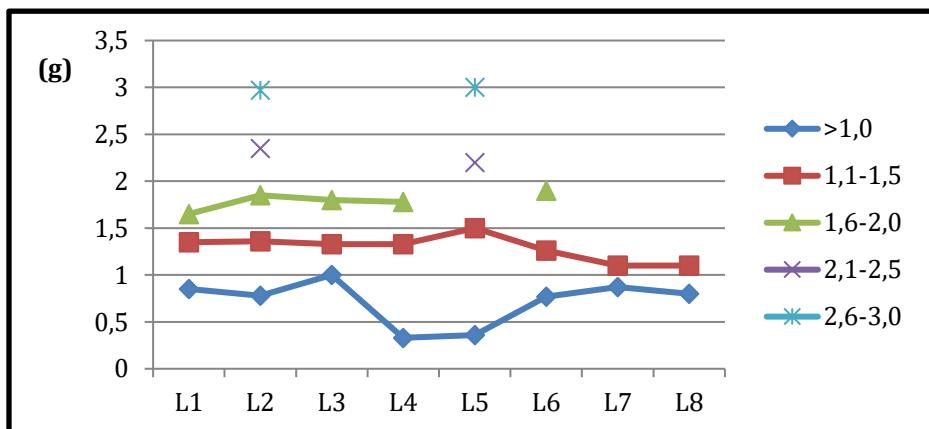
Graph 1. Length structure of the populations



Weight structure

The percentage distribution of weight classes was analyzed based on body mass measurements. All specimens were categorized into five weight classes, each with a range of 0.5 g, from the class >1 g to 2.6 - 3.0 g (Graph 2). The body weight of the analyzed *Sabanejewia balcanica* specimens from the Turija location ranged from 0.7 to 1.7 g, from the Gostelja location from 0.8 to 3.0 g, from the Oskova location from 1.0 to 1.7 g, from the Brka location from 0.2 to 1.9 g, from the Suturlija location from 0.1 to 3.0 g, from the Suha location from 0.6 to 1.9 g, from the Tinja location from 0.8 to 1.0 g, and from the Trebačka location from 0.6 to 1.1 g.

Graph 2. Weight structure of the populations



Ichthyofauna composition

During the collection of *Sabanejewia balcanica* specimens at the studied locations, the qualitative composition of ichthyofauna was determined (Table 1). The composition of ichthyofauna at the studied locations was represented by five families: Cyprinidae, Nemacheilidae, Cobitidae, Percidae, and Cottidae. The Cyprinidae family was represented by five species: *Alburnoides bipunctatus*, *Squalius cephalus*, *Barbus balcanicus*, *Gobio gobio*, and *Phoxinus phoxinus*, while the families Nemacheilidae, Cobitidae, Percidae, and Cottidae were represented by one species each (*Barbatula barbatula*, *Cobitis elongatoides*, *Perca fluviatilis*, and *Cottus gobio*, respectively). Species from all five families were present at the Suturlija location.

Table 1. Qualitative composition of ichthyofauna at the studied locations

Family:	Species:	L1	L2	L3	L4	L5	L6	L7	L8
Cyprinidae	<i>Alburnoides bipunctatus</i>	+	+	+	+	+	+	+	+
	<i>Squalius cephalus</i>	+	+	+	+	+	+	+	+
	<i>Barbus balcanicus</i>	+	+	+	+	+	+	+	+
	<i>Gobio gobio</i>	-	+	+	+	+	+	+	+
	<i>Phoxinus phoxinus</i>	-	+	+	+	+	+	+	-
Nemacheilidae	<i>Barbatula barbatula</i>	-	-	-	+	+	-	+	+
Cobitidae	<i>Cobitis elongatoides</i>	+	+	-	-	+	+	+	-
Percidae	<i>Perca fluviatilis</i>	-	+	-	-	+	-	-	-
Cottidae	<i>Cottus gobio</i>	-	+	-	-	+	-	-	-

Zoobenthic community structure

In addition to analyzing the ichthyofauna, we also analyzed the qualitative composition of the zoobenthic communities at the locations where *Sabanejewia balcanica* was found. The collected zoobenthos was analyzed and determined up to the level of classes or orders (Table 2). At these locations, we observed a fairly uniform composition of zoobenthic communities. Due to the scope and objectives of this study, a determination of taxa at lower systematic categories was not carried out; however, a general representation of their relationships will certainly serve as a foundation for further research. The zoobenthic communities were represented by Gastropoda, Bivalvia, Nematoda, Oligochaeta, various groups of crustaceans, and insects. The distribution of these organisms at the studied locations was presented in tabular form. The highest number of zoobenthic communities was observed at the Turija River location, while the lowest was at the Suha River location. Among the Crustacea, we identified species from the orders Decapoda, Amphipoda, and Cladocera. The presence of insect larvae was confirmed from the orders Diptera, Odonata, Plecoptera, Trichoptera, Ephemeroptera, and Coleoptera.

Table 2. Composition of zoobenthic communities at the studied locations

Taxa		L1	L2	L3	L4	L5	L6	L7	L8
Nematoda		+	+	-	+	+	+	+	-
Mollusca	Gastropoda	+	+	+	+	+	+	+	+
	Bivalvia	+	-	+	-	+	-	-	+
Annelida	Oligochaeta	-	+	+	-	+	-	+	-
Crustacea	Amphipoda	+	+	-	-	-	-	-	+
	Cladocera	+	-	-	-	-	-	-	-
	Decapoda	+	-	-	-	+	+	-	+
Insecta	Diptera	+	+	+	+	+	+	+	-
	Odonata	+	+	+	+	-	+	+	+
	Trichoptera	+	+	+	+	+	+	+	+
	Ephemeroptera	+	+	+	+	+	-	+	-
	Plecoptera	-	+	+	+	+	-	-	+
	Coleoptera	+	+	+	-	+	-	+	-

Plant community structure

Along the river valleys and streams from which specimens of *Sabanejewia balcanica* were collected, riparian forest communities of alder, willow, and poplar from the class *Alnetea glutinosae* are present. In the tree stratum, the dominant communities are those of *Alnus glutinosa*, *Salix alba*, and *Populus alba*. In some locations, *Fraxinus excelsior* was encountered in association with alder, and at the Trebačka River location, *Carpinus betulus* was found. In the shrub layer, among other vegetation, *Sambucus nigra* and *Sambucus racemosa* are dominant. Among herbaceous plants, the dominant species at the studied locations include *Polygonum* sp., *Equisetum* sp., *Helianthus* sp., and *Xanthium* sp. These communities develop on alluvial soils in areas that are periodically flooded. These communities are predominantly composed of phanerophytes, followed by chamaephytes, hemicryptophytes, and also hydrophytes. Additionally, there is vegetation from hygrophilous meadows, with species such as *Plantago* sp., *Trifolium repens*, *Tussilago farfara*, *Juncus* sp., *Arctium lappa*, and others.

DISCUSSION

The Balkan golden loach (*Sabanejewia balcanica*) primarily inhabits mountain streams with clean water, moderate flow speed, and sandy or fine gravelly bottoms (Freyhof, Kottelat, 2008). The riverbed at the locations where the analyzed specimens of *Sabanejewia balcanica* were collected is characterized by sand and gravel, with some rocky components. Although the water quality at these sites was not assessed using chemical or other tests, it can be noted that these locations are near populated areas, where considerable anthropogenic waste and decaying organic matter can be expected.

Recent studies of this species in our country have been intensified. Bajrić et al. (2018) confirmed that there are no inter-populational differences regarding meristic parameters and body pigmentation, which were once key parameters for describing subspecies. These findings were later confirmed through molecular-genetic research on this species (Bajrić et al., 2020).

Based on our research and the review of available literature, we can say that *Sabanejewia balcanica* most commonly coexists with other species from the Cobitidae family, but the composition of other ichthyofauna depends on the size of the watercourse. Generally, this species is found in the central parts of streams, though it has also been documented in the upper sections of streams, as confirmed in several studies (Deljić, 2006; Povž & Šumer, 2015; Marić & Milošević, 2010).

A study on the macrozoobenthos of the Petrinjčica River in Croatia, where the presence of *Sabanejewia balcanica* was confirmed, showed the presence of: Nematoda, Gastropoda, Bivalvia, Oligochaeta, Hydrinea, Aranea, Hydrachinellae, Crustacea, Plecoptera, Ephemeroptera, Odonata, Diptera, Trichoptera, Coleoptera, and Heteroptera (Mičetić et al., 2008). These authors analyzed the diet of *Sabanejewia balcanica* and found that its digestive tract contained only macroinvertebrates, with no plant material observed. Plant matter was found in the digestive tract of some Cobitidae species (Skóra, 1966; Valladolid & Przybyski, 2003).

Specimens of *Sabanejewia balcanica* from the Lim River in Montenegro had body lengths ranging from 8.07 to 9.16 cm, with an average of 8.54 cm (Marić & Milošević, 2010). Length classes of specimens from the Voćina River ranged from 4.07 to 7.7 cm (average 6.05 cm), from the Drava River from 5.6 to 9.7 cm (average 8.44 cm), from the Petrinjčica River from 6.09 to 7.6 cm (average 7.01 cm), and from the Rijeka River from 4.2 to 8.7 cm (average 6.68 cm) (Buj et al., 2008). Zanella et al. (2008) documented lengths of *Sabanejewia balcanica* from Rijeka, ranging from 5.5 to 8.7 cm. The most frequent length class of *Sabanejewia balcanica* from the Tisza River in Hungary was 3.0 to 3.4 cm (Harka et al., 2002), while Bohlen et al. (2008) found body lengths ranging from 4.0 to 5.4 cm in thermal springs in western Romania.

A review of available literature reveals a limited amount of data on the body weight of this species. The Fisheries Institute of Slovenia (BiosWeb) provides data indicating that this species weighs between 0.6 and 3.0 g. Keys for the identification of fish, both older and newer generations, do not provide data on this characteristic (Simonović, 2006; Kottelat, Freyhof, 2007; Sofradžija, 2009). Jamali et al. (2015) observed a weight range of 2.02 to 7.7 g for *Sabanejewia aurata*. The weight range for specimens analyzed by Harka et al. (2002), collected from the Tisza River in Hungary, was from 0.12 to 4.4 g.

CONCLUSION

As already noted, there is insufficient data on *Sabanejewia balcanica* in our country to determine its status on the Red List of Threatened Plants, Animals, and Fungi in the Federation of Bosnia and Herzegovina. Therefore, we believe this study will partially fill

the gaps in the missing data, given that this species is protected by the Bern Convention and the European Habitat Directive.

Considering its way of life, we believe that the species' habitats in Bosnia and Herzegovina are being degraded due to anthropogenic changes in the watercourses, particularly through the extraction of sand and gravel. For this reason, a more comprehensive assessment of these impacts is necessary to protect its habitats in a timely manner.

Population structure can indicate ecological factors in an ecosystem, as well as the rate of population renewal, growth, and mortality.

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Effect of operational management functions on the quality in nursing clinical practice

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: Improving the quality of healthcare requires the implementation of specific methods adapted to the capacities of healthcare institutions. High-quality nursing care enhances treatment outcomes and reduces costs. Nurses play a key role in this process, as they coordinate care and spend the most time with patients. Therefore, it is essential to develop workforce management strategies that will improve service quality and patient safety. This research aims to examine the level of satisfaction among nurses/technicians regarding their work environment, interpersonal relationships, job motivation, opportunities for advancement, and recognition by superiors. This is a quantitative, descriptive, and analytical study. The respondents were nurses/technicians at the Clinical Center of the University of Sarajevo. An anonymous questionnaire was distributed via an online platform. The research was conducted from May 4, 2022, to June 4, 2022, with a total of 119 participants. The obtained results indicate that there are no significant differences in nurses' attitudes toward job satisfaction. However, there is a significant difference in satisfaction with interpersonal relationships among nurses. Most respondents considered opportunities for career advancement very important. The majority (64%) reported that they are most motivated by praise from their superiors, while a smaller portion (17.4%) preferred time off, 8.1% preferred financial incentives, and 10.5% advancement. The results of the study lead to the conclusion that the quality of healthcare services depends on managers and their relationship with employees. Human resources are essential for improving healthcare services, and their management should be focused on increasing employee satisfaction and service quality.

Keywords: *quality, safety, nurse, motivation, advancement*

INTRODUCTION

Management in modern healthcare represents much more than the mere organization of resources and oversight of work processes – it encompasses the art of leading people, the ability to make well-considered decisions, and the continuous monitoring and improvement of work quality. The essence of management lies in achieving optimal outcomes through efficient organization of teamwork, rational use of resources, and strategic human resource management. Every healthcare institution has clearly defined goals, and their realization depends on the proper distribution of tasks, functional use of space, equipment, and finances, as well as on staff motivation.

At the heart of all these processes is the manager – a person responsible for aligning the institution's work with legal frameworks, ensuring optimal working conditions, engaging qualified personnel, organizing workflows, and monitoring and evaluating

achieved results. A healthcare manager, especially as a team leader, is expected to plan, organize, communicate, coordinate, motivate, and make decisions, with their role directly influencing the atmosphere and efficiency of the entire team (Bogićević Milikić, 2010).

The healthcare system is extremely complex and sensitive, as it is based on direct and often emotionally intense interactions between service users and providers. Within this interaction, the nurse holds a particularly important position – not only due to their numerical prevalence compared to other professions, but also because of their daily, close contact with patients. On average, there are two to three nurses per one physician, whose work forms a fundamental link between administration, the healthcare team, and patients. Their role includes not only providing care but also managing time, equipment, documentation, and interpersonal relationships. The quality of their work directly affects patient satisfaction, as well as the working atmosphere within the team. In times of increasing demands and expectations from the healthcare profession, nurses face daily challenges that go beyond the traditional caregiving role and require a high level of professionalism, adaptability, and emotional intelligence (Bagat, 2017).

The aim of this research is to examine the level of professional satisfaction among nurses and technicians, with a focus on the following aspects:

- working conditions and workplace organization,
- quality of interpersonal relationships within the team and in communication with supervisors,
- level of motivation for performing daily tasks,
- access to and encouragement for professional development and lifelong learning,
- recognition and appreciation of work by the management.

During the research, several dilemmas also arise that open space for deeper reflection on topics requiring the attention of healthcare management:

- Which factors have the greatest influence on overall professional satisfaction?
- Is there a correlation between the quality of interpersonal relationships and the level of motivation?
- How do work experience, education level, or job position influence the perception of satisfaction?
- Does feeling appreciated and recognized by superiors contribute to greater loyalty, engagement, and professional grow?

NURSING AND MANAGEMENT

Throughout the modern history of healthcare development, beginning with the World Health Organization (WHO) Declaration on Primary Health Care, nursing has been required to respond to changes in the conceptual, methodological, technological, and social aspects of healthcare. New managerial responsibilities within nursing services demand nurses with organizational abilities, broad knowledge, and competencies in all aspects of management. To meet contemporary demands and challenges in nursing practice, nurse managers must develop new skills that will enable them to achieve a high standard of healthcare and fulfill the strategic goals of the healthcare system. Users of healthcare services expect safe, accessible, comprehensive, and high-quality services. Therefore, education in management for nurses is of crucial importance (Kalauz, 2015). It should develop their ability to:

- engage in networking and lobbying,
- deliver effective presentations and formulate arguments,

- resolve conflicts through analysis of all relevant circumstances and
- understand the strengths and trends in nursing care.

In addition, nurses must be prepared for change, capable of working in diverse environments, and equipped to create support systems for both colleagues and patients. Nursing is a rapidly evolving discipline and a key component of the healthcare system. Patient care not only protects and promotes health but also improves the quality of life by ensuring the highest possible level of physical and mental well-being. The main goal of management in nursing is to build a quality team whose work will lead to the advancement of healthcare services. The primary task of nursing management is to continuously invest in the knowledge and skills of nurses, so that, with appropriate leadership, they can achieve set goals and ensure the highest quality of healthcare (Kloptan & Ćurko, 2019).

Motivation in the work of nurses

Employee motivation today represents one of the most important aspects of modern management. As a managerial function, motivation involves the ability of management to stimulate, direct, enhance, and sustain a high level of enthusiasm among employees for organizational tasks and goals. Through proper motivation, it is possible to improve performance and quality (Bagat, 2017). Motivation is important because it encourages creativity, efficiency, and productivity, thereby strengthening the quality of the organization. An individual must have intrinsic motivation to achieve goals, while the manager must use various methods of motivating the team to align them with goal achievement.

The motivational system consists of motivating factors, incentive measures, and motivational strategies implemented within the work organization to encourage employees. Material motivational factors are complex forms of motivation aimed at improving an individual's financial status in society. They are indicators of individual or group performance. Material incentives are divided into direct and indirect types. Direct material incentives include salary and other financial benefits, such as bonuses for innovations and improvements, compensation for knowledge expansion and flexibility, etc. These factors represent rewards for completed work.

Indirect material incentives influence an employee's material status, but not in the form of money. These include benefits received upon employment in an organization, such as paid pension and health insurance, scholarships, or opportunities for further education. Material motivation is a key factor upon which organizational motivation practices are based (Jooste & Hamani, 2017). Advancement, recognition, salary, and other material compensations are visible mechanisms for evaluating work within the policy and practice of any organization.

Alongside material factors, non-material factors are also important, as they satisfy human needs within organizations. Today, for most employees, so-called higher-order needs are crucial, including: professional development, appreciation, respect, praise, and so on. Various non-material strategies are applied, such as feedback, flexible working hours, and opportunities for professional advancement and skill development. Combined with material strategies, these form a comprehensive motivational system (Škrbić & Ružić, 2021).

RESEARCH AIM

The aim of the research is to examine the level of job satisfaction among nurses/technicians in relation to their workplace, interpersonal relationships, work motivation, opportunities for professional advancement, and recognition from superiors.

RESPONDENTS AND RESEARCH METHODOLOGY

The research is quantitative, descriptive, and analytical. The respondents are nurses/technicians employed at the Clinical Center of the University of Sarajevo. The research instrument was an anonymous questionnaire formulated for the purposes of this study based on the reviewed literature. The questionnaire was created using an online tool (Google Forms/surveys) and published on an online platform. As the survey was completely anonymous, the confidentiality and privacy of personal data were fully ensured. A total of 119 nurses/technicians participated in the study during the period from May 4, 2022, to June 4, 2022.

RESEARCH RESULTS

Table 1. Respondents by gender

Gender of respondents	Total number of respondents	Percentage
Male	5	3,4%
Female	114	96,6%

The majority of respondents in the study were female (96.6%), with the remaining 3.4% being male.

Table 2. Respondents by education level

Education level	Number of respondents	Percentage
Secondary school	68	57,1%
College degree	26	21,8%
University degree	23	19,3%
PhD and higher	2	1,7%

This table shows that 68 respondents (57.1%) had a secondary school education, 26 (21.8%) had a college degree, 23 (19.3%) had a university degree, and only 2 respondents (1.7%) held a PhD or higher.

Table 3. Position of nurses/technicians by function

Job position	Number of respondents	Percentage
Nurse/Technician	90	75,6%
Departmental Head Nurse	20	16,8%
Clinic Head Nurse	9	8,4%

Here, we see that 90 respondents (75.6%) work as nurses/technicians, 20 respondents (16.8%) as departmental head nurses, and 9 respondents (8.4%) as clinic head nurses.

Table 4. Satisfaction with current job position

Are you satisfied with your current job?	Number of respondents	Percentage
Yes	89	74,8%
No	30	25,2%

According to this table, 89 respondents (74.8%) are satisfied with their current job, while 30 (25.2%) are not.

Table 5. Satisfaction with interpersonal relationships in the organization

Satisfaction with interpersonal relationships	Number of respondents	Percentage
Satisfied	15	12,6%
Partially satisfied	43	36,1%
Neutral	38	31,9%
Dissatisfied	15	12,6%
Partially dissatisfied	8	6,7%

This table shows that 15 respondents (12.6%) are fully satisfied, 43 (36.1%) are partially satisfied, 38 (31.9%) are neutral, 15 (12.6%) are dissatisfied, and 8 (6.7%) are partially dissatisfied.

Table 6. Presence of a reward system in the organization

Is there a reward system in your organization?	Number of respondents	Percentage
Yes	15	12,6%
No	92	77,3%
Don't know	12	10,1%

As seen in the table, 15 respondents (12.6%) answered yes, while 92 respondents (77.3%) stated that there is no reward system in their organization. Twelve respondents (10.1%) were unaware of the existence of such a system.

Table 7. Ways of motivation by superiors

How are you motivated by your superiors?	Number of respondents	Percentage
Financial incentives	7	8,1%
Job advancement	9	10,5%
Praise	55	64,0%
Days off	15	17,4%

The table shows that 55 respondents (64.0%) feel most motivated by praise, 15 respondents (17.4%) by days off, 7 respondents (8.1%) by financial incentives, and 9 (10.5%) by job advancement.

DISCUSSION

An analysis of this study's results reveals numerous indicators reflecting the complexity of healthcare workers' job satisfaction within their daily professional context. The sample of 119 respondents was predominantly female (96.6%), which aligns with the known gender distribution within the healthcare profession. Most participants were between 31 and 40 years old, representing an active and employable population, but also one that is frequently at risk of professional stagnation in the absence of systemic support for development. The majority held a secondary education degree (57.1%) and worked as nurses or technicians (75.6%). Although most respondents stated they were satisfied with their current workplace (74.8%), this figure requires cautious interpretation. Satisfaction stemming from adaptation to unfavorable working conditions may mask the true state – often marked by overload, lack of professional recognition, and limited opportunities for advancement.

Our findings correspond to some extent with the study by Marija Spevan, which noted that individuals with lower levels of education are more likely to express job dissatisfaction (Spevan, 2017). However, in this research, although the majority of respondents held secondary education, there was still a notable level of declared satisfaction, which may suggest lowered professional aspirations as a result of working in demanding systemic conditions. This should not be interpreted as a sign of a satisfactory work environment, but rather as an indicator of resignation or adaptation.

Particularly concerning are the findings related to interpersonal relationships. Only 12.6% of respondents reported being fully satisfied with relationships with colleagues and superiors, while nearly 20% expressed clear dissatisfaction. Similar results were found in research conducted by Petrović and colleagues in Serbia, where more than 60% of respondents identified poor communication with superiors as a major source of stress (Petrović et al., 2020). Likewise, Vuković and associates in Croatia highlighted a connection between dissatisfaction with interpersonal relationships and the rising number of staff leaving the healthcare system (Vuković et al., 2019). These findings underscore the urgent need to improve organizational climate and culture within healthcare institutions.

Another significant finding relates to the reward system – 77.3% of respondents stated that it does not exist at all, while 10.1% were unaware of its existence. This lack of transparency and the absence of formalized recognition mechanisms negatively impact motivation and the sense of professional worth. Although the majority of participants cited verbal praise as the main form of encouragement (64%), only 8.1% mentioned financial incentives as a source of motivation. Research from Slovenia (Kobal Grum, 2021) further confirms the importance of combined emotional and material support in enhancing professional satisfaction. In practice, however, neither form of support is adequately present, and employees' needs are often neglected.

Therefore, although the data suggest a certain degree of satisfaction, deeper analysis indicates that this is an adaptive response to the lack of systemic support rather than a genuine sense of professional fulfillment. Numerous external sources confirm that the healthcare sector in the region is burdened by chronic issues – ranging from staff shortages and low salaries to excessive overtime and poor organizational structure. It is thus imperative for healthcare institutions to develop integrated strategies that incorporate clear models of motivation, recognition, and support, and that foster healthy interpersonal relationships as the foundation of quality healthcare delivery.

RESEARCH LIMITATIONS

When interpreting the results of this study, several important limitations should be taken into consideration. Firstly, the sample of 119 respondents was not gender-balanced – 96.6% of participants were women, which may limit the ability to generalize the findings to the entire population of healthcare professionals. Furthermore, all respondents were employed in a limited number of healthcare institutions, which may mean that the results do not fully reflect the situation in other geographical regions or different types of healthcare facilities.

From a methodological standpoint, the study relied solely on a questionnaire as the data collection instrument. Although this method allows for quantitative analysis, there is a risk that responses may be influenced by socially desirable attitudes, thus reducing their authenticity. The lack of qualitative data further hinders a deeper understanding of the complex causes of professional satisfaction or dissatisfaction among employees.

Additionally, the majority of the sample consisted of nurses and technicians with secondary education, which limits the ability to compare perceptions and attitudes across different educational and professional groups within the healthcare system.

Nevertheless, despite these limitations, this study offers valuable insights into employees' perceptions regarding motivation, interpersonal relationships, and professional satisfaction. It provides a useful foundation for future, more extensive research that would include more diverse samples and a combination of quantitative and qualitative methods, thereby enabling a more comprehensive understanding of the challenges and needs of healthcare workers.

CONCLUSION

Management represents the fundamental driving force of every organization, including healthcare institutions, where its role becomes even more significant due to the complexity of operations and the importance of the human factor. Effective organization of work in nursing does not only involve the technical distribution of tasks, but also careful planning, management, motivation, and supervision aimed at achieving high-quality healthcare for all service users – patients as well as healthy members of the community.

Managing healthcare services requires a high level of expertise and the ability to balance human, material, financial, and informational resources. Healthcare managers are not merely administrators; they are leaders who shape the work environment, influence interpersonal relationships, and create conditions for the professional development of staff.

A particular challenge within the domestic healthcare system remains the lack of formalized reward and recognition systems, which directly impacts employee motivation. When the efforts and commitment of medical staff are acknowledged and adequately rewarded – whether through words of praise, opportunities for further education, or tangible material incentives – overall job satisfaction increases, which in turn enhances the quality of care provided.

A healthcare system that strives for long-term sustainability must place the human being at the center of its policies – both the service user and the healthcare worker. Investment in education, emotional support, and a positive working climate should not be viewed as a luxury but as a strategic necessity. Only through a systematic and humane approach to management can we build a sustainable, functional, and high-quality healthcare system that is responsive to the modern challenges and needs of the community.

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Irrational beliefs as determinants of depression in young people

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: People who passionately believe in irrational notions may do so for a variety of reasons. It is claimed that irrational thinking leads to unpleasant emotions, dysfunctional habits, and sadness. The study sought to investigate the expression of illogical ideas, disparities by gender, and the significance of irrational beliefs in explaining depression in young people. The sample included 127 high school students. The age of the respondents varied from 16 to 19 years. The research included two questionnaires: the DASS-42 (Lovibond & Lovibond, 1995) and the GABS 55 (Bernard, 1990). The findings revealed that while young individuals did not report above-average levels of illogical ideas, a significant link between irrational beliefs and depression was identified. Significant gender differences were detected in irrational beliefs, but not in depression. While there were no significant gender differences in depression, there were substantial gender differences in illogical views, with girls reporting higher levels of irrational beliefs. Irrational beliefs account for a considerable amount of the variance in depression. All of this suggests that it is critical to educate young people about irrational ideas, the benefits of utilizing helpful or rational views, and the emotional challenges that develop as a result of irrational beliefs.

Keywords: *irrational beliefs, depression, youth*

INTRODUCTION

A basic aspect of human nature is the propensity for people to be proactive and driven toward positive change, enhancing both their living circumstances and themselves. Although young individuals also have a biological tendency, they also pick up preferences and values from their social surroundings. Both rational and irrational ideas are the result of a variety of human motivations and dispositions toward goal achievement (Vukosavljević-Gvozden, 2009). The words pertaining to rational and irrational beliefs shall be defined at the outset for the sake of clarity. According to Dryden (2002), rational beliefs are adaptable and practical, such as self-help, in line with the logic and reality of an individual's assessment of their values and goals, healthy reactions to adversity, and do not interfere with their inclinations toward preexisting goals and intentions. In order to better comprehend irrational beliefs, this paper lists rational ideas that are useful to a person's functioning rather than examining them. Self-defeating, illogical, and unrealistic ideas regarding activating events are all included in the concept of irrational beliefs, which is the focus of this work (Ellis, 1994).

According to Sulejmanović and Krnetić (2013), irrational beliefs include rigid evaluations, dogmatic, unrealistic, and illogical thoughts that are dysfunctional in relation to people's goals and values (Marić, 2000; Vukosavljević-Gvozden, 2009). They are the

result of irrational cognitive processes that encompass various areas of content (David et al., 2010). Irrational beliefs are also considered to be the main causes of emotional distress in people (Ellis, 1994, according to Miljković, 2017). In such states of emotional distress, people tend to see reality much more negatively than it actually is, while making absolutist demands that such a reality should never happen. Irrationality once had an evolutionary function to protect us, but today it often leads to emotional problems (Ellis, 1994). In contrast to irrationality, rationality represents ways of thinking, experiencing, and behaving that help people achieve their interests and goals, which is why it is often called a self-enhancing tendency (Ellis, 1994). Also, Ellis considered irrationality to be a key component of human functioning. It denotes any thought, emotion or behavior that leads to destructive consequences that interfere with people's survival and happiness. According to Vukičević, Grujić, Popović, Mihajlović and Velić (2012), the distinctive and distinctive characteristic of an irrational belief is a clearly present or implicit, implying absolutist and unconditional internal demand regarding an unfavorable activating event. The concept of irrational beliefs itself encompasses forms of self-defeating, illogical and unrealistic beliefs about activating events (Ellis, 1994). There are four types of rational beliefs: preferences, anti-terrifying beliefs, beliefs of high frustration tolerance and beliefs of acceptance of oneself/other people/life (Dryden, 2002, 2003). Demands, fearful views, low frustration tolerance beliefs, and judgmental beliefs about oneself, other people, and life are the four categories of irrational beliefs (Dryden, 2002, 2003).

According to Dryden (2002), rational beliefs are adaptable and practical, such as self-help, in line with the logic and reality of an individual's assessment of their values and goals, healthy reactions to adversity, and do not interfere with their inclinations toward preexisting goals and intentions. In order to better comprehend irrational beliefs, this paper lists rational ideas that are useful to a person's functioning rather than examining them. Self-defeating, illogical, and unrealistic ideas regarding activating events are all included in the concept of irrational beliefs, which is the focus of this work (Ellis, 1994).

In this study, the following factors of irrational beliefs were included: self-depreciation, demands for fairness, need for approval, demands for achievement, demands for comfort and devaluing others. Examples of items for individual domains or factors are: self-depreciation (I believe that I would be a worthless person if I performed poorly in the tasks that are important to me), fairness demands (People must treat me fairly and I will not accept injustice), need for approval (I cannot bear to be disliked by people who are important to me and it is unbearable if they do not like me), achievement demands (I must do well in important things and I will not accept it if I do not do well), demands for pleasantness or comfort (I can't stand being tense or nervous and I can't stand when I am), devaluing others (If people treat me with disrespect, it shows how bad they really are).

According to studies by Küçük et al. (2016), Fives et al. (2011), Flett et al. (2012), and Schniering and Rapee (2000), students had significant levels of illogical beliefs. Sulejmanović and Krnetić (2013) assert that although people are biologically inclined to think irrationally, they also possess the capacity to choose to modify irrational thought patterns and the self-destructive outcomes that result from them (Krnetić, 2006b). People who make deliberate and focused efforts to alter their dysfunctional method of assessing events might lessen irrational beliefs, which in turn causes changes in their emotions and behavior.

Irrational beliefs are often accompanied by depressive disorders, which are psychopathological illnesses that most interest academics and the general public since they rank among the most prevalent disorders by all statistical measures, frequently accompany such beliefs. It is crucial to explain the cognitive theories of depression that

form the basis of this research. Cognitive theories are predicated on the idea that a key feature of thinking in individuals with depressive disorders is improper information processing. Beck's cognitive therapy (Beck, 1976) and Ellis's rational-emotive-behavioral therapy (REBT) (Ellis, 1994) are the two main sources of theories of depression within the cognitive paradigm. Research on the connection between sad mood and depressive syndrome and dysfunctional attitudes and distorted ideas was spurred by Beck's hypothesis. Data from subsequent studies have been crucial in comprehending the cognitive characteristics of many other emotional disorders. Research on the connection between emotional disorders and dysfunctional actions and self-defeating beliefs and "hot" evaluations was sparked by Ellis' theory (Krnetić, 2015). According to REBT theory, "warm" thoughts and assessments nearly always go hand in hand with and partially "cause" feelings, whereas "hot" thoughts and assessments nearly always go hand in hand with and partially "cause" intense and protracted emotions. According to Ellis, if people had needs but did not assess themselves, other people, and life in a domineering, absolutist, and unrealistic manner, they would seldom have emotional illnesses at all (Ellis, 1979a).

Specifically, sorrow, guilt, helplessness, and loneliness are some of the symptoms of depression (Vukičević, Grujić, Popović, Mihajlović & Velić, 2012). In order to shield oneself from psychological harm brought on by a lack of social affective connections, it entails a substantial reduction or total withdrawal of one's emotional investments in the social environment and, consequently, in oneself (Hrnčić, 2008). Depression symptoms might be moderate and temporary for some people, but they can also become severe and persistent for others, making it difficult to go about their daily lives. Both dysfunctional emotions and dysfunctional behaviors are linked to irrational thinking (Ellis, 1994.). The consequences of irrational beliefs result in a wide range of negative emotions and behaviors, such as aggression, guilt, anxiety, and loss of control (Sarvestani, 2011). These emotions represent an obstacle to nonjudgmental, unconditional acceptance of oneself and others as fallible and imperfect beings. The most common dysfunctional emotions include guilt, depression, anxiety, anger, hatred, hurt, and shame. Intolerance of discomfort plays a significant role in chronic depression and problems associated with avoidant behavior (Harrington, 2007). REBT theory suggests that demands for high standards reflect either frustration intolerance or self-evaluation. For example, a person may be intolerant of suboptimal achievement, but may not consider themselves a failure because of it. Research shows that achievement beliefs can be dysfunctional independently of self-evaluation beliefs. Achievement is associated with anxiety, anger, and depression even when self-esteem is controlled for (Harrington, 2007). Therefore, as long as they "roll" success after success, people who demand achievement in critical areas and feel worthless if they fail to obtain them are unlikely to experience emotional difficulties.

Thus, the fundamental premise of cognitive models of emotional illnesses, including Ellis's REBT therapy and Beck's cognitive therapy, is that individuals themselves produce and sustain self-defeating emotions and actions through their skewed, irrational, and unrealistic thinking (Krnetić, 2015). According to REBT, people who are prone to self-deprecation assess their emotional state in a self-deprecating manner when they are depressed or dysphoric, which intensifies the depressive or dysphoric feelings. It is important to note that later research inspired by Beck's theory provided data that is important for understanding the cognitive profile of various emotional disorders, while Ellis's theory initiated research into the role of self-defeating beliefs and "hot" evaluations in emotional disorders and dysfunctional behaviors (Marić, 2003), with research into the role of distorted thoughts and dysfunctional attitudes in depressive mood being of great

importance. In addition, the specific cognitive content of depression concerns loss and/or deprivation, and characteristic negative thoughts are global conclusions about past failures and losses, expressed in internal negative sentences (Beck, 1976). Persistence, rigidity, and intrusiveness, as well as the individual's ability to rationally perceive the unrealistic, illogical, and dysfunctional nature of their thoughts, are indicators of the severity of depression, rather than the content of these thoughts themselves (Marić, 2003; Segal, Williams, & Teasdale, 2002). Some studies show that, among people who have recovered from depression, changes in the content of dysfunctional thoughts compared to the period before dysphoric mood are prospectively associated with a reduced risk of relapse one to four years after initial testing (Segal et al, 2002).

Since it has been demonstrated that irrational beliefs are significantly more prevalent in depressed and depression-prone individuals, and that irrational beliefs play a causal role in the development of depressive symptoms (Solomon et al., 1998, according to David & Avellino, 2002), the study's findings also align with the assumptions regarding evaluative cognitive factors of depressive mood.

Stanici et al. (2014) state that the majority of studies carried out over the past three decades have documented the existence of notable distinctions between men and women. Generally speaking, women are more prone to such distortions at the level of irrational beliefs. While without pointing to any notable disparities, Živčić-Bećirević (2003) stresses the verification of gender variations in the manifestation of specific types of automatic thoughts. Women are thought to be more dependent than men, which is why they are more likely to turn against themselves by experiencing feelings of guilt, self-criticism, and self-doubt. These emotions are all linked to depression (Jandrić, 2009).

The subjective experience of depression and coping mechanisms differ between men and women (Sanfilipo, 1994). Women are less likely to have unfavorable attitudes about depression, are more familiar with depression, and are more willing to identify depressive symptoms. According to research, women employ more passive coping strategies and emotion-focused coping strategies (Billings and Moos, 1981). According to Petersen, Sarigiani, and Kennedy (1991; Kurtović and Marčinko, 2011), gender differences start to show up around age 13 and become noticeable by age 17. According to Sulejmanović and Krnetić (2013), women are more likely than men to be emotionally open and trust others, which may make them more inclined to ask for and accept support without worrying about being perceived as weak and inadequate.

METHODOLOGICAL COMPONENT OF THE STUDY

It is thought that when someone has irrational beliefs, they are more likely to exhibit dysfunctional emotions and behaviors. Thus, this study's primary goal was to investigate the connection between teenage depression and irrational ideas. In an effort to prevent or lessen the likelihood of the emergence of various psychological issues whose potential causes are partially attributable to irrational beliefs, the study sought to investigate the role of irrational beliefs in explaining depression in young people and to identify gender differences.

In accordance with the aforementioned, the study seeks to achieve the following objectives:

1. Ascertain the level of expression of irrational beliefs among young people;
2. Investigate whether there is a significant connection between irrational beliefs and depression in young people;
3. Investigate whether there are significant gender differences in the irrational beliefs of young people;

4. To ascertain whether young people's depression is significantly predicted by unreasonable beliefs.

Hypotheses:

The basic hypothesis is that there is a substantial positive link between illogical ideas and sadness, that irrational beliefs and gender differ significantly, and that teenagers report an above-average expression of irrational beliefs.

Additionally, the study establishes auxiliary hypotheses:

1. The hypothesis is based on studies by Küçük et al. (2016); Fives et al. (2011); Sulejmanović and Krnetić (2013), and it assumes that young individuals exhibit above-average levels of illogical beliefs.
2. According to previous studies (Back 1977; Marcotte, 1996; Küçük, Gür, Şener, Bo-yacıoğlu and Çetindağ, 2016), there should be a strong positive correlation between illogical ideas and depression in young individuals.
3. It is believed that young people's irrational beliefs differ significantly depending on their gender (a theory developed based on research: Solomon et al., 1998; David & Avellino, 2002; Staniciu et al., 2014; Jandrić, 2009).
4. According to previous research (Ellis, 1994; Marić, 2003; Segal, Williams, & Teasdale, 2002; Krnetić, 2015; Miljković, 2017), irrational beliefs are expected to be a strong predictor of depression in young people.

A representative group of respondents

A convenient sample of 127 individuals, aged 16 to 19, participated in the study (54.33% female and 45.66% male). The respondents were 17 years and 4 months old on average ($M=17.4$, $SD=1.01$). The study comprised students from five Tuzla Canton secondary schools.

Tools

A questionnaire designed specifically for the study's purposes was utilized to gather information on the respondents' sociodemographic traits. The General Attitudes and Beliefs Scale (GABS-55) (Bernard, 2009), which includes items based on the current REBT theory, was utilized to assess the degree of irrational beliefs. Irrational cognitive processes (such as demandingness, devaluation, low frustration tolerance, and general self-esteem) as well as three other domains – accomplishment, acknowledgment, and comfort – were incorporated into the questions. On this sample, the scale's reliability was $\alpha=0.949$. Additionally, a subscale for depression of the DASS-42 questionnaire (Lovibond and Lovibond, 1995) that assesses stress, anxiety, and depression levels was used in the study. This subscale's reliability was $\alpha = 0.972$.

Methodology

A sample of teenagers in the first, second, third, and fourth grades participated in the study, which was carried out at Tuzla Canton secondary schools. Parents and schools gave their agreement at the outset, and the significance of the study was underlined in an interview with the teachers of those courses. Ethical guidelines and regulations pertaining to psychological research were adhered to during data collecting. The questionnaire took an average of 20 minutes to complete. The SPSS software was used to process the gathered data.

RESULTS

Determining the extent of depression and illogical ideas in young people was the initial goal of this study. According to Table 1, the arithmetic mean on the depression scale was $M=18.02$; $SD=10.56$, and the average degree of illogical beliefs was found to be $M=168.93$; $SD=25.80$. It can be concluded from the data that the respondents indicated a slightly higher level of illogical views. Nevertheless, it is clear by examining the Skjuni values that the findings are not clustered around higher values, and the participants in this study do not exhibit a higher degree of depression.

Table 1. Descriptive statistics for irrational beliefs and depression

	N	Min	Max	M	SEM	SD	Skewness	Kurtosis
Irrational beliefs	127	93	275	168.93	2.28	25.8022	.112	.215
Depression	127	0	42	18.02	.941	10.5667	-	.428

Determining the relationship between depression and irrational beliefs was the subject of the second study task. It is clear from Table 2's association between sadness and illogical beliefs that the two variables are statistically significantly correlated ($r=.382$; $p=.00$).

Table 2. The correlation between irrational beliefs and depression

	Irrational beliefs		Depression
Irrational beliefs	R	1	.382**
	P		.000
	N	127	127

The third task looked at how sadness and illogical beliefs differed by gender. The findings indicate that the gender difference in irrational beliefs is statistically significant ($t(2,125) = 2.995$, $p = .003$).

However, there was no discernible gender difference in depression ($t(2,125) = 1.130$, $p = .261$). Table 3 displays the results that were achieved.

Table 3. Gender differences in irrational beliefs and depression

	Spol	N	M	SD	SEM	t	p
Irrational beliefs	Male	58	176.1897	24.146	3.170	2.995	.003
	Female	69	162.8406	25.734	3.098		
Depression	Male	58	19.1930	10.800	1.430	1.130	.261
	Female	69	17.0580	10.348	1.245		

Regarding some aspects of irrational beliefs, self-defeating or self-devaluation is the most significant positive predictor of depression in young people ($\beta = .336$, $p = .004$), followed by the need for achievement ($\beta = -.242$, $p = .033$) and the need for comfort (β

=.371, $p = .013$). The coefficient of multiple correlation is $R = .505$ ($F = 6.802$, $p = .000$). All of the aforementioned suggests that a higher degree of depression in young people is associated with greater devaluation and a lower threshold for dissatisfaction in the areas of comfort and achievement. Table 4 displays the data, and the previously mentioned predictor model accounts for 25.5% of the variance.

Table 4. Multiple regression analysis with beta loading and significance levels for the depression variable

Predictors	B	t	p
Self-defeating	.366	2.940	.004
Need for achievement	-.242	-2.155	.033
Expectation of fairness	-.223	-.226	.822
Devaluation of others	.013	.115	.909
Need for recognition	-.051	-.373	.710
Need for comfort	.371	2.528	.013
$R = .505$; $R^2 = .255$		$F = 6.802$	$p = .000$

DISCUSSION

Contrary to some other research, the findings of this study indicated that the young participants' illogical beliefs were not above average. According to Küçük et al.(2016), for instance, a high percentage of students held irrational beliefs. One argument is that beliefs can be classified according to whether they pertain to particular circumstances or to a broader context; in other words, there are core and specific ideas that serve as fundamental personal philosophies that influence how we perceive the world, other people, and ourselves (Ellis, 1994). The degree to which beliefs are conscious and articulated can also vary. It is relatively easy for beliefs that manifest as verbal cognition to become conscious. They are implicit and not fully conscious when they manifest as non-verbalized, implicit life philosophies, but they can typically become conscious and be "translated" into verbal form (Ellis, 1994).

This could be explained by the flexibility of adolescent thought processes, which reduce extreme thinking by allowing young people to adopt a relativistic viewpoint and become more aware that there are multiple perspectives on the same issue, that there are multiple solutions to a problem, and that there are various facets of arguments. As a result, thinking becomes more critical, pragmatic, and mobile (Adelson, 1971). The desire for young people to have a healthy sense of self-worth could be another cause. According to Küçük et al.(2016), around 31.4% of students suffer from some form of depression. However, this study did not uncover a substantial degree of depression, and rates of depression in children and adolescents vary.

The underlying premise of cognitive models of emotional diseases is that people themselves produce and perpetuate self-defeating behaviors and emotions through their thinking, hence it was not surprising to find a link between depression and irrational beliefs (Krnetić, 2015). Additionally, Marcotte (1996) asserts that depression and irrational beliefs are positively correlated. Küçük et al. (2016) discovered a similar correlation in their study.

Furthermore, the findings of this study contradict earlier research on the gender disparities in young people's despair and irrational beliefs. According to Sulejmanović and Krnetić (2013), women report illogical ideas more frequently than males do, however our research demonstrates the contrary pattern, with men reporting irrational beliefs more prominently. This difference can be explained by changes in social influence, greater

emancipation and reduced dependence of women, as well as smaller differences in self-confidence and achievement.

Although the effect size varied, previous research also indicated significant differences between men and women in terms of irrational beliefs, and women were also more prone to such distortions. According to the findings of Stanciu, Dimitru, Mocanu, Mihoc, Grădinaru, and Panescu (2014), there were no gender differences in the degree of irrational beliefs. Men and women also experience depression differently, both in terms of how they deal with it and how they perceive it.

According to the aforementioned authors, older men are generally more knowledgeable about depression and are better at identifying depression in others as well as in themselves, whereas women are more familiar with depression, more prepared to recognize depressive symptoms, and less likely to have negative attitudes toward depression. Nevertheless, our study found no discernible gender differences in depression severity. The fact that women have more positive experiences with sharing their thoughts with others, and that this is one means of social support in trying times, is one of the explanations given in studies that indicated women exhibit a higher level of depression. On the other hand, women's decreased reliance as a result of improved interpersonal interactions and more self-confidence may account for the lack of differences in our study.

Furthermore, it has been demonstrated that low tolerance for comfort and achievement, as well as self-defeating or self-deprecating thoughts, are significant predictors of depression. This is in line with the established link between the risk of depression and self-defeating cognitive content, which can manifest as inferential thoughts and evaluative beliefs (Ellis, 1994) or automatic thoughts and cognitive schemas (Beck, 1976). It is said that if a person maintains their rational views, hardships and losses will result in "adequate" negative feelings like sadness, regret, and discontent. Beck (1976) asserted that recurrent, bothersome, and largely uncontrollable unpleasant thoughts are a major contributing factor to the onset of depression (Krnetić, 2015). Similar opinions have been expressed by other writers regarding the part automatic negative thoughts play in the emergence of different psychological diseases (Ingram, 1990; Teasdale, 1983). Additionally, Chang et al. (1996) discovered that symptoms of anxiety and depression are predicted by limited frustration tolerance, and they also discovered unique predictive values. According to the REBT perspective, people who are prone to self-deprecation assess their emotional states in a self-deprecating manner when they are experiencing dysphoria or depression, which intensifies their feelings of these conditions. According to the REBT perspective, individuals who have a high demand for comfort and ease demand that their living conditions be and stay good, that their desires be satisfied, and that they not have to put in a lot of effort to change or improve them. This also holds true for internal circumstances, where there shouldn't be excessive discomfort, unpleasantness, or challenging or upsetting emotions.

CONCLUSIONS

Several inferences can be made in light of the results that have been presented. Specifically, young people do not exhibit above-average levels of despair or illogical ideas. Depression was found to be significantly correlated with illogical beliefs. While there was no discernible difference between the sexes on the depression subscale, there were gender differences in irrational views, with girls reporting a larger degree of irrational beliefs. In the context of illogical beliefs, sadness is significantly predicted by self-defeat factors and a low threshold for annoyance in the areas of achievement and comfort. In addition, illogical beliefs account for almost 25% of the

variation in depression among youth. Considering the findings of this study, the main hypothesis has been partially validated.

All things considered, the use of these findings may be important for the creation of specific psychological programs that would aid in identifying negative feelings and illogical beliefs in adolescents. Furthermore, the results obtained highlight the importance of cognitive therapies and the formation of appropriate thought patterns that would help improve emotional regulation. Lastly, it can be claimed that the results obtained still offer a substantial foundation for future research and have important implications for addressing the aforementioned issue, despite the fact that the study was carried out on a smaller sample, which makes it impossible to generalize the findings.

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Allio carinatae-Sedetum albae Hasanbeg. 2024. comb. nova, new association in Miljacka canyon

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: A new association in the Miljacka canyon, *Allio carinatae-Sedetum albae Hasanbeg. 2024. comb. nova*, is described in this paper. The Braun-Blanquet method is phytocoenological approach used with the following parameters: life form, indicator value, phytocoenological affiliation, and floristic element. The research was conducted from 2022 to 2024. To determine the altitude, a GPS device "MagelaneXplorist" was used, and the slope of terrain was measured with the clinometer "Recta DP 6 Global". The most characteristic plant of this community is *Sedum album* L. Other significant species include: *Allium carinatum* L., *Silene vulgaris* (Mch) Gar., *Melica ciliata* L., *Chondrilla juncea* L., *Stipa calamagrostis* (L.) Wahlenb, and others. A total of 55 species have been recorded. In terms of indicator value, representatives of primary vegetation prevail. The most numerous phytocoenological order is *Amphoricarpetalia*. Hemicryptophyte are most numerous life form, the most individual floral element is smed, and the group is sub-Mediterranean. The total number of groups of floral elements is 13, and the number of individual floral elements is 44. In the association, the endemic species of *Dinaridi-Erysimum lineariifolium* Tausch was recorded, which should be further studied floristically. The aim of the work is to contribute to a better understanding of this canyon.

Keywords: canyon, Miljacka, association, rocks, Bentbaša

INTRODUCTION

For many endangered, rare and endemic species, canyons are natural refuges. Therefore, they are very interesting for various botanical studies. Apart from the Drina (Lakušić & Redžić, 1989) and Una canyon (Lakušić & Redžić, 1991) these natural refuges are largely unexplored. The Miljacka canyon can be said to be fairly well researched from a botanical perspective. On the other hand, phytocoenologically, this canyon is not sufficiently studied, and there are only a few studies available (Redžić, 1991; 1997 a, b), Hasanbegović (2018, 2020 a, b; 2022, a, b; and 2024). This canyon, in terms of geological age, belongs to the Mesozoic period and regarding tectonics, it is in the transitional zone (Cičić, 1984). The soil is lithosol and partially calcomelanosol. The aim of this paper is to contribute to a better understanding of this canyon.

MATERIAL AND METHODS OF RESEARCH

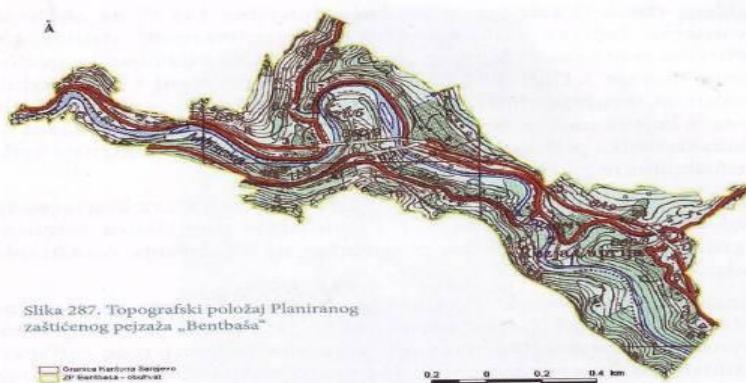
During the phytocoenological research of the Miljacka canyon, which lasted from 2022 to 2024, a large number of field studies were conducted across all vegetation aspects and a new association was identified in this area. A survey was carried out according to the Braun-Blanquet method (Braun-Blanquet, 1932). The size of each survey plot is 100m². All other parameters were also included: abundance and coverage, phytocoenological affiliation, life form, floristic element and indicator values. To determine the altitude, a GPS

device "MagelaneXplorist 500" was used, and the slope of terrain was measured with a clinometer "Recta DP 6 Global". The study area is located in the immediate vicinity of Dariva and within the "Bentbaša" protected area (Map 1).

Nomenclature

The following general literature was used in this study for the identification of plants: Aichele & Schwegler (1998), Beck-Mannagetta (1903-1923; 1927), Beck-Mannagetta et all. (1950; 1967; 1974; 1983), Čanak et all (1978), Domac (1984), Horvatić (1954), Josifović et all. (1970-77), Kojić (1981), Kvakan (1952), Šarić (1991), Šilić (1990, 2002, 2005) and Šoštarić-Pisačić & Kovačević (1968). Specialised keys consulted for following genus: for *Acinos* and *Micromeria Šilić* (1979) and for *Allium Radić* (1989). Floral elements and life forms were taken from Raunkiaer (1937), Lakušić & Redžić (1989; 1991), Oberdorfer (2001) and Redžić (1988). Phytocoenological affiliation was taken from: Horvat et all (1974), Lakušić (1989), Lakušić & Redžić (1989, 1991), Oberdorfer (1979) and Redžić (1988). Indicator values were taken from: Lakušić & Redžić (1989; 1991), Pavlović-Muratspahić (1995) and Redžić (1988).

Map 1. Position of researched association of the "Bentbaša" protected area (Map taken from Đug et al. 2008)

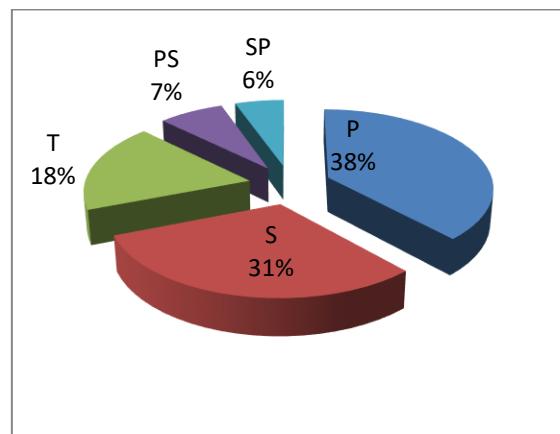


RESULTS AND DISCUSSION

The association *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova develops on the rocks the Mijacka Canyon near Dariva. It is surrounded by a forest association of the order *Quercetalia pubescentis* and is partially sunlit. In total, 55 species have been recorded. The most characteristic plant of this association is *Sedum album* L., which covers large areas. Other significant species are: *Allium carinatum* L., *Silene vulgaris* (Mch) Gar., *Melica ciliata* L., *Chondrilla juncea* L., *Stipa calamagrostis* (L.) Wahlenb., and others. As the association borders the forest ecosystem, the number of species in this association is also large: *Fraxinus ornus*, *Syringa vulgaris*, *Smyrnium perfoliatum*, *Inula conyza*, *Arabis turrita* and others. Very interesting is also the reduced abundance of some widely distributed species in this canyon, such as: *Micromeria thymifolia*, *Ceterach officinarum*, and *Erysimum linearifolium*, as well as the complete absence of equally common species in this canyon: *Thymus jankae*, *Sesleria ujhelyii*, *Minuartia bosniaca*, *Asplenium trichomanes*, *Sedum ochroleucum*, *Leontodon crispus* and others. Among the indicator values, representatives of the primary vegetation prevail, although members of the secondary vegetation also have

high values (Graph 1). The most numerous phytocoenological order is *Amphoricarpetalia* and representatives of the following orders are also numerous: *Chenopodietalia*, *Scorzonerico-Chrysopogonetalia*, *Quercetalia pubescantis* and *Brometalia erecti* (Graph 2). Hemicryptophytes are the most numerous life form (Table 3), and the most numerous individual floristic element is smed, while the most common group is sub-Mediterranean. The total number of floristic element groups is 13, and the number of individual floristic elements is 44. It should be emphasized that an endemic species of the Dinarides, *Erysimum linariafolium* Tausch, has been recorded in the association (Šoljan, 2023) which currently has no official status, and additional research is needed to assign this species an appropriate status. Additionally, a species listed in the "List of Plant Species (Pteridophyta and Spermatophyta) for the Red Book of Bosnia and Herzegovina" (Silić, 1996) has been recorded: *Micromeria thymifolia* (Scop.) Fritsch with status of a rare species (R).

Graph 1. Ratio of indicator values in *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova. association



Graph 2. Phytocoenological affiliation in the *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova. association

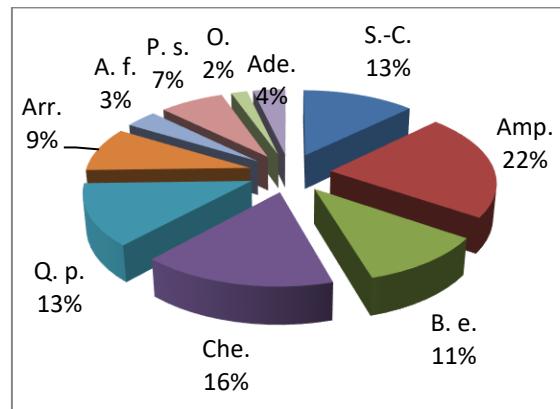
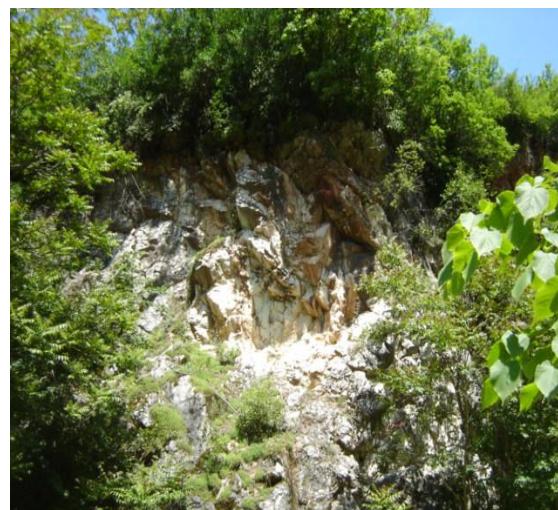


Figure 1. Part of the researched association ©Anis Hasanbegović**Table 1.** Floral elements of the *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova. association

Floral elements	Number of species	Σ	Σ %
balc	2	3	5.45
s. o. balc	1		
s. o. eur	1	1	1.81
alp-pralp-smed	1	1	1.81
wpralp	1		
w(pralp)	1	3	5.45
pralp-smed	1		
smed	6		
(pralp)smed-subatl	1		
(med)smed-subatl	1		
osmed	2		
osmed-gemässkont	2		
smed-subatl	1		
smed-subatl(circ)	1	20	36.36
smed-euras	1		
smed(-euras)	1		
smed-eurassubocean	1		
o(smed)	1		
(o)smed	1		
submed(-subatl)	1		
omed-kont	1		
med(-kont)	1		
med	1	5	9.09
med-smed-kont	1		
med-smed(-subatl)	1		
subatl-smed	2	2	3.63
euras(kont)(-smed)	1		
euras(subocean)	1		
euras(subocean)-smed	1		

Floral elements	Number of species	Σ	Σ %
euras-smed	1	7	12.72
euras-smed,circ	1		
euras-med	1		
(no-)euras-smed	1		
no-euras-med	1		
no-euras-smed	1	3	5.45
no-euras(subozean)	1		
eurassubozean	1		
eurassubozean-smed	2	4	7.27
(no-)eurassubozean(-smed)	1		
s. o. kont	1	2	3.63
europkont	1		
gemässkont-osmed	2	2	3.63
s. w. asien	1	2	3.63
china	1		
Total number of floral elements groups: 13			
Total number of individual groups of floral elements: 44			
Total:	55	55	100

Table 2. Life forms of the *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova. association

Life forms	Total number	Σ	%	Σ %
H	22	40		
H(Ch)	3	5.45		
H(T)	2	3.63		
H(G)	1	1.81		
	28	50.90		
T	7	12.72		
T(Ch)	2	3.63		
	9	16.36		
Ch	7	12.72		
Ch(P)	1	1.81		
	8	14.54		
P	8	14.54		
	8	14.54		
G	2	3.63		
	2	3.63		
Total:	55	55	100	100

Table 3. Phytocoenological composition of the researched association *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova

F i n t o c e l n o a l t o i g o c n a s i l o s r s		I	Associations	<i>Allio carinatae-Sedetum albae</i> Hasanbeg. 2024 comb. nova										
Locality			Kanyon Miljacke, Darive-north side											
Altitude (m)			543 545 550 554 555 544 545 543 550 551 550 555											
Exposition			E-SE E-SE E-SE E-SE E-SE E E E E S-SE S-SE N-NE											
Slope (°)			80 70-80 50-60 50 40-50 80 80-90 90 80-90 90 80-90 90											
Geological base			Limestone and dolomitized limestone											
Type of soil			Lithosol and calcomelanosol											
Image size (m ²)			100 m ²											
General cover (%)			20 40-50 30-40 50 50-60 40 40-50 40 40-50 40-50 30 20-30											
Date			Maj 11, 2024.											
Ordinal image number			1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.											
			Floristic composition											
S.-C.	S		<i>Sedum album</i> L.	2.2	2.2	+2	2.2	+2	+2	1.1	2.2	1.1	2.2	1.1
B. e.	S		<i>Silene vulgaris</i> (Mch) Garcke	1.1	1.1	+2	1.1	1.1	1.1	+2	+2	+2	1.1	+2
Amp.	P		<i>Melica ciliata</i> L.	1.1	1.1	-	+2	-	-	+2	1.1	+2	+2	-
Amp.	P		<i>Stipa calamagrostis</i> (L.) Wahlenb.	1.1	1.1	+2	+2	-	-	-	-	+2	+2	1.1
Amp.	P		<i>Allium carinatum</i> L.	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
Q. p.	P		<i>Coronilla emerus</i> L. ssp. <i>emerooides</i> (Boiss. et Spr.) Hayek	+2	-	+2	+2	1.1	-	+2	+2	-	+2	+1
Amp.	P		<i>Chondrilla juncea</i> L.	+2	-	+2	-	-	+2	+2	-	-	+1	+1
P. s.	PS		<i>Clematis vitalba</i> L.	+2	+2	-	-	+1	-	+1	+2	-	+2	-
Amp.	P		<i>Galium corrudaefolium</i> Tausch	+2	+2	+2	+2	+2	-	-	-	-	-	-
Q. p.	P		<i>Syringa vulgaris</i> L.	+2	+2	-	+2	-	-	-	-	+1	-	-
Amp.	P		<i>Asplenium ruta muraria</i> L.	+2	+2	-	-	-	-	1.1	-	-	+2	-
Ade.	SP		<i>Arabis glabra</i> (L.) Bernh.	+2	+2	-	-	+1	-	+2	-	-	-	-
Che.	T		<i>Geranium dissectum</i> Jusl.	+2	+2	-	-	+1	-	-	-	-	-	-
Ade.	SP		<i>Myrrhis odorata</i> (L.) Scop.	+2	-	-	+1	+1	-	-	-	-	-	-
Arr.	S		<i>Vicia sepium</i> L.	+2	+2	-	-	+1	-	-	-	-	-	-
Q. p.	P		<i>Smyrnium perforatum</i> L.	+2	+1	-	-	-	-	-	-	-	-	-

B. e.	SP	<i>Hypericum perforatum L.</i>	+2	-	-	-	-	-	-	-	+1	+1	-
A. f.	P	<i>Arabis hirsuta (L.) Scop.</i>	+2	-	-	-	+2	-	-	-	-	-	-
Arr.	S	<i>Poa trivialis L.</i>	+2	-	-	-	-	-	-	-	-	-	-
Che.	T	<i>Stellaria media L.</i>	+2	-	-	-	-	-	-	-	-	-	-
P. s.	PS	<i>Rosa canina L.</i>	+1	+1	+1	+1	+1	-	-	-	-	-	-
Q. p.	P	<i>Fraxinus ornus L.</i>	+1	-	-	-	-	+1	-	+1	-	-	-
Q. p.	P	<i>Hedera helix L.</i>	+1	-	-	-	-	-	-	-	-	-	-
S.-C.	S	<i>Tunica saxifraga (L.) Scop.</i>	-	1.1	1.1	-	-	1.1	1.1	2.2	-	-	-
B. e.	S	<i>Bromus erectus Huds.</i>	-	1.1	+2	-	-	-	-	-	-	-	-
S.-C.	S	<i>Sedum acre L.</i>	-	+2	+2	-	+2	+2	-	+2	-	1.1	-
S.-C.	S	<i>Centaurea rhenana Borb.</i>	-	+2	-	-	-	+1	+1	+2	+2	-	-
Che.	T	<i>Ailanthus glandulosa Desf.</i>	-	+2	-	-	+1	+1	-	-	-	-	-
B. e.	S	<i>Medicago lupulina L.</i>	-	+2	-	-	-	-	+1	-	-	+2	-
Arr.	S	<i>Poa vivipara L.</i>	-	+2	+2	-	-	-	-	-	-	-	-
O.	T	<i>Verbascum phlomoides L.</i>	-	+2	-	-	-	-	-	-	-	-	-
Arr.	S	<i>Vicia tetrasperma (L.) Schreb.</i>	-	+1	-	-	-	-	-	-	-	-	-
Che.	T	<i>Veronica persica Poir.</i>	-	+1	-	-	-	-	-	-	-	-	-
Che.	T	<i>Bromus sterilis L.</i>	-	-	+2	+2	-	-	-	-	-	-	-
Q. p.	P	<i>Arabis turrita L.</i>	-	-	+2	-	-	-	-	-	-	-	+2
P. s.	PS	<i>Ligustrum vulgare L.</i>	-	-	-	+2	+2	-	-	-	-	-	-
Amp.	P	<i>Sedum sexangulare L.</i>	-	-	-	-	+2	+2	-	1.1	-	-	-
Che.	T	<i>Ballota nigra L.</i>	-	-	-	-	+2	-	-	-	-	-	-
Q. p.	P	<i>Inula conyza DC.</i>	-	-	-	-	+1	-	-	-	-	-	+2
Che.	T	<i>Chelidonium majus L.</i>	-	-	-	-	+1	-	-	-	-	-	-
Amp.	P	<i>Sedum dasypyllosum L.</i>	-	-	-	-	-	+2	+2	-	+2	+2	+2
S.-C.	S	<i>Acinos arvensis (Lam.) Dandy</i>	-	-	-	-	-	+1	-	-	-	-	-
P. s.	PS	<i>Crataegus monogyna Jacq.</i>	-	-	-	-	-	+1	-	-	-	-	-
S.-C.	S	<i>Galium purpureum L.</i>	-	-	-	-	-	-	+2	1.1	-	+2	-

A. f.	P	<i>Scrophularia canina</i> L.	-	-	-	-	-	-	1.1	+2	-	-
S.-C.	S	<i>Acinos hungaricus</i> Simonkai	-	-	-	-	-	-	+2	+2	+2	-
B. e.	S	<i>Sanguisorba muricata</i> (Spach.) Focke	-	-	-	-	-	-	+2	-	-	+1
B. e.	S	<i>Potentilla recta</i> L.	-	-	-	-	-	-	+1	-	+2	-
Che.	T	<i>Papaver rhoeas</i> L.	-	-	-	-	-	-	+1	-	-	-
Amp.	P	<i>Erysimum linearifolium</i> Tausch	-	-	-	-	-	-	-	+2	1.1	-
Amp.	P	<i>Ceterach officinarum</i> DC.	-	-	-	-	-	-	-	+2	-	-
Arr.	S	<i>Lolium perenne</i> L.	-	-	-	-	-	-	-	-	-	-
Che.	T	<i>Calystegia sepium</i> L.	-	-	-	-	-	-	-	-	-	+1
Amp.	P	<i>Sedum maximum</i> (L.) Hoffm.	-	-	-	-	-	-	-	-	-	-
Amp.	P	<i>Micromeria thymifolia</i> (Scop.) Fritsch	-	-	-	-	-	-	-	-	-	-

CONCLUSIONS

The *Allio carinatae-Sedetum albae* Hasanbeg. 2024. comb. nova association develops on the rocks Miljacka Canyon near Dariva. The most characteristic plant of this association is *Sedum album* L. Other significant species include *Allium carinatum* L., *Silene vulgaris* (Mch) Gar., *Melica ciliata* L., *Chondrilla juncea* L., *Stipa calamagrostis* (L.) Wahlenb., and others. A total of 55 species were recorded. Primary species are dominant in the studied association. The largest number of species in studied association belong to the phytocoenological order *Amphoricarpetalia*. Hemicryptophyte represent the most numerous life forms. The most significant floral element is smed and the most significant group is sub-Mediterranean. Total number of groups of floral elements is 13, and the total number of individual elements is 44. In the association, the endemic species from Dinaridi-*Erysimum linearifolium* Tausch was recorded, which currently has no status, so further research is needed to assign an appropriate status to this species.

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ABBREVIATIONS

Abbreviations of phytocenological affiliations:

Amp.-*Amphoricarpetalia*, Q. p.-*Quercetalia pubescens*, Arr.-*Arrhenatheretalia*, B. e.-*Brometalia erectii*, P. s.-*Prunetalia spinosae*, S.-C.-*Scorzonero-Chrysopogonetalia*, Che.-*Chenopodietalia*, A. f.-*Arabidetalia flavescentis*, Ade-*Adenostyletalia*, O-*Onopordetalia*.

Abbreviations of life forms:

P-*phanerophyta*, H-*hemicryptophyta*, Ch-*chamaephyta*, G-*geophyta*, T-*therophyta*

Abbreviations of indicator values:

P-primary, PS-primary-secondary, S-secondary, SP-secondary-primary, T-tertiary

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Psychometric properties of the organizational resilience measurement scale

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ORIGINAL SCIENTIFIC PAPER

Abstract: The aim of this analysis was to examine the factor structure of the measurement instrument designed to assess organizational resilience, developed by Kantur and Işeri-Say (2015). The study included a sample of 285 participants, divided into two subsamples for the purposes of conducting exploratory and confirmatory factor analyses. Exploratory factor analysis (EFA) was conducted on a subsample of 170 participants, while confirmatory factor analysis (CFA) was performed on a subsample of 115 participants. The initial EFA extracted a single factor; however, based on the Scree plot, a two-factor solution was indicated. The first factor comprises items related to the organization's ability to respond quickly, maintain stability, and adapt under challenging conditions – corresponding to the theoretical dimensions of agility and robustness. The second factor includes items reflecting employee engagement and internal functional alignment, which aligns with the construct of integrity. The CFA supported a stable two-factor structure. The results partially confirm the expected structure, with the agility and robustness factors merging into a single factor. Item analysis indicates satisfactory discriminant validity and reliability indices for all items. Cronbach's alpha coefficients for the individual subscales range from 0.88 to 0.90, while the composite reliability is $\alpha = 0.92$.

Keywords: resilience, robustness, agility, integrity, psychometric properties

INTRODUCTION

Recently, the concept of resilience has gained renewed momentum in research. It is considered a highly promising framework for explaining how organizations can survive and thrive amidst unpredictable circumstances. In today's business environment, characterized by rapid changes, high uncertainty, and frequent disruptions both global (e.g., pandemics, economic crises) and local (e.g., market shifts, regulatory demands) – there is an increasing focus on organizations' capacities to effectively manage challenges. One of the key concepts in this context is organizational resilience, defined as the ability of an organization to absorb shocks, adapt to change, and continue functioning, often emerging stronger after a crisis (Lengnick-Hall & Beck, 2005; Sutcliffe & Vogus, 2003).

Organizational resilience is not merely about survival; it represents a proactive capacity for adaptation, learning, and innovation under pressure. It is recognized as a multidimensional construct encompassing elements such as robustness, flexibility, strategic foresight, readiness for change, and collective learning ability (Duchek, 2020). This construct is becoming increasingly relevant both in academic literature and in practice, as an organization's resilience directly impacts its competitiveness, agility, and long-term sustainability.

Recently, the concept of resilience has garnered significant attention within organizational studies. It is considered a promising framework for understanding how organizations can survive and thrive amid adverse conditions and turbulence. Although empirical research on the topic has increased, there remains a need for greater clarity regarding the definition and measurement of organizational resilience.

Resilience is defined in the literature in various ways: as an ability, capacity, characteristic, outcome, process, behavior, strategy, approach, type of effect, or a combination thereof. Lengnick-Hall and colleagues (2011) critique resilience research for being predominantly descriptive and outcome-focused, often overlooking the underlying mechanisms of resilience development. In contrast, other authors emphasize that resilience forms the foundation for organizational development and can be measured proactively (Akgün & Keskin, 2014; Stephenson, 2010; Sutcliffe & Vogus, 2003).

Some researchers conceptualize resilience as a process, viewing it as the way organizations confront challenges to achieve a positive outcome. For example, according to Sutcliffe and Vogus (2003), resilience is the process of coping with adversity to reach a resilient outcome. Similarly, Sun et al. (2011) define resilience as a process that links a set of adaptive capacities with positive development following a crisis or disruption.

Carmeli and Markman (2011) describe resilience as an ongoing process of managing strategies. However, this process-oriented approach raises certain dilemmas. Boin and van Eeten (2013) caution that if resilience is understood exclusively as a process, it becomes difficult to identify and even harder to measure, as it can only be assessed after the process has been successfully completed.

Another approach considers resilience as an ability or capacity of the organization. Within this framework, resilience is treated as a resource possessed by the organization (Duchek, 2014; Williams et al., 2017). However, confusion exists regarding the meaning of "capacity" and "ability" in relation to resilience. Lengnick-Hall et al. (2011) emphasize that these terms are not synonymous – having the capacity for resilience does not necessarily mean having the ability to be resilient. Richtnér and Löfsten (2014) further clarify that ability encompasses both capacity and skill, and resilience becomes an organizational capability only when capacity is concretely applied through organizational action.

Despite the theoretical development of the concept, measuring organizational resilience remains a challenge due to its complexity and multilayered nature. Many authors emphasize the need to develop reliable and valid measurement instruments that would enable precise operational definitions and facilitate research across various organizational contexts (Boin & van Eeten, 2013).

One of the most significant contributions in this field was made by Kantur and Işeri-Say (2015), who developed an organizational resilience scale through empirical research within a business context. Their scale encompasses three dimensions: robustness (the organization's stability and internal strength), agility (the ability to anticipate and adapt), and integrity (reflection, analysis, and adoption of new strategies). The organizational resilience scale consists of 9 items distributed across these previously described dimensions. It employs a five-point Likert scale (1 – strongly disagree to 5 – strongly agree), enabling quantitative data analysis.

The authors developed the scale using a combination of qualitative research (interviews with managers and employees) and quantitative methods (exploratory and confirmatory factor analysis). Initial validation was conducted on a sample of organizations in Turkey, and the scale demonstrated high internal consistency (Cronbach's $\alpha > 0.80$), confirming its reliability (Kantur & Işeri-Say, 2015).

This scale is applied both in research and practical managerial contexts. Organizations can use the scale for self-assessment of their resilience capacities, identification of vulnerabilities, and as a foundation for strategic planning and development of more resilient structures and processes. It is particularly useful in sectors exposed to frequent changes and high risks, such as healthcare, public administration, education, and manufacturing.

The scale has also been adapted in other contexts, such as the SEOR model (Scale for Evaluating Organizational Resilience), which expands the original framework by Kantur and Işeri-Say (2015) by adding dimensions such as social capital and individual competencies. The organizational resilience scale developed by Kantur and Işeri-Say (2015) represents a significant contribution to the conceptualization and operationalization of organizational resilience. Its simple structure, theoretical grounding, and empirical validation make it a valuable tool for researchers and practitioners aiming to systematically measure and develop the resilience of their organizations.

In times characterized by uncertainty and rapid change, such instruments contribute to strategic preparedness and the long-term sustainability of organizations. However, like any instrument developed within a specific cultural and organizational context, this scale requires verification of its psychometric properties when applied in new contexts to ensure its construct validity, factorial stability, and reliability.

METHODOLOGY

Research Objective

The objective of this study is to examine the psychometric properties of the Organizational Resilience Scale developed by Kantur and Işeri-Say (2015), through the application of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The study employed a quantitative approach aimed at assessing the construct validity, internal consistency, and factor structure of the scale within an organizational context. The research was conducted using methods that facilitate the evaluation of the scale's psychometric characteristics to determine its applicability across organizations from various sectors.

Participants (Sample)

The study included 285 employees from various organizations. The sample was convenience-based, formed according to the availability and willingness of organizations from both the public and private sectors in Bosnia and Herzegovina to participate in the research. Although the sample comprises different organizations, it is important to note that this approach carries limitations regarding the generalizability of the results to the entire population of organizations. All participants took part voluntarily and were informed about all necessary information related to the study, with anonymity and confidentiality of data ensured. The sample was divided into two parts for the purpose of conducting different statistical analyses. The first part consisted of 170 participants for the exploratory factor analysis, while the remaining 115 participants were used for confirmatory factor analysis.

In the first part, out of 170 participants, 60 were male (35.3%) and 110 female (64.7%). Regarding age, the majority were between 40 and 50 years old (35.3%), followed by those aged 29 to 39 years (29.4%). Next was the age group 51 to 60 years (26.5%), with the fewest participants aged 61 and above (8.8%). In terms of education, most participants held a university degree (47.1%), followed by those with secondary education (35.3%), then master's degree holders (11.8%), and finally doctorate holders

(5.8%). Regarding work experience, 11.8% had up to 5 years of service, 14.7% had 6 to 10 years, 17.6% had 11 to 15 years, and 14.7% had 16 to 20 years. Additionally, 11.8% had 21 to 25 years of experience, 10.6% had 26 to 30 years, 8.8% had 31 to 35 years, and 10% had 36 years or more. Concerning contract type, the majority held permanent contracts (58.8%), followed by fixed-term contracts (29.4%), and the fewest had freelance contracts (11.8%). Within this part of the sample, 125 participants (73.5%) were employed in the private sector, and 45 participants (26.5%) in the public sector.

In the second part, among 115 participants, 30 were male (26.1%) and 85 female (73.9%). Regarding age, 35 participants (30.4%) were aged 29 to 39, 40 participants (34.8%) were 40 to 50 years old, 30 participants (26.1%) were 51 to 60 years, and the fewest were 61 years or older (8.7%). As for education, the majority held university degrees (43.5%), followed by secondary education (34.8%). Twenty-five participants (21.7%) reported having a master's degree, while none reported holding a doctorate. Regarding work experience, most participants had 1 to 5 years of service (39.1%), followed by those with 6 to 10 years (30.4%). Ten participants (8.7%) had 16 to 20 years of experience, and 15 participants (13%) had 21 to 25 years. The fewest had 31 to 35 years of work experience (4.3%). Regarding contract types, the majority had permanent employment contracts (60.9%), followed by fixed-term contracts (30.4%), and the fewest had freelance contracts (8.7%). In this part of the sample, 75 participants (65.2%) were employed in the private sector, while 40 participants (34.8%) worked in the public sector.

Instrument

For the purposes of this study, a sociodemographic questionnaire was designed to collect information on participants' gender, age, education level, length of service in their current organization, and type of employment contract.

To measure organizational resilience, the Organizational Resilience Scale (Measuring Organizational Resilience: A Scale Development, Kantur and Işeri-Say, 2015) was used. For this study, the scale was translated into Bosnian using a double translation procedure. Responses were recorded on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale consists of 9 items divided into 3 subscales. The first dimension, robustness, includes four items and measures the organization's ability to withstand and recover from adverse conditions. The second dimension, agility, includes three items and assesses the organization's capacity for rapid action. The integrity dimension includes two items and measures cohesion among employees within an organization facing adverse circumstances. In the original version, the Organizational Resilience Scale demonstrated satisfactory reliability with a Cronbach's alpha of 0.85.

Procedure

Data were collected through online surveys completed by participants between September 2023 and May 2024. Participants were informed about the anonymity of their responses and the importance of providing accurate and honest answers to the questions.

After data collection, analyses were performed using SPSS version 26 and AMOS version 23. In the first part of the sample ($N = 170$), item analysis, normality tests for each item, reliability assessment of the measurement scale, and exploratory factor analysis were conducted. Confirmatory factor analysis was carried out on the second part of the sample ($N = 115$).

RESULTS

Item Analysis

Item analysis was conducted by examining the mean scores of items, item-total correlations, as well as reliability indices of the items. Based on item means, all items show average values, with means ranging from 3.16 to 3.80, indicating that the items are discriminative. Corrected item-total correlations (reliability indices) are above 0.3, which suggests that the reliability of each individual item is more than satisfactory. These results imply that all items demonstrate adequate discriminative power and reliability, and there is no need to exclude any items from the scale. Furthermore, an examination of the normality of the distribution for each item shows that the skewness and kurtosis values fall within the range of -2 to +2, indicating acceptable normality for all items (Tabachnick & Fidell, 2012).

Table 1. Item Analysis of the Organizational Resilience Scale (N=170)

Item	M	Sd	Corr (rit)	Alpha if item deleted	Skew.	Kurt.
My organization is stable and maintains its position.	3.54	1.026	.745	.916	-1.213	.678
My organization is successful in creating solutions.	3.59	.938	.799	.913	-.894	.250
My organization takes action quickly.	3.46	.822	.698	.919	-1.333	.730
My organization develops alternatives to benefit from negative circumstances.	3.65	.944	.786	.914	-.820	.232
My organization is agile in taking necessary actions when needed.	3.69	.926	.735	.917	-.926	.757
My organization is a place where all employees are engaged in performing their tasks.	3.16	1.224	.702	.920	-.428	-.950
My organization effectively operates as a whole with its employees.	3.18	1.289	.709	.921	-.374	-1.081
My organization shows resilience until the end in order not to lose.	3.69	.924	.752	.916	-.849	.266
My organization does not give up and continues on its path.	3.80	.885	.739	.917	-1.104	1.234

Following the item analysis, the reliability of the organizational resilience measurement scale was examined. The internal consistency reliability was assessed using Cronbach's alpha for the entire scale as well as for the individual subscales. As shown in Table 2, the overall reliability of the instrument is 0.92, indicating excellent reliability. The individual subscales also demonstrated high reliability.

Table 2. Reliability of the Organizational Resilience Measurement Scale

Reliability	Parameter	
	Number od Items	Cronbach's α
Entire Scale	9	.92
Robustness	4	.89
Agility	3	.88
Integrity	2	.90

EXPLORATORY FACTOR ANALYSIS

After assessing the reliability of the measurement scale, the prerequisites for conducting the exploratory factor analysis (EFA) were examined. As shown in Table 3, the Kaiser-Meyer-Olkin (KMO) measure was .900, and Bartlett's test of sphericity was statistically significant, indicating that the data were suitable for conducting exploratory factor analysis (Field, 2009).

Table 3. KMO Measure and Bartlett's Test of Sphericity

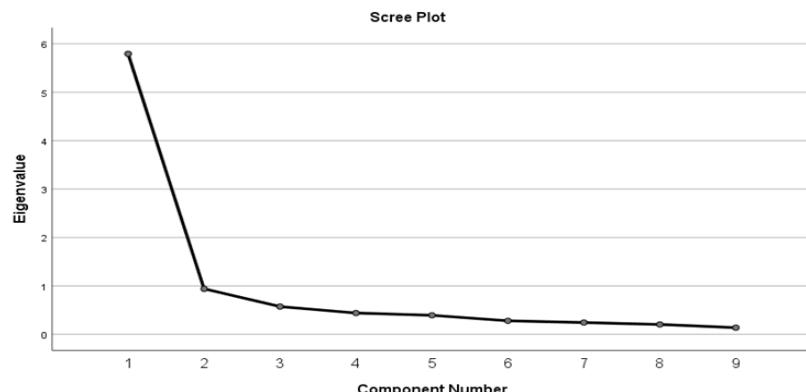
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.900
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.

To examine the factor structure of the Organizational Resilience Scale, an exploratory factor analysis (EFA) using the principal axis factoring method was conducted. As shown in Table 4, a single factor initially emerged, explaining 64.370% of the total variance with an eigenvalue of 5.793. However, based on the Scree plot (Figure 1), which displays the eigenvalues by component, a clear elbow effect is visible at the second component. The first component has a substantially higher eigenvalue (above 5), while the second component's eigenvalue is slightly above the cutoff value of 1. After the second component, all subsequent components show a gradual decline and stabilization of eigenvalues below 1.

In accordance with Kaiser's criterion (which recommends retaining factors with eigenvalues greater than 1) and the visual inspection of the Scree plot, it was decided to retain two components. These two components account for the majority of the variance and have theoretical meaningfulness. Retaining these two components further supports the validation of the constructs used in the study, confirming the existence of two latent factors underlying the measured variables. This represents a significant contribution to understanding the psychometric properties of the scale and the foundation of the model used in the research. Therefore, a varimax rotation with two factors was conducted (Table 5).

Table 4. Eigenvalues and Percentage of Explained Variance for Extracted Factors

Comp.	Initial EV			Extraction SS Loadings		
	Tot.	%Var.	Cum. %	Tot.	%Var.	Cum. %
1	5.793	64.370	64.370	5.793	64.370	64.370
2	.940	10.444	74.815			
3	.573	6.364	81.178			
4	.439	4.883	86.061			
5	.392	4.361	90.422			
6	.279	3.099	93.521			
7	.243	2.696	96.217			
8	.203	2.260	98.477			
9	.137	1.523	100.000			

Figure 1. Graphical representation of the eigenvalues for each factor of the Organizational Resilience Scale**Table 5.** Eigenvalues and explained variance percentage of extracted factors after Varimax rotation

Comp.	Initial EV			Extraction SS Loadings			Rotation SS Loadings		
	Tot.	% Var.	Cum. %	Tot.	% Var.	Cum. %	Tot.	% Var.	Cum. %
1	5.793	64.370	64.370	5.793	64.370	64.370	4.444	49.380	49.380
2	.940	10.444	74.815	.940	10.444	74.815	2.289	25.435	74.815
3	.573	6.364	81.178						
4	.439	4.883	86.061						
5	.392	4.361	90.422						
6	.279	3.099	93.521						
7	.243	2.696	96.217						
8	.203	2.260	98.477						
9	.137	1.523	100.000						

An examination of Table 6 reveals how the items load on the extracted factors. Some items load on both factors; however, based on the conceptual meaning of the items, the first factor encompasses statements reflecting the organization's ability to respond

quickly and decisively under adverse conditions, adapt to circumstances, maintain stability, and persist in pursuing goals. Theoretically, according to the original scale, these statements correspond to the dimensions of agility and robustness. Robustness is manifested in the organization's resilience and persistence, while agility refers to the speed of response and the ability to make timely and flexible decisions. Therefore, we named the first factor Robustness and Agility.

The second factor includes statements related to internal alignment, cooperation, and collective action within the organization. According to Kantur and Iseri-Say (2015), these statements represent the dimension of Integrity, which pertains to internal cohesion, interpersonal trust, collective commitment, and coordination within the organization. The high factor loadings indicate a clear distinction of this aspect from robustness and agility.

Table 6. Rotated Exploratory Factor Matrix (Varimax Rotation)

Item	FACTORS		
	Robustness and Agility	Integrity	
My organization does not give up and continues on its path.	.834		
My organization develops alternatives to benefit from adverse circumstances.	.821		
My organization is agile in taking necessary actions when needed.	.781		
My organization is successful in creating solutions.	.773	.376	
My organization shows resilience until the end to avoid failure.	.759	.324	
My organization takes action quickly.	.759		
My organization is stable and maintains its position.	.719	.375	
My organization is a place where all employees are engaged in doing what is required.	.308	.910	
My organization operates successfully as a whole with its employees.	.322	.906	

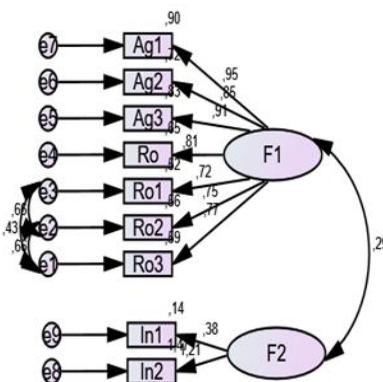
Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted on the second half of the sample (N = 115) using the AMOS v.23 software. A model was constructed with two predefined factors: Robustness-Agility (F1) and Integrity (F2). Measurement errors were specified, and each manifest variable was linked to its corresponding latent factor.

As shown in the model (Figure 2) and Table 7, the obtained indices indicate an acceptable fit of the measurement model. The presented model confirms that the structure of the observed variables can be explained by two latent dimensions, which are both theoretically and empirically justified. High factor loadings suggest that the measurement model is valid, while the correlation between factors indicates their differentiation as well as a certain degree of interrelation.

Table 7. Fit Indices of the Tested Model

CMIN/DF	P	NFI	Fit Indices		IFI	TLI	RMSEA
			SRMR	CFI			
2.319	,000	.965	.044	.973	.971	.964	.065

Figure 2. Structural Model of the Organizational Resilience Scale

CONCLUSION

The results obtained through item analysis indicate that the discriminant validity and reliability indices of all items are satisfactory. The Cronbach's alpha coefficient for the individual subscales ranges from 0.88 to 0.90, while for the entire scale it is $\alpha = 0.92$, which is more than satisfactory. The results of the exploratory factor analysis suggest that the measurement instrument is structured into two dominant dimensions: agility and robustness, and integrity. This structure aligns with the theoretical assumptions of the original authors of the scale, with the note that the two conceptual dimensions – agility and robustness – did not clearly separate into distinct factors in this sample. This may indicate their conceptual and perceptual overlap among respondents.

These findings have practical implications, as they confirm that the instrument reliably measures key aspects of organizational resilience and can be used in future research and evaluations of organizational functioning. A confirmatory factor analysis was conducted using AMOS v.23, in which a measurement model with two specified factors was tested. After model modifications, the obtained fit indices indicated an acceptable model fit. The first factor (F1) included items related to agility and robustness, while the second factor (F2) included items representing integrity.

Both standardized and unstandardized regression coefficients showed that all items were statistically significant at the $p < .001$ level, with high loadings, further confirming the acceptable fit of the model. The correlation between the two factors was $r = .29$, indicating a moderate association, which supports the conclusion that they represent distinct constructs.

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Perception of leadership and school climate in primary schools

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: School leadership and the quality of the school climate are significant factors that influence the success of the teaching process and the satisfaction of all participants in education. A need for a better understanding of the role of principal's leadership in enhancing collaboration and engagement within schools was the base for this research. Despite the principal's crucial role in shaping school climate and promoting teacher collaboration, there is no enough research on how different educational groups (students, teachers, and principals) perceive principals' leadership competencies and how leadership style influences collaborative behavior and engagement within the school. The study was conducted on a sample of 338 participants (195 students, 132 teachers and 11 principals) using a questionnaire based on a Likert scale. Data analysis included descriptive statistics, Pearson's correlation, Kruskal-Wallis test, and one-sample t-test. The results indicate that all three groups of respondents evaluated principal leadership positively. The t-test confirmed that the average rating was significantly higher than the neutral point, indicating an affirmative perception of principals' competencies in the areas of vision, motivation, and professional development. Findings show that respondents positively assess the leadership abilities of principals, particularly regarding vision, motivation, and support for development. A positive correlation was established between leadership perception and school climate, as well as increased teacher collaboration in schools where principals apply a democratic leadership style. Principals had the highest level of perceived leadership in all examined dimensions compared to teachers and students. These results confirm the importance of principal leadership in building a positive school climate and strengthening collaborative relationships, in line with recent research. Further investment in the development of principals' leadership skills through participatory and supportive leadership models is recommended.

Keywords: leadership, principals, teachers, students, school climate

INTRODUCTION

Modern education is confronted with numerous challenges that demand continuous adaptation, innovation and strategic control of the changes. In this context, leadership within educational institutions has become a key factor in the success and sustainable development of schools. Research shows that high-quality leadership directly affects school climate, teacher motivation, professional development, and, consequently, student learning outcomes (OECD, 2020; Day & Sammons, 2016).

The role of school principals is no longer limited to administrative management; it now includes the ability to lead with vision, build relationships, support teamwork, and foster innovation (Leithwood et al., 2020). Within this framework, the importance of

transformational leadership is increasingly recognized – an approach based on inspiration, motivation, and the empowerment of staff members. Transformational leaders do not merely manage structures; they drive profound change through a shared vision, emotional connection, and professional growth (Bass & Riggio, 2006; Bush & Glover, 2014). Their ability to motivate and engage staff contributes to a higher level of collective efficacy and a positive working atmosphere within the school.

At the same time, teacher leadership has gained growing attention, with teachers recognized as active agents of change, facilitators of learning, and collaborators in creating a positive school environment (Wenner & Campbell, 2017). Particularly relevant in this regard is the concept of distributed leadership, which involves the distribution of responsibilities and leadership tasks among multiple actors within the school, not only principals, but also teachers, professional associates, and teams (Harris, 2019). Distributed leadership strengthens a culture of trust, open communication, and professional learning communities, where leadership is based on expertise and mutual support rather than solely on formal position (Spillane, 2006; Gronn, 2009).

Successful schools are characterized not only by strong principals but also by collegial relationships among teachers, mutual support, and shared responsibility for instructional development. Contemporary approaches to school management emphasize the importance of shared responsibility and building a collective school vision (Harris, 2019; Lambert, 2017). In this sense, it is crucial to understand how different stakeholders within the educational community, principals, teachers, and students, perceive the leadership practices implemented in schools.

This study focuses precisely on these three key groups: students, teachers, and principals where each of them is assessing specific aspects of school leadership from their own perspectives. Therefore, the research provides multiple viewpoints on the role of school leadership in creating a positive and stimulating environment for teaching and learning. The particular value of this approach lies in the fact that leadership is examined not only as a formal role, but also as a network of interpersonal relationships, attitudes, and concrete pedagogical practices experienced daily by all education stakeholders.

RESEARCH METHODOLOGY

Aim and Nature of the Study

The aim of this study is to analyze the perceptions of students, teachers, and school principals regarding the role of leadership in educational institutions, with a particular focus on how principals and teachers contribute to school leadership and the enhancement of the educational process. Considering the complexity of the school environment and the multiple roles that leadership plays within it, the research is based on a quantitative approach, utilizing a valid instrument (a Likert-scale questionnaire) that enables the collection of data on various aspects of leadership practices from the perspectives of three key respondent groups: students, teachers, and principals. The specific value of this study lies in its multi-perspective approach, which allows for a more comprehensive understanding of the role of leadership in contemporary schools.

Hypotheses

H1: Students, teachers, and principals positively assess the leadership competencies of school principals, particularly in terms of vision clarity, motivation, and the encouragement of professional development.

- H2: There is a positive correlation between perceived principal leadership and a positive school climate.
- H3: Perceptions of leadership differ depending on the respondent's role (students, teachers, principals).
- H4: Schools where principals apply a democratic leadership style demonstrate a higher level of teacher collaboration and student engagement.

Participants

The study included 338 participants from primary schools in the Herzegovina-Neretva Canton, divided into three target groups: students, teachers and school principals. The largest group was the group of students ($N = 195$) that provided assessments of the leadership qualities of principals and teachers in their schools. Group of teachers ($N = 132$), completed the questionnaire based on their own perceptions of the professional climate and leadership within their schools. The smallest, yet significant, group of school principals ($N = 11$) evaluated various dimensions of leadership within the school context.

Research Instrument

For the purposes of this study, a standard questionnaire with a 5-point Likert scale was created to examine the perceptions of students, teachers, and principals regarding the leadership qualities and behaviors of school principals and teachers in primary schools. The scale ranged from 1 – "strongly disagree" to 5 – "strongly agree." The questionnaire consists of 10 statements aimed at measuring various aspects of leadership, including clarity of school vision communication, motivation, professional development, democratic atmosphere, innovation, collaboration, student engagement, promotion of critical thinking, and overall school climate. All statements were grouped into four factors: principal leadership (items 1-3), teacher leadership (items 6-10), democratic atmosphere (item 4), and school climate (item 5). The questionnaire was originally developed and validated as part of a doctoral dissertation in the field of educational sciences, where it demonstrated satisfactory psychometric properties. In this study, a repeated reliability analysis showed high internal consistency of the instrument, with a Cronbach's alpha coefficient of $\alpha = 0.89$, indicating high reliability of the questionnaire. Considering the clarity of the statements, the relevance of the content for the target population, and the confirmed psychometric properties, this instrument has proved to be suitable for assessing perceptions of leadership in the school context from the perspectives of all involved stakeholders.

Statistical Analysis

Data were processed using SPSS version 20.0. At first, descriptive statistics were applied to analyze the basic characteristics of the sample and the distribution of responses. The reliability of the instrument was confirmed by calculating Cronbach's alpha coefficient. Pearson's correlation coefficient was used to examine the relationship between perceptions of leadership and school climate. To determine differences among respondent groups (students, teachers, principals), the Kruskal-Wallis test was applied due to the non-parametric nature of the data. Additionally, a one-sample t-test was used to test deviations of the mean scores of statements from the neutral scale value, thereby assessing the statistical significance of positive or negative orientation of the responses.

RESULTS

Assessment of School Principals' Leadership Competencies from the Perspectives of Students, Teachers, and Principals

A positive assessment of leadership competencies indicates that the principal successfully leads the school toward common goals, strengthens professional development, and encourages collaborative culture. We aimed to determine how students, teachers, and principals evaluate the key leadership competencies of principals regarding clarity of vision, motivation, and encouragement of professional development. The results showed that all three dimensions were rated positively, with mean values ranging from 3.82 to 3.92. The application of the t-test revealed that these average ratings were statistically significantly higher than the neutral scale value, as confirmed by high t-statistic values (14.178; 15.655; 15.272) and an extremely low significance level (Sig. = .000). This indicates that respondents clearly recognize and positively evaluate principals' abilities to communicate, motivate, and promote professional development within the school.

Table 1. Descriptive Statistics and t-Test Values for the Assessment of Perceptions of School Principals' Leadership Competencies (*Source: Author*)

	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
The school principal clearly indicates the school's vision and goals.	338	3,82	1,067	14,178	337	,000
The principal motivates teachers and students to be the best they can be.	338	3,92	1,084	15,655	337	,000
The principal encourages innovation and the professional development of teachers.	338	3,87	1,044	15,272	337	,000

The results obtained from the analysis of the first set of statements (Table 1) confirm hypothesis H1, which posits that students, teachers, and principals positively evaluate the leadership competencies of school principals, particularly regarding clarity of vision, motivation, and encouragement of professional development. The mean scores for all three examined dimensions were statistically significantly higher than the neutral scale value, indicating that respondents recognize and affirm the role of the principal as a leader. These positive evaluations are further supported by the fact that all three respondent categories, although with varying intensity, acknowledged the principal's importance in guiding the school towards common goals, strengthening team spirit, and encouraging the professional competencies of teachers. Thus, the findings empirically support the assertion that effective principal leadership is a key component of successful school management.

Correlation Between Perceived Principal Leadership and School Climate

The analysis results revealed a strong positive correlation between perceived principal leadership and school climate. The Pearson correlation coefficient of 0.843 indicates a very strong relationship, suggesting that effective principal leadership has a significant impact on the formation of a positive school climate. The highly significant p-value (0.000) confirms the statistical significance of this correlation, supporting the assertion that principal leadership and school climate are closely interconnected.

Table 2. Pearson Correlation Coefficient Values for Principal Leadership and School Climate
(Source: Author)

		School Climate
Principal Leadership	Pearson Correlation	,843(**)
	Sig. (2-tailed)	,000
	N	338

The obtained results confirm hypothesis H2 (Table 2), which assumes the existence of a positive correlation between perceived principal leadership and school climate. Statistical analysis showed a strong positive correlation (Pearson's coefficient $r = 0.843$; $p < 0.001$), indicating that schools where principal leadership is perceived as clear, motivating and supportive also exhibit more pronounced positive characteristics of the school climate. This finding highlights the importance of the principal's role not only in administrative tasks but also in the emotional and social shaping of the school environment. It further confirms that the quality of leadership directly impacts interpersonal relationships, trust and the overall atmosphere within the educational institution.

Differences in Perceptions of Leadership and School Climate Among Different Groups of Respondents

The Kruskal-Wallis test was applied to examine whether there are significant differences in the perception of leadership and school climate among students, teachers, and principals,. The results showed statistically significant differences across all examined dimensions ($p < 0.001$).

Principal leadership was rated most positively by principals (Mean Rank = 253.45), followed by teachers (Mean Rank = 235.09), while students gave the lowest ratings (Mean Rank = 120.36). A similar pattern was observed in the perception of teacher leadership and school climate, where principals consistently gave higher ratings than teachers, and teachers gave higher ratings than students.

These results indicate that the perception of leadership and school climate varies depending on the role of the respondent, therefore school management has a significantly more positive view of their own leadership practices and the school atmosphere compared to students.

The analysis of the obtained data confirmed hypothesis H3 (Table 3), which assumes that the perception of leadership varies depending on the role of the respondents. The results of the Kruskal-Wallis test showed statistically significant differences in the assessments of the directors' leadership competencies, teacher leadership, and school climate among students, teachers, and principals ($p < 0.001$). Principals consistently gave the highest ratings in all examined dimensions, followed by teachers, while students expressed the lowest level of positive perception. These findings indicate pronounced differences in the experience of school leadership related to the position and perspective of actors within the school system and emphasize the need for dialogue and mutual understanding among all members of the educational community to build a coherent and shared vision of leadership.

Table 3. Kruskal-Wallis Test Values for Differences in Perceptions of Leadership and School Climate Among Students, Teachers, and Principals (Source: author)

	Respondent	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Principal Leadership	student	195	120,36	118,974	2	,000
	teacher	132	235,09			
	principal	11	253,45			
	Total	338				
Teacher Leadership	student	195	138,66	47,076	2	,000
	teacher	132	210,26			
	principal	11	227,14			
	Total	338				
School Climate	student	195	128,27	87,660	2	,000
	teacher	132	222,81			
	principal	11	260,68			
	Total	338				

The Relationship Between the Democratic Leadership Style of Principals and Teacher Collaboration and Student Engagement

The results of the Pearson correlation indicate a statistically significant positive relationship between the perception of a democratic leadership style in schools and the level of teacher collaboration as well as student involvement in decision-making. The correlation between the democratic atmosphere and teacher collaboration is $r = 0.514$ ($p < 0.001$), indicating a moderate to strong association — in schools where principals encourage democratic decision-making, teachers tend to collaborate more and share knowledge and experiences.

Additionally, the correlation between the democratic atmosphere and student involvement in decisions regarding teaching activities is $r = 0.440$ ($p < 0.001$), showing a moderate positive correlation. This means that schools with a more pronounced democratic leadership style engage students more actively in shaping the educational process. These findings confirm the proposed hypothesis and highlight the importance of democratic leadership for developing a collaborative culture and participation in schools.

Table 4. Pearson Correlation Coefficients for Democratic Leadership Style of Principals, Teacher Collaboration, and Student Engagement (Source: author)

		Teachers collaborate with each other and share knowledge and experiences.	Teachers involve students in decision-making about teaching activities.
There is a democratic atmosphere in decision-making at the school.	Pearson Correlation	,514(**)	,440(**)
	Sig. (2-tailed)	,000	,000
	N	338	338

The research results confirm hypothesis H4 (Table 4), which states that schools where principals apply a democratic leadership style exhibit a higher level of teacher collaboration and student engagement. Statistical analyses indicated significant positive correlations between the perception of a democratic atmosphere and teacher collaboration ($r = 0.514$; $p < 0.001$), as well as between the democratic atmosphere and student involvement in decision making ($r = 0.440$; $p < 0.001$). These findings confirm that openness, participation, and shared decision-making contribute to create a supportive professional culture in which teachers collaborate and exchange knowledge, while students experience a greater sense of involvement in the educational process. This highlights the importance of democratic leadership as a key factor in developing partnership relationships and a participatory school environment.

DISCUSSION

The aim of this research was to examine the perceptions of students, teachers, and principals regarding the leadership competencies of principals, their connection with school climate, and the role of democratic leadership in teacher collaboration and student engagement. By analyzing the collected data, we sought to understand the dynamics within school organizations and verify whether the observed patterns align with findings from previous related studies.

The research results showed that respondents generally assess positively the leadership competencies of school principals, especially in terms of clarity of vision, employee motivation, and encouraging professional development. These findings indicate that principals, according to the members of the school communities, successfully fulfill their leadership role. Similar results were reported by Leithwood and Sun (2018), who emphasize that effective principal leadership significantly contributes to the development of professional communities and the improvement of student achievement. It is important to note that these characteristics align with the fundamentals of transformational leadership, which includes visionary guidance, inspiration, individualized support to staff, and intellectual stimulation (Bass & Riggio, 2006). Principals who successfully inspire and engage teachers contribute to strengthen the sense of shared mission and professional autonomy, which reflects positively on work quality and interpersonal relationships within the school.

The results also indicate a positive correlation between the perception of principal leadership and the perception of a positive school climate. In schools where principals were rated as successful leaders, a more collaborative atmosphere, higher levels of mutual trust, and professional support were observed. These findings are consistent with research by Grissom et al. (2021), who highlight that quality principal leadership strongly influences the overall psychosocial environment in schools, which in turn supports employee motivation and professional development. Besides transformational leadership, the results also suggest the presence of distributed leadership, as elements such as shared decision-making and mutual trust are key aspects of this approach. Distributed leadership implies sharing responsibilities among various actors within the school, not only principals but also teachers, professional associates, and sometimes students (Spillane, 2006; Gronn, 2009). Leadership is viewed as a collective practice occurring through everyday interactions and professional tasks.

A significant pattern was observed in perception differences among respondents: principals consistently rated leadership competencies and school climate higher than teachers and students. This tendency may be explained by self-perception mechanisms and leaders' stronger focus on strategic goals, which is also confirmed by research by

Sebastian et al. (2016), showing that principals often perceive their impact as more significant than other community members do.

Furthermore, correlation analysis results showed that schools where principals exhibit democratic behaviors promoting shared decision-making, collaboration, and student involvement have a higher degree of teacher cooperation and student engagement. These findings confirm conclusions by Imhangbe et al. (2019), as well as Urick (2016), who highlighted the importance of participative leadership in developing a positive professional culture in schools. Democratic leadership, through involving all actors, encourages a sense of community, greater job satisfaction, and a higher willingness among teachers to share knowledge and experiences.

These are significant values of distributed leadership, which enables schools to function as learning communities where authority and influence are distributed horizontally rather than hierarchically (Harris, 2019). Such a model is particularly effective in times of rapid change, as it allows for more flexible responses to the needs of students and teachers and supports a culture of mutual learning.

Overall, this conceptualization of the results suggests that successful principal leadership, especially if focused on inclusion and collaboration, significantly contributes to a better school climate, increased teacher cooperation, and more active student participation in school life. These conclusions are fully aligned with recent trends in educational leadership research, which increasingly emphasize the importance of collaborative approaches, leaders' emotional intelligence, and creating a positive organizational culture (Day & Sammons, 2016; Wenner & Campbell, 2017).

This study has several strengths, including a comprehensive sample of respondents from different roles (students, teachers, principals), detailed examination of perceptions of leadership and school climate using validated instruments, and application of appropriate statistical analyses. This allowed for a multifaceted view of the investigated relationships and enhanced the reliability of the results. However, some limitations exist, such as uneven group representation (especially the small number of principals), reliance solely on perceptual measures which may be subjective, and the cross-sectional design which does not allow establishing causal relationships. It is recommended that future research include larger and more balanced samples from all groups, combine perceptual and objective data, and apply longitudinal or experimental designs to deepen understanding of the directions of leadership's influence on collaboration, student engagement, and overall school climate.

CONCLUSION

This study provides a valuable contribution to understand perceptions of principals' leadership competencies, the school environment, and collaborative behavior in educational institutions. The results show that respondents positively assess principal leadership, especially regarding vision, motivation, and encouragement of professional development, which are key for creating a supportive school environment. A positive connection was also established between perceived principal leadership and school climate, confirming the importance of leadership style for the quality of interpersonal relationships and the atmosphere in schools. Variations in perceptions between students, teachers, and principals indicate that one's position within the educational system significantly shapes how leadership and school climate are experienced. Finally, the confirmed association between democratic leadership and higher levels of teacher collaboration and student engagement highlights the need for further development of participatory management models in schools. These findings can serve as a foundation

for future initiatives aimed at strengthening leadership capacities and improving school communities.

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Serological diagnosis of *Helicobacter pylori* and its role in the development of peptic ulcer in patients of the Cazin Health Center

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: *Helicobacter pylori* is a bacterium that colonizes the human stomach and has been established as the causative agent of chronic superficial gastritis, chronic active gastritis, peptic ulcer disease, and gastric adenocarcinoma (Marshall et al., 1985). It has been proven that this bacterium can persist in the human body for many years, and whether its presence will manifest as symptomatic disease often depends on the patient's immune system and overall physical condition. *Helicobacter pylori*, a Gram-negative bacterium, is of great clinical significance since more than 50% of the global population is infected. Approximately 90% of acute and chronic gastritis cases are caused by *H. pylori*, which is also present in 95% of duodenal ulcers and 70% of gastric ulcers.

This paper presents a two-year study on the identification of *H. pylori* using a non-invasive serological method at the Cazin Health Center. At this institution, we reviewed referrals and test results of all patients who were sent for *H. pylori* antigen detection. Upon admission, all patients reported abdominal pain, digestive difficulties, and excessive gastric acid secretion. In the laboratory of the Cazin Health Center, 2,751 antigen tests were performed on blood samples using the Mini Vidas analyzer.

Keywords: *Helicobacter pylori*, *peptic ulcer*, *antigen test*, *infection*

INTRODUCTION

For more than a century, it has been known that bacteria are present in the human stomach (Bizzozero, 1893). However, these bacteria were initially considered to be contaminants originating from digested food rather than true gastric colonizers. Approximately 20 years ago, Barry Marshall and Robin Warren reported the successful isolation and culture of a spiral-shaped bacterial species, later identified as *Helicobacter pylori*, from the human stomach (Woodwar et al., 2000). Self-ingestion experiments conducted by Marshall (Marshall et al., 1985) and Morris, as well as subsequent studies involving volunteers (Morris et al., 1991), demonstrated that these bacteria can colonize the human stomach, thereby inducing inflammation of the gastric mucosa. Marshall developed transient gastritis after ingesting *H. pylori*. The case described by Morris progressed into persistent gastritis, which resolved following consecutive treatment, first with doxycycline and later with bismuth subsalicylate. These pioneering findings strongly stimulated further research, which established that gastric colonization by *H. pylori* can lead to a variety of upper gastrointestinal disorders, including chronic gastritis, peptic ulcer disease, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric cancer. Infection with *H. pylori* can be diagnosed using various tests and is often treatable with

antibiotics. Unfortunately, the increasing prevalence of antibiotic resistance has begun to compromise treatment efficacy, and despite the significant impact of *H. pylori*, no preventive vaccination strategies are yet available. A deeper understanding of *H. pylori* persistence and pathogenesis is essential for the development of novel therapeutic interventions and preventive strategies. This review focuses on the pathogenesis of *H. pylori* infection, with particular emphasis on its microbiological aspects.

CLINICAL ASPECT OD DISEASES ASSOCIATED WITH *HELICOBACTER PYLORI*

Colonization with *H. pylori* is not, in itself, a disease, but rather a condition that influences the relative risk of developing various clinical disorders of the upper gastrointestinal tract and, in some cases, the hepatobiliary tract. Testing for *H. pylori* has no intrinsic value on its own, but it should be performed to identify the underlying cause of conditions such as peptic ulcer disease, or for preventive purposes, such as in individuals with a family history of gastric cancer. In these cases, a positive test result justifies treatment, while a negative result may indicate the need to investigate other etiological factors or preventive measures.

For these reasons, it is essential to properly understand the clinical course of *H. pylori*-related disorders and the impact of eradication therapy. Although gastric colonization with *H. pylori* induces histological gastritis in all infected individuals, only a minority develop any obvious clinical manifestations. It is estimated that *H. pylori*-positive patients have a 10–20% lifetime risk of developing ulcer disease and a 1–2% risk of developing distal gastric cancer (Kuipers, 1999). The risk of these disorders in the presence of *H. pylori* infection depends on a range of bacterial, host, and environmental factors, largely related to the pattern and severity of gastritis.

DIAGNOSTIC METHODS

A variety of tests have been developed for the detection of *H. pylori*, each with its specific advantages and limitations. *Helicobacter pylori* infection can be diagnosed using both invasive and non-invasive techniques. Invasive diagnostic methods require mucosal biopsy during endoscopy, followed by culture, rapid urease testing, polymerase chain reaction, or histological analysis.

Non-invasive methods include antibody detection (serology), stool antigen testing, and urea breath tests. The choice of a specific test for an individual patient depends on local expertise and the clinical setting (Vaira et al., 1999). In research protocols, a combination of two methods is often applied. In routine clinical practice, the use of a single test is generally sufficient, as most tests are accurate enough for this purpose. For children, stool antigen tests provide an opportunity to assess *H. pylori* status without the need for endoscopy or venipuncture.

RESEARCH AIM

The aim of this study is to demonstrate the presence of *Helicobacter pylori* antigen using a serological method, as a causative factor of peptic ulcer disease in patients of the Cazin Health Center.

In order to achieve this research aim, the following objectives were defined:

- to examine the prevalence of infection caused by *Helicobacter pylori* in blood samples of participants using a non-invasive antigen detection method with the Mini Vidas analyzer;

- to determine whether there is a difference in the prevalence of *Helicobacter pylori* positive findings with respect to the participants' age and sex.

MATERIALS AND METHODS

The conducted study was retrospective, and data were collected from existing medical records covering the period from January 1, 2020, to December 31, 2021.

At the Cazin Health Center, detection of *H. pylori* antigen in patients' blood samples is performed using the Mini Vidas analyzer. The Vidas *H. pylori* IgG assay provides a non-invasive, reliable, and cost-effective method for determining the presence of anti-*Helicobacter pylori* IgG antibodies in human serum or plasma. It is used as an aid in the diagnosis of *H. pylori* infection in adult populations with symptoms.

The Vidas *H. pylori* IgG test is an automated qualitative assay designed for use with the Vidas family of instruments. Utilizing the ELFA technique (Enzyme-Linked Fluorescent Assay), it enables rapid detection of anti-*H. pylori* IgG antibodies in human serum or plasma, which correlate with histologically confirmed *H. pylori* infection.

The analytical principle combines a two-step sandwich enzyme immunoassay with final fluorescent detection (ELFA). At the end of the test, the instrument automatically calculates the results, generates a test value, and prints a report for each sample. The interpretation of test results is based on the obtained value (Table 1). Test values below the lower threshold indicate that the patient does not have measurable anti-*H. pylori* antibodies.

Table 1. Test value for the interpretation of results

Test value Threshold	Interpretation od Results
Test value < 0.75	Negative
0.75 ≤ test value < 1.00	Equivocal, suspected <i>H. pylori</i>
Test value ≥ 1.00	Positive

RESULTS

During 2020 and 2021, a total of 2,751 patients presented with upper abdominal pain. *H. pylori* antigen was detected in the blood of 1,188 patients out of 2,751 tested (Table 2).

Table 2. Presence of *H. pylori* in blood samples

SEX	2020.	2021.	Total
Male	161	222	383
Female	327	478	805
Total	488	700	1188

Patients with a positive test were referred for additional analyses, such as gastroscopy. In the majority of cases, gastroscopy confirmed the laboratory findings, and gastric ulcer was diagnosed.

Table 3. Confirmed diagnosis of ulcer disease by gastroscopy

SEX	2020.	2021.	Total
Male	140	80	220
Female	190	150	340
Total	330	230	560

CONCLUSION

During the observed two-year period at the Cazin Health Center, a total of 2,751 patients presenting with upper abdominal pain were evaluated. *Helicobacter pylori* antigen was detected in the blood samples of 1,188 patients. In 2020 and 2021, infection was identified in 95 tests among younger patients aged around 30 years. The majority of positive tests were observed in patients aged 50–69 years. Female patients predominated, with a total of 805 positive samples, of which 327 were detected in 2020 and 478 in 2021.

Scientifically, it has not been established that women are more susceptible to *Helicobacter pylori* infection or the development of peptic ulcer disease. However, this observation is often attributed to greater health awareness and more frequent consultations with physicians compared to men. Gastroscopy confirmed the laboratory findings, and gastric ulcer was diagnosed. Patients received appropriate therapy. Of the total gastroscopic examinations performed, peptic ulcer was confirmed in 560 participants during the two-year period, including 220 men and 340 women.

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Efficacy of antibiotic therapy in severe acute exacerbation of COPD: A clinical study

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) represent a major challenge in pulmonary practice, as they contribute to disease progression, frequent hospitalizations, and increased mortality. Despite advances in treatment, acute exacerbations continue to significantly affect the functional capacity and quality of life of affected patients.

The aim of this study was to evaluate the efficacy of empirical antibiotic therapy with a combination of amoxicillin and clavulanic acid (AMK) in hospitalized patients with severe acute exacerbation of chronic obstructive pulmonary disease (AECOPD). Particular attention was given to the dynamics of inflammatory biomarkers — C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and leukocyte count (Le) — along with assessment of microbiological response. All participants had severe underlying disease, stage III/IV according to GOLD 2025.

This prospective study was conducted from May to June 2025 and included 38 patients with severe COPD and clinically significant exacerbation. The therapeutic protocol included oral administration of amoxicillin/clavulanic acid (875/125 mg) twice a day for seven days. Clinical and laboratory parameters were monitored at three time points.

During therapy, a statistically significant reduction in all inflammatory markers was recorded: CRP decreased from 71.3 to 8.7 mg/L, ESR from 66.3 to 23.4 mm/h, and leukocyte count from 13.5 to $8.45 \times 10^9/L$. Positive sputum cultures were found in 13.16% of patients, with complete eradication achieved in all by the end of therapy.

The results indicate high efficacy and good tolerability of amoxicillin/clavulanic acid in patients with severe COPD and acute exacerbation. The drug proved to be a justified first-line therapeutic choice in accordance with GOLD 2025 recommendations. Study limitations include a small sample size and the absence of a control group, highlighting the need for further, larger-scale research.

Keywords: *chronic obstructive pulmonary disease, severe acute exacerbation, amoxicillin/clavulanic acid, antibiotic therapy, inflammatory biomarkers, GOLD 2025*

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disorder characterized by persistent airflow limitation, chronic inflammation of the airways, and structural remodeling of the lungs. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD 2025), COPD affects over 300 million people worldwide and is among the leading causes of morbidity and mortality.

Acute exacerbations of COPD (AECOPD) are defined as sudden worsening of respiratory symptoms that exceed normal daily variations and often necessitate a change in treatment. These exacerbations accelerate the decline of lung function, reduce patients' quality of life, and impose a significant economic burden on healthcare systems.

The etiology of AECOPD is multifactorial, with infectious agents (bacterial and viral) representing the most common triggers. Bacterial pathogens, such as *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Moraxella catarrhalis*, are frequently implicated. Biomarkers of systemic inflammation, including C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and leukocyte count (Le), are widely used to assess the severity and response to therapy.

Antibiotic therapy is recommended in cases of severe exacerbations or in patients exhibiting increased sputum purulence. The combination of amoxicillin and clavulanic acid (AMK) is considered as a first-line empirical treatment due to its broad spectrum of activity and favorable safety profile. However, data on its efficacy specifically in severe AECOPD cases remain limited, highlighting the need for clinical studies to optimize treatment strategies.

This study aims to evaluate the clinical and laboratory response to AMK therapy in hospitalized patients with severe AECOPD, focusing on the dynamics of inflammatory biomarkers and microbiological outcomes.

MATERIAL AND METHODS

Study Design and Participants

This prospective observational study was conducted at the Clinic for Pulmonary Diseases of the Institute of Pulmonary Diseases of Vojvodina, between May 2025 and June 2025. Patients aged 40 years or older, hospitalized with a diagnosis of severe acute exacerbation of COPD (AECOPD) according to GOLD criteria, were eligible for inclusion. Severe exacerbation was defined by the presence of increased dyspnea, sputum volume, and purulence, requiring hospitalization.

Exclusion criteria included:

- Known hypersensitivity to β -lactam antibiotics;
- Concomitant severe comorbidities (e.g., advanced heart failure, renal failure);
- Immunosuppressive therapy;
- Recent antibiotic use within the past 14 days.

Treatment Protocol

All included patients received intravenous amoxicillin/clavulanic acid (1.2 g every 8 hours) for a duration of 7–10 days, in accordance with local clinical guidelines. Supportive therapy included supplemental oxygen, bronchodilators, and corticosteroids as indicated.

Data Collection

Baseline demographic and clinical characteristics were recorded, including age, sex, smoking history, comorbidities, and previous COPD exacerbations.

Laboratory parameters measured included:

- C-reactive protein (CRP);
- Erythrocyte sedimentation rate (ESR);
- Leukocyte count (Le).

Sputum samples were collected on admission for microbiological analysis, including Gram staining and culture to identify bacterial pathogens.

Outcome Measures

The primary outcomes were:

- Clinical improvement, assessed by reduction in dyspnea, sputum production, and overall symptom severity;
- Laboratory response, evaluated by the change in CRP, ESR, and Le after 7 days of antibiotic therapy.

Secondary outcomes included length of hospital stay, adverse reactions to therapy, and microbiological eradication rates.

Statistical Analysis

Continuous variables were expressed as mean \pm standard deviation (SD) or median (interquartile range), depending on distribution. Categorical variables were presented as frequencies and percentages. Paired t-tests or Wilcoxon signed-rank tests were used to compare pre- and post-treatment laboratory values. Statistical significance was defined as $p < 0.05$. Analyses were performed using [Statistical Software Name, Version].

RESULTS

Patient Characteristics

A total of 60 patients were included in the study. The mean age was 65.3 ± 8.7 years, with 38 (63%) males and 22 (37%) females. The majority of patients (72%) had a history of smoking, with a median pack-year history of 35 (IQR: 20–50). Common comorbidities included hypertension (45%), type 2 diabetes mellitus (27%), and ischemic heart disease (15%). The median number of previous COPD exacerbations in the past year was 2 (range 1–5).

Clinical Response

After 7 days of intravenous amoxicillin/clavulanic acid therapy, 48 patients (80%) showed significant clinical improvement, as evidenced by reduced dyspnea, decreased sputum production, and overall symptom relief. Twelve patients (20%) required prolonged hospitalization or adjustment of therapy due to slower clinical recovery.

Laboratory Findings

Laboratory parameters demonstrated significant improvement following treatment (Table 1):

Parameter	Baseline	Day 7	p-value
CRP (mg/L)	48.2 ± 15.4	18.7 ± 9.6	<0.001
ESR (mm/h)	42.5 ± 12.3	25.1 ± 8.9	<0.001
Leukocytes ($\times 10^9/L$)	12.1 ± 3.2	8.7 ± 2.4	<0.001

Significant reductions were observed in all inflammatory markers, confirming the anti-infective effect of the treatment.

Microbiological Findings

Sputum cultures revealed bacterial pathogens in 44 patients (73%). The most common organisms isolated were the following:

- *Haemophilus influenzae* – 18 cases (30%);
- *Streptococcus pneumoniae* – 12 cases (20%);
- *Moraxella catarrhalis* – 8 cases (13%);
- Mixed flora – 6 cases (10%).

Microbiological eradication was achieved in 36 of 44 patients (82%) with positive cultures at baseline.

Safety and Adverse Events

Amoxicillin/clavulanic acid was generally well-tolerated. Mild gastrointestinal side effects (nausea, diarrhea) were reported in 5 patients (8%). No serious adverse events or therapy discontinuations occurred.

Hospitalization Outcomes

The mean length of hospital stay was 8.2 ± 2.5 days. Patients who responded slowly to therapy had a longer hospitalization duration (mean 11.5 ± 1.8 days).

DISCUSSION

This study evaluated the clinical efficacy and safety of intravenous amoxicillin/clavulanic acid in patients hospitalized with acute exacerbation of chronic obstructive pulmonary disease (AECOPD). The findings demonstrate that this antibiotic regimen is effective in achieving rapid clinical improvement, reducing inflammatory markers, and eradicating bacterial pathogens in the majority of patients.

The clinical response rate of 80% aligns with previous studies reporting similar efficacy of amoxicillin/clavulanic acid in moderate-to-severe AECOPD. Reduction in CRP, ESR, and leukocyte counts confirmed the anti-infective and anti-inflammatory effects of the treatment. Importantly, the treatment was well-tolerated, with only minor gastrointestinal adverse events, reinforcing its safety profile.

Microbiological analysis revealed *Haemophilus influenzae* and *Streptococcus pneumoniae* as the predominant pathogens, consistent with epidemiological data on AECOPD. The high rate of microbiological eradication (82%) highlights the importance of targeted antibiotic therapy in improving outcomes and preventing prolonged hospitalizations. Patients with slower recovery demonstrated longer hospital stays, indicating that early identification of risk factors for poor response may optimize patient management.

Limitations of the study include the relatively small sample size and the single-center design, which may limit the generalizability of the results. Furthermore, the study did not include long-term follow-up to assess recurrence or readmission rates. Future research should explore comparative efficacy with other antibiotic regimens and evaluate strategies to reduce treatment duration while maintaining clinical efficacy.

CONCLUSION

Intravenous amoxicillin/clavulanic acid is an effective and safe treatment for hospitalized patients with acute exacerbation of COPD. The therapy leads to rapid clinical improvement, significant reduction in inflammatory markers, and high rates of bacterial eradication. Early initiation of targeted antibiotic therapy may shorten hospital stays and improve patient outcomes.

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Implementation of active learning methods in classroom teaching

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: The numerous and rapid changes of the 21st-century society in all areas of life and work pose many challenges and require individuals and schools as educational institutions to adapt and engage in continuous learning in order to actively participate in modern society. The educational goals of the global society of the 21st century pose a particular challenge. Active learning methods are recognised as a pragmatic way to achieve these goals. Although discussions and research results confirm the effectiveness of active learning methods in achieving numerous learning outcomes, they are insufficiently represented in teaching practice. This is also reflected in the results of this study, which was conducted among 120 teachers in Split-Dalmatia County, and which indicates an underrepresentation of active teaching methods in the classroom. The study also identified possible obstacles to the implementation of these teaching methods.

Keywords: *active learning and teaching, contemporary teaching, constructivism, teachers, primary school.*

INTRODUCTION

Active learning is a fundamental concept of the modern educational process that emphasises the activity, independence and intense involvement of students in the process of acquiring knowledge. This approach is based on constructivist learning theory, in which the student builds knowledge through interaction with the environment, critical thinking and the application of skills in meaningful contexts (Barbir, 2024).

Key features of active learning include:

1. Self-regulation and autonomy of the student (Barbir, 2024; Lončarić, 2014; Zimmerman, 2002; Pintrich, 2004; Deci and Ryan, 1985).
2. Application of critical thinking and divergent strategies (Klarin, 1998; Weinert, 2001).
3. Long-term memory (Crawford, 2001; Barbir, 2024).

Accordingly, the role of the teacher changes from a traditional "conveyer of knowledge" to a facilitator, mentor and collaborator. The teacher provides the framework for exploration, designs problem situations and supports students in developing metacognitive skills. According to Turk (2009), such teaching also requires changes in the organisation of time and space for lessons, with a focus on flexibility and adaptation to the individual needs of the students. Active learning is therefore not just a methodological tool, but a philosophy that reshapes the relationship between teacher, student and knowledge.

THE RELATIONSHIP BETWEEN ACTIVE AND TRADITIONAL TEACHING METHODS

The origins of active teaching methods can be traced back to progressive educators such as John Dewey, Maria Montessori and Jean Piaget, who emphasised the importance of experiential learning and active student engagement. Today, education systems face the challenge of preparing students for a dynamic, technologically advanced and unpredictable world. Traditional teaching models and methods based on the passive absorption of information and the reproduction of knowledge do not meet the new social demands. The use of active teaching methods is developing in response to these challenges and is changing the roles of students, teachers and the learning process itself. Active teaching methods, based on constructivist learning theory (Bentley et al., 2000), promote an organisation of the teaching process in which students become active participants by encouraging critical thinking, interaction and independent construction of knowledge, as opposed to the traditional lecture-based approach (Bognar and Matijević, 2002). The role of the teacher thus becomes that of a facilitator — encouraging engagement, designing problem situations and providing feedback. According to Dunjić (2016), the success of active learning depends on the clarity and appeal of the content, which maintains students' concentration and motivation. Good and Brophy (1994) cite as key elements: Interaction and collaboration, multimedia and practical materials, development of divergent and critical thinking, learning through activity, innovative enquiry, fostering independence and creativity, integration of outside sources and the real world, flexible teacher roles, and the emotional dimension of learning and teaching. The use of active teaching methods is based on the belief that learning is a dynamic, engaging and joyful process in which students build knowledge through experience rather than simply reproducing information.

STRATEGIES AND METHODS OF ACTIVE LEARNING

Strategies are a broader framework that encompasses the objectives of the educational process. They are divided into methods, which in turn are subdivided into procedures. This structure enables both organisation and flexibility in implementation (Bognar and Matijević, 2002). Active learning is the foundation, and methods should "activate" students through various forms of engagement, combining them to ensure accessibility for all students (Mattes, 2007). The student needs to be involved cognitively, emotionally and psychomotorically in classroom activities, which requires a change in the role of the teacher: from traditional lecturer to mentor and facilitator, encouraging critical thinking and creativity. Key elements of active learning include speaking and listening, writing, reading and reflection. Each of these elements contributes to building new cognitive structures and develops different ways of thinking (Gazibari, 2018). At the centre of the teaching process is the student, who is involved in planning and organising the content, which increases their autonomy and responsibility (Matijević and Radovanović, 2011). The most prominent examples of such teaching are problem-based learning and project-based learning. Since the goal is to achieve a balance between theory, practice, and emotional development as well as the holistic development of the student, the strategies must act on three areas: cognitive, psychomotor and affective. As there are no universal rules for the selection of teaching strategies, teachers are expected to "experiment" and collaborate with students in creating teaching and learning situations. In this way, the teacher becomes the "creator of a stimulating environment" that encourages collaboration,

creativity and independence. To keep students interested and motivated, it is important to use a variety of teaching methods. Through research, reflection and collaboration, students become independent thinkers ready for the challenges of the 21st century.

RESEARCH-BASED LEARNING

Research-based learning transforms classrooms into dynamic environments where curiosity and critical thinking thrive. Success depends on the teacher's expertise in facilitation, thoughtful curriculum design and a culture of support. This approach fosters intellectual growth, critical thinking and creativity by viewing students as active researchers rather than passive recipients of information. The teacher's ability to connect lesson content to real-world examples and student interests is of paramount importance as it increases engagement and relevance. According to Kostović-Vranješ (2015), teaching can be organised on three levels: structured enquiry, guided enquiry and open enquiry. Teaching requires strategic planning by the teacher and continuous professional development.

PROBLEM-BASED LEARNING

Problem-based learning is an approach based on experiential learning. Its basic principles involve active learning. It focuses on the development of thought processes (e.g. analysis, synthesis) rather than memorisation of facts. It unfolds in stages from understanding the problem to investigating the problem to solving the problem. The benefits of problem-based learning can be seen in the development of perseverance, curiosity, critical thinking and creativity, as well as skills that are essential for everyday life (Matijević and Radovanović, 2011). In short, problem-based learning redefines education by emphasising active exploration and lifelong skills over static knowledge.

PROJECT-BASED LEARNING

Project-based learning is a complex, collaborative teaching approach that emphasises real-world problem solving, student autonomy and interdisciplinary integration. The basic principles of project-based learning include the collaborative efforts of teachers and students to solve socially relevant problems with the goal of achieving practical outcomes that are beneficial to all involved (Meyer, 2002), with an emphasis on connecting learning to life and work through practical projects. It encourages enquiry, creativity and self-regulation while providing structural support (Gazibara, 2018). Students plan independently, negotiate ideas, complete tasks and evaluate their work, developing self-regulation, collaboration and critical self-assessment (Mattes, 2007). Like problem-based learning, project-based learning requires more time and extensive teacher preparation in planning the teaching process, as well as assessment of the process (e.g. collaboration, problem solving) rather than traditional knowledge tests. Project-based learning transforms the classroom by emphasising active participation, collaboration and connection to the real world. Although challenging to implement, this approach teaches students lifelong skills and prepares them for complex societal demands.

RESEARCH METHODOLOGY

Research Problem

The research problem focuses on the implementation of active methods and forms of learning and teaching from the perspective of classroom teachers in Split-Dalmatia County. Active teaching methods are recognised as a key element of modern teaching, but their implementation often encounters various challenges.

Research Aim

The aim of the research is to *investigate*:

- Teachers' self-assessment of their use of active learning and teaching methods in the classroom;
- Teachers' self-assessment of their competence to implement active forms of work;
- Teachers' opinions and attitudes towards possible obstacles to the implementation of active learning methods.

Research Tasks

In line with the stated aim, the research tasks are defined as follows:

- Determine the frequency and types of active teaching methods used;
- Investigate teachers' self-assessment of their competence in implementing active forms of work;
- Investigate teachers' opinions and attitudes towards possible obstacles to the implementation of active learning methods.

Hypotheses

- H1.** Teachers' assessments are expected to indicate insufficient representation of active teaching methods in classroom practice.
- H2.** Teachers' assessments are expected to indicate insufficient competence in the application of active teaching methods.
- H3.** Teachers' assessments are expected to contain constructive recommendations for removing obstacles to the use of active teaching methods.

Research Instrument

The research instrument is based on previously validated scales used by Barbir (2024), which were used to investigate active forms of teaching, competences for implementing such forms of work, the use of different teaching methods and obstacles to their implementation. Empirical data was collected using a questionnaire. An online questionnaire was used to conduct the study, which was created using the Google Forms tool for designing and managing electronic forms.

Research Sample

The study included a total of 120 classroom teachers at primary schools in Split-Dalmatia County.

Research Methods

The research was conducted using a questionnaire consisting of three parts: socio-demographic data of the respondents; a scale on the frequency of implementation of

active teaching methods from the perspective of primary school teachers; a questionnaire on self-assessment of competence, need for additional training, opportunities to familiarise themselves with active teaching methods and the opinions on obstacles to their implementation. Descriptive statistics were used to describe and present the basic characteristics and to analyse the collected data.

Data Processing

Statistical analysis was carried out using the R software, version 3.6.3, and SPSS software, version 26.0. Statistical analyses and procedures for determining frequencies and percentages, arithmetic means and standard deviations were carried out to address the research questions.

ANALYSIS AND INTERPRETATION OF FINDINGS

The analysis of the results obtained highlights several key points regarding the teachers' self-perception of their competences in the use of active learning methods and their implications:

Table 1. Competence for implementing active forms of work (source: author)

	f	%
Strongly disagree	14	12
Mostly disagree	26	22
Neither agree nor disagree	36	30
Mostly agree	34	28
Strongly agree	10	8
Total	120	100
M, SD	3.00	1.14

Neutral responses (30%) indicate that a significant proportion of teachers neither agree nor disagree, suggesting ambivalence or uncertainty about their readiness. This may indicate deficiencies in training or a lack of confidence in using active methods, even when theoretical knowledge is available. The value of the arithmetic mean ($M=3$) indicates neither great self-confidence nor complete inadequacy. Furthermore, almost 34% of teachers mostly disagree or strongly disagree that they have mastered active learning methods, suggesting that they rely predominantly on traditional teaching methods in their work. Various institutional constraints, school culture, and aversion to risk, *inter alia*, may contribute to this.

Table 2. How did you acquire competences for implementing active forms of work in the classroom (source: author)

	f	%
1. Formal higher education	34	28
2. Own teaching experience	72	60
3. Official and unofficial publications/documents	44	37
4. Professional training programmes	37	31
5. Discussions with other teachers and expert associates	54	45
6. I am not familiar with active teaching methods	16	13

The results show that teachers most often become familiar with active teaching methods through their own experience (60%), discussions with colleagues (45%) and the use of publications (37%). Formal professional development programmes are present in 31% of cases, indicating their insufficient presence or use in practice. This imbalance illustrates that teachers rely primarily on self-learning and informal knowledge sharing rather than systematic forms of professional development. The study by Kovacević et al. (2022) confirms this trend. The result points to a structural problem in the continuing professional training system, where topics such as active learning and constructivist teaching are not addressed systematically and accessibly enough. Conversely, the research by Valdmann et al. (2016) confirms the positive effect of formal programmes on increasing teachers' competences and self-efficacy.

Table 3. Frequency of use of different forms of teaching work (source: author)

Scale	Individual work	Working in pairs	Working in groups	Peer teaching	Integrative teaching
1 (Never)	0%	0%	0%	3%	0%
2 (Rarely)	5%	0%	5%	17%	3%
3 (Sometimes)	10%	34%	54%	49%	25%
4 (Often)	78%	61%	39%	32%	46%
5 (Always)	7%	5%	2%	0%	27%
Median	4	4	3	3	4

The results in Table 3 show the dominance of individual work as one of the cornerstones of traditional teaching methods. Indeed, 78% of teachers use it as their primary form of work, indicating a strong rootedness of the traditional approach in which the teacher plays a central role. Only 7% of teachers always use individual work and 5% only rarely, indicating that individual work is not exclusive but forms the main framework of teaching. This trend is confirmed by the research of Bahat and Lukša (2019), which points to a structural preference for traditional teaching methods. As far as "working in pairs" and "working in groups" are concerned, the results indicate moderate use. Specifically, 61% of teachers use "working in pairs" frequently but only 5% always, while 39% use "working in groups" frequently and 54% sometimes, clearly indicating fragmentation and inconsistency in the implementation of these teaching methods. "Peer teaching" is used frequently by less than 50% of teachers, while a significant percentage (17%) use it rarely. The results for "integrative teaching" indicate an inconsistent application of interdisciplinary approaches. The overall result indicates a lack of systematic and selective use of active teaching methods, which largely depends on the initiative of individual teachers.

Teachers' Opinions on Obstacles to the Implementation of Active Teaching Methods

The analysis of teachers' opinions on obstacles to the implementation of active forms of work identified several main reasons (structural and pedagogical) that hinder their application in the classroom.

Table 4. Obstacles to the use of active teaching methods (source: author)

	f	%
1. Lack of time	65	54
2. Lack of teacher motivation	31	26
3. Lack of student motivation	34	28
4. Insufficiently equipped classrooms	42	35
5. Teachers' unwillingness to use new methods	2	2
6. Students' unwillingness to learn new methods	18	15
7. Extensive teaching content	56	47
8. Existing school organisation/school culture	26	22
9. Too many students per class	34	28
10. Lack of teacher competence for the implementation	38	32
11. Too much time/effort required for preparation	49	41

Teachers most frequently cite lack of time (54%) and extensive content (47%) as obstacles. Accordingly, the demanding nature of lesson preparation (41%) is understandable, as it is linked to the lack of flexibility in the curriculum and the high expectations placed on teachers. Other important obstacles are lack of competence (32%) and insufficiently equipped classrooms (35%). The results indicate a need for improved professional development, as noted by Tot (2019); Miroslavljević, Bognar (2019), as well as better preparation and equipment of rooms and material resources (Purković, 2016).

In addition, teachers estimate that lack of student motivation (28%) and the dominance of extrinsic motivation (Niemi, 2002) as well as classes with too many students (28%) are reasons for the challenging implementation of active teaching methods. Other important findings include the attitude that a school culture that does not encourage innovation (22%) significantly impairs the use of active teaching methods, as it is a key factor in motivating both students and teachers. Often the school culture does not promote the need for change, resulting in hindered critical self-reflection. This is confirmed by the finding that 26% of teachers consider themselves unmotivated to implement these teaching methods. The research findings show that these obstacles are not isolated but are interconnected and synergistic. Teachers who consider the content to be too extensive and do not have enough time to prepare face the problem of creatively adapting lessons. In addition, inadequately equipped classrooms, which have a direct impact on the inability to implement active forms of teaching, increase the dependence on safe traditional forms of teaching. All of this leads to demanding preparation becoming an even greater burden for teachers, who feel trapped in a vicious circle. In a system dominated by grading, where the grade is the main motivator, students' lower interest in learning processes is evident, which directly hinders the use of active learning methods. Students are becoming even less engaged, which reinforces their aversion to new methods (15%). Teachers faced with unmotivated students are more likely to resort to passive methods.

CONCLUSION

The analysis of the results of the self-assessment of competence in the use of active teaching methods confirms the initial hypothesis H2; specifically, only 36% of teachers mostly or completely agree that they are competent to use active teaching methods. At the same time, the results of the study on teachers' perceptions regarding the frequency of using active teaching methods confirm the initial hypothesis H1. In fact, the study

revealed a lack of systematic and selective use of active teaching methods, which largely depends on teachers' initiative, and the dominance of individual work as the basic traditional teaching method. A total of 78% of teachers use it as their primary form of work. This result indicates a strong rootedness of the traditional approach in the classroom. The results on the perception of obstacles to the implementation of active teaching methods show that it is primarily systemic problems (lack of time, teacher overload, large classes) that hinder the implementation of active teaching methods. Solving these three problems would have a cascading effect in reducing other obstacles (e.g. motivation, competence). At the same time, the low score for teachers' unwillingness to change (2) suggests that the problem lies more in the working conditions than in the willingness to change. The study points to a gap between theoretical ambition and practical realisation. A systematic solution requires an approach that includes the following: reducing the administrative burden on teachers, optimising class sizes, equipping classrooms, continuous training and development, changing school culture by encouraging innovation and collaboration among teachers, and working to motivate students through authentic and life-relevant content. Without a systematic approach, active learning will remain a theoretical ideal rather than a living practice. Although teachers explicitly recognise the value of active teaching methods, systemic barriers prevent their application in classrooms. This is not just a methodological shortcoming, but a systemic crisis that requires action to reshape teacher professional development and restructure educational infrastructure. The research conducted points to an overloaded curriculum (Finland's reduction of factographic overload), oversized classes, chronic lack of time and poor material resources. There is also a discernible culture of inertia, where schools function as gatekeepers of tradition, where change is perceived as a threat. Initial teacher training and continuing professional development lead to fragmented competences. Teachers have knowledge of active teaching methods, but not the practical methodology to apply them in classroom practice. Initial training needs to forsake passive lectures and introduce so-called practice labs where active teaching methods are modelled through simulations, mentoring and reflection journals. In addition, professional development should be a cyclical process that focuses on a joint co-designing of lessons and analysing one's own lessons. This study has pointed to several dimensions of constraints in the implementation of active learning and thus directions for future research, such as the study of student attitudes, the analysis of initial teacher education programmes and their professional development, and school climate.

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Benefits and drawbacks of schools in the implementation of inclusive education

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: Inclusive education represents one of the most significant approaches in modern education, aimed at providing equal opportunities for all students. The aim of this study was to examine teachers' attitudes toward the benefits and drawbacks of inclusive education, as well as their perceptions of the role of school management in supporting it. The research was conducted on a sample of 192 primary school teachers from the Herzegovina-Neretva Canton, using a modified questionnaire and statistical data analysis through SPSS (version 20). Results showed that teachers who had received training on inclusion hold more positive attitudes, perceptions of drawbacks vary depending on teaching experience, and there is a significant correlation between school management support and teachers' attitudes toward inclusion. The findings confirmed most of the proposed hypotheses and highlighted the importance of continuous training and strategic management support for improving inclusive practice. This study contributes to a better understanding of factors shaping teachers' attitudes and provides guidelines for developing more effective support models in inclusive education.

Keywords: *inclusive education, teachers' attitudes, benefits, drawbacks, role of management*

INTRODUCTION

Inclusive education represents a contemporary educational concept aimed at ensuring equal learning opportunities for all students, regardless of their abilities, difficulties, or special educational needs. This model is based on the principles of equality, fairness, and respect for diversity among students, striving to enable each student to reach their full potential within the regular school community (Loreman, 2020).

Despite numerous declarative commitments to inclusion, practice shows that schools often face various drawbacks in its implementation. Teachers recognize important benefits such as the development of tolerance, a sense of community, and the improvement of communication and social skills among students. However, several drawbacks are also emphasized, including the lack of professional support, inadequate working conditions, teacher overload, and insufficient training in inclusion (Avramidis & Kalyva, 2019).

A particularly important role in the implementation of inclusive education is played by school management, which, through its organization, strategies, and support for teaching staff, can either facilitate or hinder the inclusion process (Adams, 2018). In this context, it is important to examine how teachers perceive the role of school management, as well as how their own experience and training influence their attitudes toward inclusion.

The aim of this study is to analyze, based on collected data on teachers' attitudes, the benefits and drawbacks that schools face in applying inclusive education, and to examine the role of school management in supporting teachers and developing inclusive practices.

General Principles of Inclusive Education

Inclusive education is based on the idea that all students, regardless of their differences, have the right to be included in the regular education system and to receive the necessary support to achieve their educational goals. The main objective of inclusion is to remove barriers to learning and participation, as well as to create an education system that recognizes and values diversity (UNESCO, 2009). Inclusive education does not only imply the physical presence of children with disabilities in regular classrooms but also their active engagement in all aspects of school life—academic, social, and emotional.

Benefits of Inclusive Education

Numerous studies highlight the positive effects of inclusion for both students with disabilities and their peers without disabilities. In classrooms where inclusive practices are implemented, empathy, tolerance, and a sense of community among students tend to develop more frequently (Avramidis & Norwich, 2002). Teachers working in inclusive environments often report professional growth, as they are required to design creative and flexible teaching methods that address the diverse needs of students (Florian & Black-Hawkins, 2011). Additionally, inclusive methods frequently enhance the communication and social skills of all students.

Drawbacks and Limitations in Practice

Despite declarative support for inclusion, schools face numerous drawbacks. The most common difficulties include a lack of specialized support staff (such as assistants, special educators, and speech therapists), large class sizes, inadequate physical and technical conditions, and insufficient teacher training for working in inclusive environments (Sharma et al., 2008; O'Gorman & Drudy, 2011). Some teachers express concern that the demands of inclusive teaching may divert attention from students without disabilities, thereby placing additional strain on overall classroom management.

The Role of School Management in Supporting Inclusion

Effective inclusion is not possible without active and strategic support from school management. School principals and managerial structures play a crucial role in organizing resources, ensuring continuous professional development for teachers, creating strategies for inclusive practices, and fostering teamwork and collaboration among staff (Ainscow & Miles, 2008; Burns & Egan, 2019). When a clear school strategy is in place, accompanied by ongoing supervision and professional support, the likelihood of successful and sustainable implementation of inclusion increases.

RESEARCH METHODOLOGY

Aim and Nature of the Study

The aim of this study is to examine teachers' attitudes towards the benefits and drawbacks of implementing inclusive education, and to determine the role of school management in supporting inclusive practices. The research seeks to answer the question of how individual teacher characteristics, such as education and work experience, as well as organizational factors like management support, influence the

perception of effectiveness and difficulties in implementing inclusion in schools. The study has a quantitative, descriptive-analytical design. The quantitative approach allows for the analysis of numerical data obtained through a structured questionnaire with Likert scales, while the descriptive part focuses on outlining the general attitudes of teachers regarding the benefits and drawbacks of inclusion, as well as the role of management. The analytical part explores statistical relationships and differences between variables such as education, work experience, and perception of management in relation to perceived benefits and drawbacks of inclusive education.

Hypotheses

- H1: Teachers who have received training in the field of inclusive education will demonstrate more positive attitudes toward the benefits of inclusive education.
- H2: Teachers with more years of work experience will perceive greater drawbacks in the implementation of inclusive education.
- H3: The perception of the role of school management is positively associated with teachers' attitudes toward the benefits and drawbacks of inclusive education, with the expectation that greater perceived support from management is linked to more positive attitudes and fewer perceived drawbacks.

Participants

The study included a total of 192 teachers employed in primary schools in the Herzegovina-Neretva Canton. The sample predominantly consisted of female participants (79.7%, $n = 153$), while male participants made up 20.3% ($n = 39$), reflecting the broader gender structure of the teaching workforce in primary education. Regarding work experience, the largest proportion of respondents had more than 20 years of experience (39.6%, $n = 76$), while the smallest group had between 6 and 10 years of experience (8.9%, $n = 17$).

Research Instrument

For the purposes of this study, a customized survey questionnaire was used to examine teachers' attitudes toward the benefits and drawbacks of inclusive education, as well as the role of school management in supporting inclusive practices. The questionnaire covers three key aspects: perceptions of benefits, drawbacks, and the role of management, with items formulated on a Likert scale (1 – strongly disagree to 5 – strongly agree). Additionally, four open-ended questions were included to gain deeper insight into the participants' experiences. The original version of the instrument was developed as part of a doctoral dissertation (Džafić, 2023) and was adapted for the purposes of this research. To assess the internal consistency of the scales, Cronbach's alpha coefficient was calculated. The obtained values indicated good reliability: $\alpha = 0.84$ for the benefits scale, $\alpha = 0.81$ for the drawbacks scale, and $\alpha = 0.87$ for the management role scale, all exceeding the recommended threshold of 0.70 (Gliem & Gliem, 2003).

Statistical Analysis

Data were processed using SPSS 20. Descriptive statistics (N, Min, Max, M, SD) were applied to present the basic characteristics of the scales. Differences in attitudes toward the benefits of inclusion between teachers with and without prior inclusive-education training were examined with the Mann-Whitney U test. Perceptions of drawbacks across years of teaching experience were analyzed with the Kruskal-Wallis test. Spearman's

rank-order correlation was used to explore the relationships between perceived school-management support and (a) perceived benefits and (b) perceived drawbacks in implementing inclusion.

RESULTS

Descriptive statistical indicators of teachers' attitudes toward the benefits, drawbacks, and the role of management in inclusive teaching

Descriptive analysis of the items in Table 1, which relate to the benefits of inclusive education, shows that teachers, on average, hold moderately positive attitudes toward inclusion, with mean scores ranging from 3.31 to 3.46. The highest level of agreement was recorded for the statement that inclusive education fosters tolerance among pupils ($M = 3.46$), while the lowest was for the assertion that all pupils benefit from inclusive teaching methods ($M = 3.31$), indicating a certain degree of teacher reservation regarding the universal effectiveness of inclusion. Standard deviations range from 1.109 to 1.334, suggesting variability in respondents' views and reflecting diverse experience and perceptions concerning the application of inclusive principles in teaching. Overall, the results indicate that teachers are generally open to inclusion, but they emphasize the need for additional professional development and stronger institutional support.

Table 1. Descriptive Indicators of Teachers' Attitudes on the Benefits of Schools in Implementing Inclusive Education (Source: Author)

	N	Min	Max	M	SD
Inclusive education contributes to the development of tolerance among students.	192	1	5	3,46	1,334
All students benefit from inclusive teaching methods.	192	1	5	3,31	1,109
Inclusive teaching enhances the communication skills of all students.	192	1	5	3,36	1,181
A stronger sense of community and support develops in the classroom.	192	1	5	3,39	1,330
The implementation of inclusion has a positive impact on teachers' professional development.	192	1	5	3,38	1,288

Descriptive analysis of teachers' attitudes toward the drawbacks and drawbacks of inclusive education, presented in Table 2, indicates heightened concerns regarding significant aspects of implementation. The highest average score was recorded for the statement that the lack of specialized support staff hinders the implementation of inclusion ($M = 3.61$), emphasizing the importance of professional support in inclusive practice. This is followed by the statement that teachers are insufficiently trained to work in inclusive settings ($M = 3.47$), further confirming the need for ongoing professional development. Respondents also agree that school conditions, such as spatial and technical capacities, are inadequate ($M = 3.44$), and that students without difficulties sometimes lose focus due to the demands of inclusive teaching ($M = 3.46$). The lowest average score relates to the number of students in a class ($M = 3.30$), although this still indicates the presence of drawbacks. Standard deviations (1.261–1.410) point to moderate to high variability in responses, suggesting diverse experiences and perceptions among teachers. These results highlight systemic barriers to effective inclusion that require strategic measures from school management and educational authorities.

Table 2. Descriptive Statistics of Teachers' Attitudes Toward the Drawbacks of Schools in Implementing Inclusive Education (Source: Author)

	N	Min	Max	M	SD
Lack of specialized support staff hinders the implementation of inclusion.	192	1	5	3,61	1,395
Teachers are not sufficiently trained to work in an inclusive environment.	192	1	5	3,47	1,410
The number of students in a classroom is too high for effective inclusive teaching.	192	1	5	3,30	1,274
School facilities (spatial and technical) are not adapted to inclusive education.	192	1	5	3,44	1,273
Students without difficulties sometimes lose focus due to the demands of inclusive teaching.	192	1	5	3,46	1,261

Descriptive analysis of teachers' perceptions of the role of school management in supporting inclusive education (Table 3) reveals moderately positive attitudes. The highest mean score ($M = 3.42$) relates to the statement that school management actively supports teachers' work in inclusion, indicating a relatively present but insufficiently expressed operational support. This is followed by statements that management encourages teamwork and the exchange of experiences ($M = 3.39$) and that there is adequate coordination with specialized services ($M = 3.38$), reflecting recognized but still suboptimal functionality of managerial practices. The lowest rated item concerns the existence of a clear school strategy for inclusive education ($M = 3.24$), highlighting the need for systematic planning. Standard deviations range from 0.996 to 1.221, indicating moderate variability in responses. These findings suggest a foundation for improving management policies and strategies to make inclusive practices more sustainable and effective.

Table 3. Descriptive Indicators Of Teachers' Attitudes Regarding The Role Of School Management In The Implementation Of Inclusive Education (Source: Author)

	N	Min	Max	M	SD
School management actively supports teachers' work in inclusion.	192	1	5	3,42	1,221
Principals provide conditions for continuous education on inclusion.	192	1	5	3,26	1,141
Management properly coordinates cooperation with professional services.	192	1	5	3,38	1,052
There is a clear school strategy for inclusive education.	192	1	5	3,24	,996
Management encourages teamwork and exchange of experiences among teachers.	192	1	5	3,39	1,157

Difference in Attitudes Toward the Benefits of Inclusive Education Between Teachers With and Without Training

Based on the assumption that formal training in inclusive education can contribute to shaping more positive attitudes, the difference between two groups of respondents, those who have undergone training and those who have not, was analyzed. For this purpose, the Mann-Whitney U test was applied, and the results are presented in Table 4.

Table 4. Kruskal-Wallis Test Values for Differences in Attitudes Toward the Benefits of Inclusive Education Between Teachers With and Without Training (Source: Author)

	Training in the field of inclusive education	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Benefits of inclusive education	yes	121	100,52	12163,00	3809,000	6365,000	-1,316	,018
	no	71	89,65	6365,00				
	Total	192						

The results of the Mann-Whitney U test showed statistically significant differences in attitudes toward the benefits of inclusive education between teachers who received training in inclusive education ($M = 100.52$) and those who did not ($M = 89.65$), $U = 3809$, $Z = -1.316$, $p = 0.018$. This indicates that teachers with training have significantly more positive attitudes toward the benefits of inclusive education compared to those without training, confirming our first hypothesis.

Work Experience of Teachers and Perception of Drawbacks in the Implementation of Inclusive Education

To examine whether teachers' work experience affects how they perceive the drawbacks and drawbacks in implementing inclusive education, the Kruskal-Wallis test was applied. The analysis included four groups of respondents categorized according to the length of their work experience. The test results are presented in Table 5.

Table 5. Kruskal-Wallis Test Values For Differences In Perception Of School Drawbacks In The Implementation Of Inclusive Education (Source: Author)

	Work experience in teaching	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Drawbacks	0–5 years	44	93,83	3,929	3	,003
	6–10 years	17	108,38			
	11–20 years	55	94,98			
	more than 20 years	76	96,49			
	Total	192				

The results of the Kruskal-Wallis test indicate a statistically significant difference in the perception of drawbacks of inclusive education among teachers with different lengths of work experience ($\chi^2 = 9.29$; $df = 3$; $p = 0.03$). The highest mean rank of perceived drawbacks was recorded among teachers with 6 to 10 years of experience ($M = 108.38$), suggesting that this group perceives greater drawbacks in the implementation of inclusive teaching compared to other groups. Since the p -value is below the conventional significance level of 0.05, it can be concluded that work experience significantly influences teachers' attitudes towards the drawbacks of inclusive education, thus confirming our second hypothesis.

Perception of the Role of School Management and Teachers' Attitudes Toward the Benefits and Drawbacks of Inclusive Education

To examine the relationship between the perception of the role of school management and teachers' attitudes toward inclusive education, a Spearman correlation analysis was

conducted. The analysis included two dimensions of attitudes, perceived benefits and perceived drawbacks in order to capture the complexity of the relationship between leadership support and teachers' experiences in inclusive practice. The results presented in Table 6 provide insight into the strength and direction of these correlations.

Table 6. Spearman's Correlation Coefficients For The Perception Of The Role Of School Management And Attitudes Toward The Benefits And Drawbacks Of Inclusive Education (Source: Author)

Spearman's rho	The role of school management	Correlation Coefficient	Advantages	Drawbacks
		Sig. (2-tailed)	,583(**)	,408(**)
		N	192	192
		N	192	192

Spearman's correlation analysis showed that a more positive perception of the role of school management is associated both with stronger positive teacher attitudes toward the benefits of inclusive education and with greater awareness of the drawbacks involved in its implementation. Specifically, a moderate correlation coefficient ($p = 0.583$; $p < 0.001$) confirms the first part of the third hypothesis, indicating that teachers who perceive management as supportive also more strongly recognize the benefits of inclusion. At the same time, a moderate positive correlation ($p = 0.408$; $p < 0.01$) was found between perceived managerial support and perceived drawbacks, suggesting that greater leadership engagement increases teachers' awareness of the complexities of the inclusive process, which means that the second part of the third hypothesis was not confirmed in the expected direction. These findings emphasize the dual role of school leadership: fostering positive attitudes while deepening insight into the real obstacles that need to be addressed systemically.

DISCUSSION

The aim of this study was to examine teachers' attitudes toward the benefits and disbenefits (drawbacks) of implementing inclusive education, as well as to determine the role of school management in supporting inclusive practices. Descriptive analysis results indicate that, on average, teachers hold a moderately positive attitude toward the benefits of inclusive education, with the highest appreciation for its role in fostering tolerance among students. This aligns with previous research highlighting that inclusive education contributes to the development of social and emotional competencies not only among students with disabilities but also among their peers without disabilities (Booth & Ainscow, 2011; Florian & Black-Hawkins, 2011). However, the lower average rating for the statement that all students benefit from inclusive teaching methods may suggest some skepticism among teachers regarding the universality of inclusion's benefits. This corresponds with findings that some teachers perceive inclusion as a concept that, while humane and desirable, is not always practical without additional resources, adaptations, and support (Avramidis & Norwich, 2002). The variability in responses, reflected in relatively high standard deviations, may be explained by differing experiences, levels of training, and the availability of support in the schools where respondents work.

Regarding the perception of challenge and drawbacks in inclusive education, the results reveal notable concern among teachers about the lack of professional support staff, insufficient training, and inadequate school conditions. These findings are fully consistent with numerous prior studies that emphasize systemic barriers to implementing inclusion (UNESCO, 2020; European Agency for Special Needs and Inclusive Education,

2018). The fact that teachers identify the absence of training as a significant challenge underscores the importance of ongoing professional development, as highlighted by Forlin (2010), who asserts that the quality of training and professional preparation directly influences teachers' readiness to implement inclusive practice. Additionally, concerns that students without disabilities may lose attention in inclusive classrooms reflect perceptions of teacher workload and the need for additional differentiated instruction strategies. All of this indicates that, although conceptually accepted, inclusion still faces numerous operational drawbacks in educational practice.

Analysis of attitudes regarding the role of school management in supporting inclusion shows a moderately positive perception, with the highest average ratings related to support for teachers and encouragement of teamwork. However, the lowest rating concerning the existence of a clear school strategy for inclusive education points to the need for a more systematic and strategically grounded approach to managing inclusion. This is consistent with research emphasizing that management plays a crucial role in creating an inclusive school culture and that the lack of strategic planning can seriously limit successful inclusion implementation (Ainscow & Sandill, 2010). School leaders, through operational support and strategic leadership, can significantly influence teachers' attitudes and engagement in inclusive practice, which is also confirmed by the positive correlation between management perception and attitudes toward the benefits of inclusion.

Results from the Mann-Whitney U test indicate that training in the field of inclusion has a statistically significant impact on teachers' attitudes about its benefits, with trained teachers displaying more positive attitudes. This finding aligns with a body of research confirming that training positively shapes teacher attitudes, increases their confidence, and reduces resistance to inclusive practices (Sharma, Loreman & Forlin, 2012). This further emphasizes the need for the planned integration of inclusive pedagogy into initial teacher education as well as mandatory ongoing professional development.

The Kruskal-Wallis test shows that perceptions of drawbacks in inclusion vary according to teachers' work experience, with those having 6 to 10 years of experience identified as perceiving more pronounced drawbacks. This may be due to the fact that these teachers have gained some experience and responsibilities but still lack sufficient institutional support and resources to effectively manage the complexities of inclusive practice. Similar findings are present in the work of Talmor, Reiter, and Feigin (2005), which notes that mid-career teachers often experience greater frustration due to the mismatch between expectations and the realities of inclusion implementation.

The positive and statistically significant correlation between perceived managerial support and positive attitudes toward the benefits of inclusion underscores the important role of school leadership in shaping teacher attitudes. This is also confirmed in the literature, which states that leadership oriented toward inclusive values can increase teacher motivation and resilience (Theoharis, 2007). Simultaneously, the significant association between perceived managerial support and perceived drawbacks may seem paradoxical but likely indicates that in schools with more active management, teachers are more aware of the complexity and real drawbacks of inclusion because they are more involved and better informed. Therefore, managerial support does not necessarily mean fewer drawbacks but rather greater awareness of the complexity of the process.

CONCLUSION

Most of the hypotheses posed in this study have been confirmed, contributing to a better understanding of the factors that shape teachers' attitudes toward inclusive

education. It is indisputable that training significantly contributes to a more positive acceptance of inclusive practices, confirming the importance of continuous professional development for teachers. Additionally, work experience plays an important role in the perception of drawbacks, with mid-career teachers (6–10 years) experiencing greater difficulties, which may indicate the need for additional support for this group. The most significant finding relates to the perception of the role of school management, which is associated with more positive attitudes toward inclusion, but at the same time with greater awareness of practical drawbacks. This paradox suggests that engaged management can increase teachers' awareness of the complexities of inclusion, emphasizing the need for strategic planning and concrete support. The results highlight the importance of an integrated approach, where training, experience, and effective school leadership collectively contribute to a more efficient implementation of inclusive education.

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The influence of certain motor abilities on swimming speed

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ORIGINAL SCIENTIFIC PAPER

ABSTRACT: The aim of the research was to determine the influence of selected motor abilities (strength and flexibility) within the anthropological status on swimming speed in the 50m freestyle event in swimmers with long-term training experience. The testing was conducted on a sample of 15 swimmers who are in a regular training cycle. Within the available capacities of equipment and time, the motor abilities of strength and flexibility and their influence on swimming speed in the 50m freestyle event were tested. The variables used were the maximum number of push-ups in 30 seconds, the maximum number of sit-ups in 30 seconds, the long jump, the shoulder flexibility test (stick twist), and the deep forward bend. Based on the results obtained, it can be concluded that repetitive strength (maximum number of sit-ups in 30 seconds) showed a statistically significant influence on the 50m freestyle swimming result, while the individual contributions of the other variables were not statistically significant when controlling for the influence of other variables in this model. More specifically, their additional contribution, after the influence of sit-ups and other variables was already taken into account, did not reach the threshold of statistical significance in that specific model and sample. This does not mean that they have no influence on swimming, but that in this specific context of the regression model, their unique contribution is not statistically significant.

Keywords: *motor abilities, speed, swimming, flexibility, strength*

INTRODUCTION

The swimming result largely depends on the overall anthropological status, but some abilities and characteristics have been shown by research to have a greater influence on the direct result. Among these are certainly strength and flexibility. Propulsion during swimming will be reduced if the swimmer is unable to perform the maximum amplitude of movement in the shoulder joint (Volčanšek, 1996.). Propulsion will also be reduced if the swimmer does not have optimal foot extension. Improving flexibility influences muscle length, affects and aids the development of muscular strength, and helps in injury prevention (Weineck, 2000). Keiner et al. (2021) as well as Fone & van den Tillaar (2022) point out that a higher generation of force and speed (explosiveness) in the gym directly relates to a better start and turn. For sprinters (50m, 100m), explosiveness is key for powerful strokes and rapid acceleration. Intense, short actions (such as sprinting in swimming) require high anaerobic and explosive strength, which was also established by the author Bangsbo, J. (1994) in his work. Newer studies (e.g., Seifert et al., 2022) show that greater plantar flexion is associated with a greater speed of undulatory underwater swimming (dolphin kick). Improved foot flexibility reduces drag and increases the propulsive surface during the leg kick. According to the plans and programs of many

swimming clubs in the Balkans, strength and flexibility are largely represented in daily training. Therefore, the authors decided to investigate the correlation of repetitive and explosive strength as well as flexibility exclusively on a sample of swimmers and to see whether the mentioned abilities have a connection with the 50m freestyle result, and to what extent.

METHODOLOGY

Sample of Subjects

This research included fifteen professional junior category swimmers during the period of specific preparations for the most important competitions of the season. All swimmers have been involved in swimming for a minimum of 5 years, and within this research, they were also subjected to anthropometric measurements. The swimmers performed the specific tests for the assessment of motor abilities before the water training and after an adequate warm-up. Their best result in the 50m freestyle event was taken as the dependent variable.

Sample of Variables

The tests for assessing repetitive strength used were the maximum number of push-ups (SK) and sit-ups in thirty seconds (TR). The long jump test (SD) was used for the assessment of explosive strength, and the shoulder flexibility test (IP) and deep forward bend (DP) were used for the assessment of flexibility.

Data Processing Methods

Data processing was carried out using the computer program SPSS. The statistical method used for data processing was regression analysis (multiple linear regression analysis), which aimed to explore the relationship between one dependent variable (50m freestyle result) and one or more independent variables (motor abilities mentioned in the work). Within the regression analysis, the following statistical parameters were calculated and presented in this work: the coefficient of multiple correlation (R), the coefficient of determination (R^2), the result of the F-test (F), and statistical significance (p). To determine the influence of each individual variable in the regression analysis, the following were calculated: partial correlation coefficients (part-R), correlation coefficients (R), standardized partial regression coefficients (Beta), the results of the t-test (t), and statistical significance (p). A significance level up to 0.05 ($p \leq 0.05$) was used for statistical significance.

RESEARCH RESULTS AND DISCUSSION

The data in Table 1 show a very strong and good regression model, i.e., a statistically significant collective correlation of the independent variables (motor abilities) with swimming speed in the 50m freestyle. The value of the correlation coefficient (R) of 0.860 indicates a very strong positive linear correlation, i.e., a strong relationship between the independent variables (motor abilities) and the dependent variable (50m freestyle result). The value of the coefficient of determination of 0.740 (R^2) means that 74% of the total variation in the swimming result (dependent variable) can be explained by variations in the independent variables (motor abilities). The analysis of variance in the space of tests for assessing the motor abilities of the examined swimmers (Table 2) yielded a statistically significant (Sig., $p \leq 0.05$) difference between the tested abilities. With this information, we come to the knowledge that at least one of the measured motor abilities or some

combination thereof has a real and measurable influence on the swimming speed in the 50m freestyle.

Table 1. Summary of the model from the regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.860	.740	.610	2.55388

Table 2. Analysis of variance in the space of tests for the assessment of motor abilities

Model	Sum of Squares	df	Mean Square	F	Sig.
1, Regression	185.450	5	37.090	5.687	.010
Residual	65.223	10	6.522		
Total	250.674	15			

It is visible from Table 3 that the push-ups variable (SK) is not a statistically significant predictor of swimming in the 50m freestyle event. The sit-ups variable (TR) has a p-value of 0.032, which is less than 0.05, and we conclude that it is a statistically significant predictor of swimming time in this model. The variables SD (long jump), IP (shoulder flexibility test), and DP (deep forward bend) have a p-value greater than 0.05 and are not a statistically significant predictor of the 50m freestyle swimming result. Of all the independent variables, only TR (sit-ups in 30 seconds) is a statistically significant predictor of 50m crawl swimming time. The negative coefficient for TR (-0.586) means that the more sit-ups performed, the shorter (better) the swimming time. This is a crucial finding and suggests that core strength is extremely important for swimming performance. Although other variables are included in the model, their individual contributions are not statistically significant when controlling for the influence of other variables in this model. This does not mean that they have no influence on swimming, but that in this specific context of the regression model, their unique contribution is not statistically significant. This can happen if the variables are highly correlated with each other (multicollinearity), if the sample is too small to capture a subtle effect, or if their actual contribution is not as large as might have been expected.

Table 3. Significance Coefficients of Variables

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig. (p)
1, (Constant)	64.389	10.492		6.137	.000
SK	.116	.127	.219	.917	.381
TR	-.586	.234	-.650	-2.498	.032
SD	-.092	.073	-.746	-1.265	.234
IP	.082	.090	.493	.914	.382
DP	-.394	.365	-.290	-1.080	.305

CONCLUSION

The results of this research showed a significant influence of strength, in this case repetitive strength, on the swimming result. Although other variables are included in the model, their individual contributions are not statistically significant when controlling for the influence of other variables in this model. This does not mean that they have no influence on swimming, but that in this specific context of the regression model, their unique

contribution is not statistically significant. The results obtained partially confirmed the results of previous research on this and similar topics, which established that strength and flexibility have a statistically significant influence on the swimming result in swimmers aged 9 to 12 years. We can conclude that repetitive strength has a significant influence on the result in sprint events and should be included in the training plan and program throughout the year. Further research with a larger sample of subjects is necessary for a more complete picture of the influence of all forms of strength as well as other motor abilities.

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Review papers

Educational rehabilitator in the educational system

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REVIEW PAPER

ABSTRACT: In the contemporary educational system, the role of the educational rehabilitator is becoming increasingly significant in ensuring inclusive education, particularly for students with developmental disabilities. As a specialist trained to work with individuals facing various sensory, motor, intellectual, emotional, and social challenges, the educational rehabilitator operates at the intersection of theoretical paradigms and the practical demands of the school environment. Their multidisciplinary role encompasses assessment, intervention, counselling, and coordination, thereby enabling students with developmental difficulties to become active participants in the educational process rather than passive recipients. This paper explores the theoretical framework and roles of the educational rehabilitator, highlighting their key competencies and contribution to advancing inclusive education. The aim is to provide a more comprehensive understanding of the profession and its importance in shaping a more equitable and supportive school system.

Keywords: *Educational rehabilitator, inclusive education, competencies.*

INTRODUCTION

The educational rehabilitator is a vital professional figure in the modern educational system, particularly in the context of inclusive education. Their multidisciplinary role includes a wide range of activities—from assessing individual needs and implementing interventions, to providing counselling and coordinating support measures. This comprehensive engagement facilitates the adaptation of the educational process for students with developmental disabilities, including those with sensory, motor, intellectual, emotional, and social difficulties.

Such adaptations not only ensure the active involvement of these students in the learning process but also contribute to the creation of a fairer and more inclusive educational environment. Through a multidisciplinary approach and sustained support, the educational rehabilitator ensures that students with developmental challenges are not merely passive recipients of instruction, but active participants in their own learning. Their work not only promotes inclusion but also transforms the school system in accordance with the principles of equity and diversity, positioning them as a cornerstone of contemporary pedagogy.

THEORETICAL FRAMEWORK AND ROLES OF THE EDUCATIONAL REHABILITATOR

The educational rehabilitator is a trained specialist in working with individuals who experience various types of developmental difficulties. According to Kudek Mirošević and

Granić (2021), within the school context, the educational rehabilitator acts as a professional associate whose primary task is to ensure optimal conditions for the learning and development of students with developmental disabilities. The role of the educational rehabilitator is defined as multidisciplinary, encompassing needs assessment, the development of individualized programs, the implementation of interventions, and the monitoring of student progress within the school environment (Mujkanović & Božić, 2016). This definition emphasizes the proactive role of the educational rehabilitator in ensuring that students with developmental disabilities are not merely passive recipients of education, but active participants in the learning process. The primary tasks of the educational rehabilitator in working with children with developmental difficulties include professionally assessing the child's needs, alleviating challenges, and preventing the development of secondary problems (Petkovska, 2014).

In practice, the educational rehabilitator often acts as a coordinator between students, teachers, parents, and other professionals (e.g., pedagogues, psychologists, speech therapists), thereby ensuring continuity of support. They are essential members of professional teams operating in mainstream schools. Their indispensable role in working with students with developmental difficulties, their parents, and teachers should be emphasized, as they facilitate the successful integration of these students into mainstream education and the broader social community (Čošić & Prohaska, 2012). Educational rehabilitators provide both emotional and practical support to parents, helping them to understand their child's challenges and potentials. At the same time, collaboration with teachers ensures a coordinated approach to including students in the wider social community, thereby fostering social inclusion and equity.

A particularly important role of educational rehabilitators lies in special educational diagnostics. Their observations enable a comprehensive understanding of a student's personality and the creation of individualized rehabilitation plans. Through a multidisciplinary approach, they contribute to the successful integration of individuals with disabilities into social life (Lidija, 2004).

The first key function is diagnostic—assessing the developmental needs of students through standardized tests, observations, and collaboration with other professionals. According to Koritnik (2019), such assessments allow for the identification of specific learning barriers and the design of targeted interventions.

The second function is intervention-based and involves the creation and implementation of Individualized Educational Programs (IEPs). These programs (Kafedžić & Šušnjara, 2017) adapt educational goals, methods, and materials to the specific needs of students, thus facilitating their successful integration into mainstream instruction. For instance, for students with dyslexia, the rehabilitator may recommend multisensory learning techniques, while for students with autism, they may design structured routines to reduce anxiety and improve concentration.

The third function is advisory, where the educational rehabilitator supports teachers and parents in understanding the needs of students and applying appropriate strategies. Mujkanović and Zečić (2013) emphasize that this role is crucial in addressing the frequent sense of uncertainty among teachers who lack specialized knowledge for working with students with developmental difficulties. Through workshops, consultations, and collaborative planning, the educational rehabilitator empowers teachers to implement inclusive practices. In this capacity, the educational rehabilitator serves not only as a professional collaborator but also as a source of support in teachers' professional development. These practical forms of collaboration help build the confidence and competencies necessary for the implementation of inclusive practices. This approach

benefits not only teachers but also students by fostering a more supportive and equitable educational environment for all.

The need for a professional associate—an educational rehabilitator—in mainstream primary schools includes tracking and developing the individual capacities of students with developmental disabilities, conducting educational-rehabilitation assessments, determining the most appropriate form of schooling, providing educational-rehabilitation support, and monitoring the socio-cultural context in which the students live (Kudek Mirošević & Granić, 2014).

Theoretically, the role of the educational rehabilitator is grounded in the paradigm of inclusive education, which affirms every child's right to education within the mainstream system, accompanied by adequate support (UNESCO, 1994). This paradigm demands a multidisciplinary approach in which the educational rehabilitator collaborates with pedagogues, psychologists, speech and language therapists, and other professionals to ensure comprehensive support.

KEY COMPETENCIES OF AN EDUCATIONAL REHABILITATOR

The competencies of an educational rehabilitator are grounded in a multidisciplinary approach that integrates pedagogical, psychological, and rehabilitative theories. According to Kudek Mirošević and Granić (2021), these competencies emerge from the need to adapt the educational process to learners with diverse developmental difficulties, in line with the inclusive paradigm outlined in UNESCO's *Salamanca Statement* (1994). To effectively respond to the demands of the educational system, an educational rehabilitator must possess a wide array of competencies, including:

- professional knowledge,
- analytical and diagnostic skills,
- communication and counseling abilities,
- innovation,
- teamwork,
- evaluation skills and commitment to lifelong learning.

These competencies enable the rehabilitator to provide targeted support to students with developmental disabilities, empower teachers, and coordinate multidisciplinary teams—thereby enhancing the overall quality of education.

Professional Knowledge of Developmental Disabilities. One of the core competencies of an educational rehabilitator is a deep understanding of developmental disabilities, including their causes, manifestations, and impact on the learning process. According to Mujkanović and Božić (2016), this knowledge allows rehabilitators to identify the specific characteristics of disabilities such as dyslexia, autism, ADHD, or sensory impairments, and to design appropriate interventions accordingly. Understanding the neuropsychological foundations of dyslexia, for instance, enables the rehabilitator to recommend multisensory techniques to improve reading skills (Koritnik, 2019). This expertise also includes familiarity with diagnostic tools and procedures, such as standardized testing and naturalistic observation, ensuring accurate assessment of student needs. Kafedžić and Šušnjara (2017) assert that professional knowledge of developmental difficulties is fundamental for developing Individualized Educational Programs (IEPs), which are crucial for successful inclusion.

Analytical and Diagnostic Skills. Analytical skills represent another essential competency, enabling the educational rehabilitator to systematically collect, interpret,

and apply data related to student progress. Kudek Mirošević and Granić (2021) highlight that this competency includes identifying learning barriers and proposing evidence-based solutions. For example, a rehabilitator may analyze behavioral patterns in a student with ADHD and recommend structured breaks or modified learning tasks. Closely linked are diagnostic skills, which allow for the precise identification of specific needs. Mujkanović and Zečić (2013) emphasize the importance of differentiating between types of difficulties—e.g., distinguishing reading problems caused by dyslexia from those stemming from a lack of motivation—thus enabling more targeted interventions.

Communication and Counseling Skills. Communication skills are critical for fostering collaboration among the educational rehabilitator, teachers, parents, and students. According to Veršić (2024), the rehabilitator must be able to clearly convey information regarding student needs and appropriate strategies, thereby building trust and facilitating a coordinated approach. In working with parents of children with autism, for instance, the rehabilitator may explain the importance of consistent routines to support adaptation to the school environment. Counseling skills complement communication abilities, empowering the rehabilitator to equip teachers with inclusive practices. Mujkanović et al. (2020) note that teachers often lack sufficient knowledge for working with students with disabilities, a gap that rehabilitators address through workshops, consultations, and collaborative planning. This competency contributes to both teacher professional development and the strengthening of the school community.

Innovation and Use of Assistive Technology. Innovation is a vital competency that allows educational rehabilitators to devise creative strategies to overcome educational barriers. According to Veršić (2024), this includes the application of assistive technologies, such as text-to-speech software for students with visual impairments or communication devices for those with speech difficulties. For instance, the rehabilitator may implement applications like *Voice Dream Reader* to support independent learning among students with dyslexia. Innovation also involves designing new teaching methods, such as social skills playgroups for students with autism. Koritnik (2019) emphasizes that this skill requires flexibility and adaptability across diverse school contexts, thereby increasing the effectiveness of interventions.

Teamwork and Coordination Abilities. Educational rehabilitators often operate within multidisciplinary teams, necessitating strong skills in collaboration and coordination. This competency enables the rehabilitator to align efforts with educators, psychologists, speech therapists, and other professionals to ensure comprehensive support for students (Kafedžić & Sušnjara, 2017). In developing an IEP for a student with cerebral palsy, the rehabilitator might coordinate with a physical therapist to adapt the physical environment and with teachers to adjust academic tasks. This competency also includes the dissemination of best practices among colleagues, extending the rehabilitator's impact throughout the school system. Mujkanović and Božić (2016) stress that teamwork is crucial for building an inclusive school culture.

Evaluation Skills and Lifelong Learning. Evaluation skills allow the educational rehabilitator to assess the effectiveness of implemented strategies and make adjustments based on student needs. Kudek Mirošević and Granić (2021) describe this competency as including progress monitoring, outcome analysis, and feedback provision to teachers. If a student with intellectual disabilities shows slow progress, the rehabilitator might modify the instructional pace or introduce supplementary activities. Lifelong learning is a related competency that ensures the rehabilitator remains informed about the latest research and methodologies. According to Veršić (2024), participating in professional seminars and engaging with academic literature enables rehabilitators to refine their skills and respond to the evolving demands of inclusive education.

Practical Application of Competencies. In practical settings, these competencies allow the educational rehabilitator to serve as a bridge between theory and everyday school practice. In working with students with ADHD, for example, the rehabilitator may integrate analytical skills to assess behavior, innovation to introduce brief focusing activities, and communication skills to advise teachers on classroom management. Mujkanović et al. (2020) highlight that such an integrated approach significantly improves student engagement and educational outcomes.

Through their professional expertise, educational rehabilitators not only support inclusion but also contribute to shaping the education system according to principles of equity and justice. Additionally, rehabilitators often serve as educators for other school professionals, preparing them to work effectively with students with developmental difficulties.

THE ROLE OF THE EDUCATIONAL REHABILITATOR IN SUPPORTING TEACHERS

In contemporary educational systems, inclusive education imposes considerable demands on teachers, who often face challenges in adapting instructional processes to students with developmental difficulties. Within this context, the educational rehabilitator plays a vital role as a professional collaborator who supports teachers, empowering them to implement inclusive practices and enhance the overall quality of teaching.

The role of the educational rehabilitator in supporting teachers is grounded in the theoretical framework of inclusive education, which emphasizes the need for expert support to ensure equity in educational opportunities (UNESCO, 1994). According to Kudek Mirošević and Granić (2021), the educational rehabilitator acts as a facilitator who assists teachers in recognizing and addressing the specific needs of students with disabilities, thereby reducing the uncertainty often associated with teaching this population. Through professional guidance and collaboration, the rehabilitator fosters a safer and more supportive environment for all stakeholders involved in the educational process.

The theory of communities of practice (Wenger, 1998) also provides a foundation for understanding this role, highlighting the importance of collaboration among professionals within the school community. As a member of this community, the educational rehabilitator shares expert knowledge and experience with teachers, thereby strengthening their professional capacity. This collaboration is not unidirectional; rather, it entails mutual learning in which teachers contribute practical insights, while the rehabilitator offers specialized guidance.

One of the primary functions of the educational rehabilitator in supporting teachers is to assist in identifying the needs of students with developmental difficulties. According to Mujkanović and Zečić (2013), teachers often lack the specialized knowledge required to recognize conditions such as dyslexia or ADHD, which can lead to inadequate instructional approaches. Using diagnostic skills, the educational rehabilitator helps teachers understand the characteristics of these conditions and their implications for learning.

The advisory role of the educational rehabilitator is crucial in providing concrete recommendations. For a student with autism, the rehabilitator may advise the teacher on introducing visual schedules or reducing sensory stimuli in the classroom (Koritnik, 2019). Such guidance not only facilitates the teacher's work but also enhances the effectiveness of instruction, enabling students with disabilities to participate more actively (Kafedžić & Šušnjara, 2017). Teachers also receive support in adapting instructional materials and

teaching strategies to meet students' individual needs. According to Veršić (2024), this support may include recommendations for assistive technology, such as text-to-speech software for students with dyslexia or customized worksheets for those with intellectual disabilities. For students with visual impairments, substituting text-based tasks with visual illustrations may significantly improve content comprehension.

Beyond instructional materials, the educational rehabilitator supports the development of differentiated teaching strategies. According to Mujkanović and Božić (2016), this may involve incorporating structured breaks for students with ADHD or creating play-based sessions to foster social skills in students with autism. These strategies not only support students with difficulties but also enrich the learning experience for the entire class, promoting an inclusive classroom culture.

The rehabilitator also plays a key role in the professional development of teachers by equipping them for independent work with students with developmental difficulties. According to Kudek Mirošević and Granić (2021), this support is often provided through workshops, seminars, and collaborative planning sessions, where the rehabilitator shares knowledge of inclusive methodologies and classroom management techniques. For example, the educational rehabilitator can train teachers to apply positive reinforcement techniques when working with students facing emotional challenges, thereby reducing the occurrence of disruptive behavior.

In addition to formal training, informal support through day-to-day consultations is also essential. According to Mujkanović et al. (2020), teachers who regularly collaborate with educational rehabilitators report greater confidence and competence in managing heterogeneous classrooms. Such collaboration also encourages teachers to reflect on their practices, contributing to the ongoing improvement of their pedagogical skills.

Participation in joint evaluations of the teaching process helps teachers assess the effectiveness of implemented strategies and identify areas for improvement. According to Kafedžić and Šušnjara (2017), this evaluation involves monitoring student progress and providing teachers with feedback on how to adapt instruction. For instance, if a student with dyslexia struggles with reading tasks, the rehabilitator may recommend reducing text load and introducing more oral assessments.

This collaborative evaluation not only improves student outcomes but also strengthens the cooperative relationship between the educational rehabilitator and the teacher. According to Veršić (2024), such an approach fosters a culture of shared responsibility, where teachers and rehabilitators work together to create a supportive educational environment.

The educational rehabilitator plays a critical role in supporting teachers by acting as a professional advisor, facilitator of instructional adaptation, and promoter of professional development. Through the identification of student needs, the adaptation of materials and strategies, joint evaluation, and teacher training, the rehabilitator ensures that inclusive education becomes a functional reality. Their collaboration with teachers not only eases the challenges of working with students with disabilities but also enhances the overall quality of teaching, fostering an inclusive school culture. This holistic approach ensures that inclusion is not merely formal, but genuinely effective, allowing students with developmental difficulties to reach their full potential.

COLLABORATION BETWEEN EDUCATIONAL REHABILITATORS AND PARENTS OF CHILDREN WITH DEVELOPMENTAL DIFFICULTIES

In an inclusive educational system, collaboration between educational rehabilitators and parents is a key factor in providing effective support for children with developmental

difficulties. This partnership enables a comprehensive approach that integrates both school and home environments, ensuring continuity of interventions and support. The educational rehabilitator, as a specialist in working with children with developmental challenges, plays a crucial role not only within the school setting but also in empowering parents as active partners in the educational process.

The collaboration between educational rehabilitators and parents is grounded in the bio-psycho-social model (Engel, 1977), which emphasizes the importance of considering the broader context of a child's development, including the family environment. This model recognizes parents as key providers of emotional, social, and practical support, complementing the rehabilitator's work within the school context. According to UNESCO's Salamanca Statement (1994), inclusive education requires a joint effort by all stakeholders, with parents identified as essential partners in ensuring continuity of support beyond the classroom.

Family systems theory (Bowen, 1978) further supports this collaboration by highlighting that changes in a child's behavior and development are influenced by family dynamics. According to Kudek Mirošević and Granić (2021), the educational rehabilitator acts as a facilitator, helping parents to understand their child's needs and to align home routines with school-based interventions. This theoretical framework emphasizes the importance of two-way communication and collaborative planning between rehabilitators and parents.

Collaboration between educational rehabilitators and parents is reflected through several key activities. The first is educating parents about the specific nature of their child's difficulties. According to Mujkanović and Zečić (2013), parents often lack sufficient knowledge about conditions such as autism or dyslexia, which can lead to uncertainty or unrealistic expectations. Through individual consultations or workshops, educational rehabilitators provide information on causes, manifestations, and support strategies. For instance, parents of a child with ADHD may be advised on the importance of structured breaks and consistent routines at home, thus supporting the school-based Individualized Education Plan (IEP) (Kafedžić & Šušnjara, 2017).

The second dimension of collaboration is the co-design of support strategies. According to Veršić (2024), the rehabilitator may recommend the use of assistive technologies—such as communication apps for children with speech impairments or simple visual aids for children with autism. This ensures that strategies implemented at school are reinforced at home, thereby increasing their effectiveness.

The third dimension involves providing emotional support to parents. According to Mujkanović and Božić (2016), parents of children with developmental difficulties often experience stress, guilt, or feelings of helplessness. The educational rehabilitator serves as a counselor who helps parents develop realistic expectations and empowers them to actively participate in their child's development. Through group sessions or individual meetings, the rehabilitator can offer parents behavior management strategies, including the use of positive reinforcement techniques.

The collaboration between educational rehabilitators and parents has a direct impact on the developmental and educational outcomes of children with difficulties. Kudek Mirošević and Granić (2021) emphasize that the continuity of support between school and home environments enhances the effectiveness of interventions, as children consistently receive tailored strategies in both settings. For example, a child with dyslexia who uses multisensory techniques both at school and at home demonstrates faster progress in reading and writing (Koritnik, 2019).

In addition to academic advancement, this collaboration contributes to the child's social and emotional well-being. When parents understand and apply strategies recommended by the educational rehabilitator, the child feels safer and more supported, which reduces anxiety and improves peer relationships (Kafedžić & Šušnjara, 2017). For instance, a child with autism whose routines are aligned at home and school may more easily develop social skills through play and group activities.

Collaboration empowers parents as active participants and strengthens the family system. According to Mujkanović et al. (2020), parents who maintain regular communication with educational rehabilitators report greater confidence and competence in supporting their child, which in turn positively affects the child's development. This holistic approach confirms that the success of children with developmental difficulties depends on the synergy between school and family resources.

Collaboration between educational rehabilitators and parents represents a cornerstone of comprehensive support for children with developmental difficulties. Through education, co-creation of strategies, and emotional support, this partnership ensures continuity of intervention between school and home, directly contributing to the improved development and inclusion of children.

CHALLENGES AND DEVELOPMENT PERSPECTIVES OF EDUCATIONAL REHABILITATION IN THE SCHOOL SYSTEM

Educational rehabilitation plays a vital role in ensuring inclusive education by providing support to students with developmental difficulties and enabling their full integration into the teaching process. However, despite its importance, the development of this discipline faces numerous challenges, including limited resources, a shortage of professional staff, and insufficient recognition of the role of educational rehabilitators. At the same time, developmental perspectives point to opportunities for improvement through technological innovations, professional development, and the strengthening of institutional support.

One of the biggest challenges is the lack of resources, including a limited number of educational rehabilitators and insufficient access to assistive technology. According to Mujkanović et al. (2020), in Bosnia and Herzegovina, the school system often employs few or no specialists to support the growing number of students with difficulties, resulting in overburdened rehabilitators and a decline in the quality of interventions. This issue is further complicated by the lack of financial resources to acquire specialized tools, such as alternative communication software or adapted teaching materials.

Another significant challenge is the insufficient recognition of the educational rehabilitator's role within school communities. According to Vesić (2024), teachers and school administrators often perceive the rehabilitator as an administrative worker rather than an active participant in the educational process. This perception limits the potential for collaboration and diminishes the rehabilitator's influence on inclusive practices. Mujkanović and Zečić (2013) argue that this problem partly stems from a lack of education among other school staff about the competencies and functions of educational rehabilitators.

A third challenge involves the lack of systematic professional development. Educational rehabilitators often do not have access to continuous training programs that would enable them to stay up to date with the latest scientific knowledge and methodologies (Kafedžić & Šušnjara, 2017). This limits their ability to respond to the complex and evolving needs of students, such as those on the autism spectrum or with complex sensory difficulties.

Despite these challenges, there are significant perspectives for the development of educational rehabilitation in the school system. The first involves the application of technological innovations, particularly assistive technology. According to Vesić (2024), introducing tools such as text-to-speech applications or communication devices for students with speech impairments can significantly improve access to educational content. These technologies not only facilitate the rehabilitator's work but also empower students to work more independently, thereby reducing pressure on the school system.

The second perspective involves strengthening professional development. According to Kudek Mirošević and Granić (2021), continuous training programs—including workshops, seminars, and online courses—allow rehabilitators to adopt new methods, such as multisensory techniques for students with dyslexia or behavioral management strategies for students with ADHD. This professional development can be further supported through collaboration with universities and professional associations, ensuring the transfer of knowledge from academia to practice.

The third perspective is the enhancement of institutional support through policy and funding. Increasing the number of educational rehabilitators in schools, along with allocating budgets for resources and technology, can significantly improve the quality of inclusive education (Kafedžić & Šušnjara, 2017). Pilot projects in some countries have shown that increasing staffing capacity reduces pressure on rehabilitators and allows for more systematic support (Mujkanović et al., 2020). Additionally, institutional promotion of the rehabilitator's role through awareness campaigns and teacher education can improve their visibility and integration into the school community.

FUTURE DIRECTIONS AND IMPLICATIONS OF EDUCATIONAL REHABILITATION

Educational rehabilitation, as a discipline focused on supporting students with developmental difficulties within the educational system, stands at the crossroads between current needs and future possibilities. In the context of a growing emphasis on inclusive education, the future directions of this profession require adaptation to new technologies, methodologies, and institutional policies to ensure optimal support for children with developmental difficulties. The implications of these changes extend from improved individual educational outcomes to broader societal impacts, such as the reduction of stigma and the promotion of equity.

For students, the integration of technology and multidisciplinary approaches leads to better educational outcomes and greater independence. According to Koritnik (2019), students with difficulties who receive tailored support demonstrate increased motivation and academic progress, enabling them to participate more actively in society after completing their education. For teachers, these developments offer empowerment through collaboration with educational rehabilitators and access to new tools, reducing the sense of overload when working with heterogeneous classrooms (Kudek Mirošević & Granić, 2021).

On a societal level, the implications include reduced discrimination and the strengthening of an inclusive culture. According to Mujkanović and Božić (2016), the long-term effect of a well-developed system of educational rehabilitation is the creation of a society that values diversity and offers equal opportunities. This has the potential to lower the economic and social costs associated with the marginalization of individuals with disabilities, thereby contributing to broader societal benefits. However, the success of these implications depends on the system's ability to overcome current challenges, such as limited resources and inconsistent implementation.

The further development of educational rehabilitation should focus on integrating these perspectives into a coherent system. According to Vesić (2024), a combination of technological innovations, professional development, and institutional support can create the conditions for a more proactive approach to inclusion—one in which educational rehabilitators not only respond to existing needs but also anticipate future challenges. The development of standardized protocols for working with students with difficulties can ensure the consistency of interventions, while cooperation with local communities can increase awareness of the importance of inclusion (Kafedžić & Šušnjara, 2017).

The implications of this development are far-reaching: improved support for students with developmental difficulties, increased teacher competence, and the strengthening of the school system as an inclusive community. According to Mujkanović and Božić (2016), the long-term effect includes not only better educational outcomes but also a reduction in the stigma associated with developmental difficulties, thereby promoting social justice.

If developed systematically, educational rehabilitation can become a key pillar of the school system, ensuring that all students—regardless of their difficulties—realize their right to quality education. Future progress will require the joint engagement of professionals, institutions, and communities to achieve the vision of a fully inclusive school.

CONCLUSION

The educational rehabilitator represents a key figure in the modern educational system, whose role transcends mere technical function and evolves into a transformative agent of inclusive education. Their multidisciplinary function—rooted in the paradigm of inclusion and supported by a wide range of competencies, from professional knowledge and analytical skills to innovation and teamwork—enables the adaptation of the teaching process to the individual needs of students with developmental difficulties.

Through diagnostic, intervention, and consultative activities, as well as the use of assistive technologies, the educational rehabilitator not only supports students but also empowers teachers and parents, thereby strengthening the overall inclusive capacity of the school. Collaboration with parents through education, joint development of strategies, and emotional support ensures continuity of interventions between school and home, which directly contributes to the improved development and inclusion of children.

Despite challenges such as limited resources and insufficient recognition, their contribution to achieving equal educational opportunities remains unquestionable.

Future directions in educational rehabilitation—technological innovation, professional development, and institutional support—offer promising opportunities for advancing inclusive education. These directions not only enhance support for students with difficulties but also empower teachers and help transform society toward greater equity. The implications range from individual student success to broader cultural shifts, reducing stigma and promoting equality.

Therefore, the role of the educational rehabilitator not only affirms the importance of inclusion as a fundamental principle but also lays the foundation for the further development of the educational system in accordance with the principles of fairness and quality.

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Inclusion of persons with disabilities and development of accessible tourism: Conceptual framework and challenges of application in Bosnia and Herzegovina

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REVIEW PAPER

ABSTRACT: Inclusion and accessible tourism strive to create equitable opportunities for all individuals in the tourism industry (travel, education, employment), including people with disabilities. Establishing an accessible environment requires the incorporation of elements related to accessible infrastructure, services, and products, as promoted in this paper. The aim is to identify accessibility components in tourism tailored to various disabilities, thus formulating a model for enhancing accessible destinations. This paper elaborates on the key features of accessible tourism and its positive global trends, including a case of Bosnia and Herzegovina. The research highlights the multiplicative benefits and challenges related to accessible tourism, proposing a model for developing accessible infrastructure. The findings enhance the sustainable development of tourism and promote societal awareness regarding the needs of individuals with disabilities, particularly in terms of their involvement in travel experiences. The reform of inclusion within the tourism sector in Bosnia and Herzegovina (employment and education) will encourage innovative research aimed at assessing its implementation, along with the significant challenges due to the scarcity of data regarding the involvement of individuals with disabilities in tourism activities.

Keywords: *tourism, accessibility, disabilities, inclusion, equal opportunities, implementation, sustainable development*

INTRODUCTION

Tourism serves as a catalyst for economic growth and acts as a global passport to peace, as it fosters connections among individuals in a positive spirit and mood, yielding numerous benefits (socio-cultural, economic, and geo-ecological). Nevertheless, it is imperative that tourism remain sustainable and accessible to everyone, particularly the over one billion individuals with special needs arising from health challenges and mobility restrictions (such as disabilities, psychological issues, and motor disorders). The foundation of tourism lies in principles of responsibility, equality, and the creation of opportunities for all people.

Contemporary tourism aims to establish equal opportunities for the inclusion of individuals with disabilities in tourism activities, necessitating specific modifications to tourist facilities (transport, accommodation, products, and services) and the requisite training of tourism personnel to effectively engage with disabled individuals. The World Tourism Organization promotes the adoption of international accessibility standards in

tourism, which would encompass universal design and adapted infrastructure for individuals with disabilities, as well as opportunities for their employment and education, alongside a broader array of tourist products.

This paper elaborates on the universal attributes of accessible tourism and strategic directives for inclusion within the tourism sector by providing accessible tourism experiences that cater to the specific access needs of all users, while also facilitating educational and inclusive opportunities for individuals with disabilities within the tourism industry. It includes examples from various regions, including Bosnia and Herzegovina, highlighting current trends in the tourism sector that advocate for accessible tourism grounded in the inclusion of all individuals, irrespective of their health conditions.

LITERATURE REVIEW

In the literature examined within the realm of inclusion (USAID, 2022; Žunić et al., 2024; Bjelopoljak and Kafedžić, 2018; Carter, 2024; ACC, 2018; CDC, 2024; WHO, 2024; ISTO, 2024; Mackett, 2017), the terminology associated with persons with disabilities and the typology of disabilities is elucidated. The globally recognized term is persons with disabilities, where 'disability' denotes a limitation in general life activities, as opposed to an 'incapability' to work; thus, the terms medical (illness) and anatomical (biological or congenital) disability should be distinguished. According to the International Classification of Impairments, Disabilities and Handicaps (Carter, 2024; ACC, 2018), 'disability' refers to a functional limitation concerning a specific activity (for instance, the inability to walk), while related terms include 'impairment,' which pertains to an issue with a body structure or organ (for example, the inability to easily move the legs at the joints and support weight on the feet due to abnormally contracted muscles), and 'handicap,' which signifies a physical deficiency that hinders the execution of a normal role in life (for example, cerebral palsy may prevent an individual from fulfilling a typical role at home, in a preschool setting, and within the community). The designation 'person with disabilities' should be employed only when necessary, and it is advisable to avoid labeling individuals, while emphasis should be placed on activities that are tailored to their capabilities, as persons with disabilities are capable of performing various jobs (Bjelopoljak and Kafedžić, 2018). However, the criteria for terminology, typology, and classification of disabilities are not entirely consistent across domestic and international literature, varying according to the parameters of differentiation: type or category of disability, anatomical region of impairment, severity of disability, category of limitation in daily activities, medical, biological, or psychological origins, i.e., physical, mental, intellectual, or sensory impairments, as well as the generalization of categorization vs. detailed systematization, etc. For instance, the World Health Organization and the US Centers for Disease Control and Prevention categorize three primary types based on impairment and the ability to perform regular activities; the International Social Tourism Organization (ISTO) recognizes five principal types of disability according to specific areas (vision, hearing, motor skills, intellect, psyche); Mackett asserts that the term "persons with mental disabilities" encompasses both intellectual disabilities and mental health issues, while the majority of authors primarily differentiate between cognitive (intellectual) and psychological (mental) disabilities, among others. Consequently, there exists a wide variety of disabilities: vision, movement, cognition, memory, learning, communication, hearing, mental health, social relationships, and thus individuals with disabilities constitute an exceptionally diverse group with a broad range of needs.

In the reviewed literature concerning accessible tourism (Aynalem et al., 2016; Bakker, 2019; Chalvantzi-Stringer, 2021; Münch and Ulrich, 2011; ISTO, 2024; Australia Gov., 2025; WHO, 2024; IGLU, 2024; CBI, 2022; Boes, 2014; USAID, 2022; UNWTO, 2024;

Žunić et al., 2020), the concept, characteristics, and terminology of accessible tourism are discussed. "Accessible tourism encompasses a range of services and facilities designed for persons with special requirements: those with disabilities, elderly travelers, pregnant women, parents with young children, and individuals with temporary injuries or chronic health conditions" (Münch and Ulrich, 2011). The terms accessible, inclusive, and tourism tailored for persons with disabilities are frequently used interchangeably; however, distinctions are sometimes made. Inclusive tourism primarily emphasizes the involvement of persons with disabilities (including those with hearing, visual, cognitive, mental, and motor impairments) in tourism activities, whereas accessible tourism has a broader definition, encompassing accessibility for all, including the elderly, pregnant women, and children. Furthermore, inclusive tourism delves into a more profound aspect that, similar to accessible tourism, aims to include all individuals, particularly vulnerable groups with disabilities. The level of their engagement in tourism is heightened under the banner of inclusion compared to accessibility, as it emphasizes both spiritual and material dimensions to enhance the tourist experience. Therefore, "accessible tourism is about ensuring that travel and tourism destinations, products, and services are available to everyone, irrespective of their physical limitations, age, or cognitive abilities, as it eliminates physical barriers. In contrast, inclusive tourism advances this concept by not only ensuring accessibility but also fostering an environment that welcomes and accommodates individuals from diverse backgrounds and abilities, allowing travelers to feel at ease and included during their journeys" (Australia Gov., 2025). In this perspective, the concept of inclusion within the tourism industry is advanced to the extent that inclusive tourism is entirely devoted to persons with disabilities, encompassing both material and spiritual dimensions, which contrasts with accessible tourism, which primarily emphasizes the establishment of a universally accessible tourism infrastructure from the aspect of physical inclusion. For example, accessible tourism aims to enhance physical access to a museum by constructing a wheelchair ramp, whereas inclusive tourism prioritizes ensuring that a visitor with disabilities, in addition to having physical access to the museum, also receives essential assistance from curators, guides, and other visitors at the location, thereby enriching the overall tourist experience. Given that these terms are interrelated and that efforts in inclusive and accessible tourism converge on similar issues and interpretations, it can be asserted that inclusion constitutes a fundamental component of the accessible tourism concept.

RESEARCH METHODOLOGY

Fundamental-applied research aims to provide scientific comprehension and knowledge in the field of accessible tourism, with the goal of facilitating the establishment of a sustainable tourism development model that considers the needs of individuals with disabilities.

The research is based on an extensive collection of international literature (in English), particularly emphasizing the recommendations of global organizations concerning social inclusion within the tourism industry, including insights from Bosnia and Herzegovina. Various methods were employed for data gathering, translation and processing, analysis, identification, classification, and synthesis, alongside informal interviews. The findings are complemented by the empirical experiences acquired through authors' interactions with persons with disabilities (mainly those with low vision, hearing impairments, or mobility challenges); for qualitative analysis, a semi-structured interview format based on conversational principles was utilized, involving approximately twenty participants discussing their experiences and capabilities in navigating geographical spaces and attending specific cultural events. The identification process revealed the attributes of

accessible tourism, barriers and amenities encountered during tourism travels and at tourist sites, and strategic initiatives for managing tourism development that honor the unique needs of individuals with disabilities in relation to travel, employment, and education within the tourism sector.

The paper has an educational and applicative significance, as it provides the latest findings on pressing issues related to accessible tourism globally, highlighting various challenges and offering constructive solutions for the sustainable development of accessible tourism.

RESEARCH RESULTS

Typology of people with disabilities

Persons with disabilities have long-term physical, mental, intellectual, or sensory impairments that, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others (USAID, 2022). Disability is an impairment of the body or mind that makes it difficult for a person to perform certain activities and limits interaction with the environment (CDC, 2024). Disability results from the interaction between individuals with health conditions, such as cerebral palsy, Down syndrome, and depression, and personal and environmental factors, including negative attitudes, inaccessible transportation and public buildings, and limited social support (WHO, 2024).

Žunić et al. (2024) state that this is the most vulnerable population that faces numerous problems regarding its regular functioning in the physical, virtual and sociological environment. Disability has three dimensions:

- a) impairment of the structure or function of a person's body or mental functioning (e.g., loss of: limbs, vision, or memory);
- b) activity limitation (e.g., difficulty with vision, hearing, walking, or problem-solving);
- c) limitations in participation in normal daily activities (e.g., work, engaging in social and recreational activities, and obtaining health and preventive services), (CDC, 2024; WHO, 2024).

From the aspect of accessible tourism, the basic typology of disabilities includes: hearing, intellectual, motor, visual, and psychological, where tourism infrastructure aims to accommodate these categories of people.

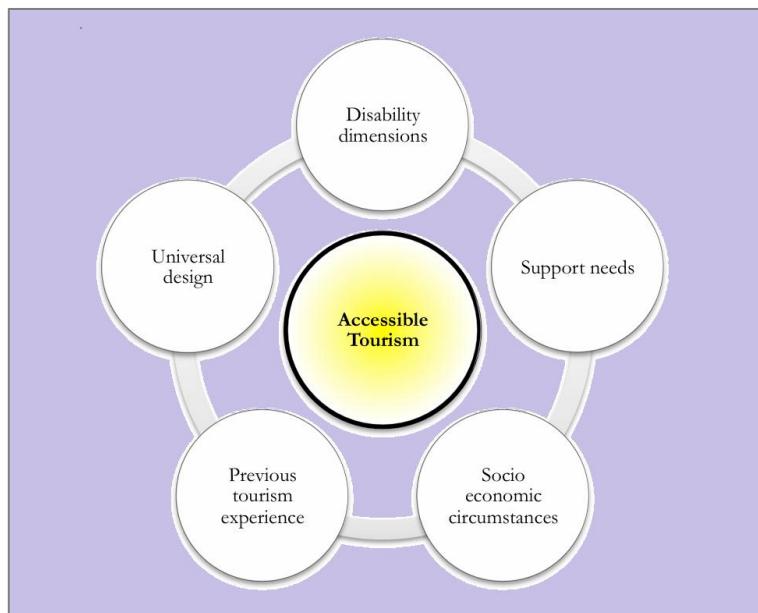
- a) "Hearing disability" or hearing impairment is partial or complete hearing loss, and can be: mild (resulting in poor word perception), moderate (understanding only loud speech), severe (perceiving sounds but not distinguishing them), and profound hearing impairment (not recognizing sound). In cases of moderate hearing impairment, a hearing aid serves as a significant tool, provided that the surroundings are not noisy; for individuals with severe hearing impairment, the device can assist in sound recognition, although lip reading becomes crucial; in instances of profound impairment (total deafness), "sign language" acts as a method of communication.
- b) "Intellectual disability" refers to a condition where an individual experiences significant challenges or delays in developing skills across various developmental domains, such as motor abilities, communication and speech, social interactions, and cognitive functions. Support tools may include textual and pictorial labels, as well as easy-to-read documents.

- c) "Motor disability" encompasses all conditions that may result in partial or total loss of motor skills, particularly affecting the upper and/or lower limbs (challenges in movement, maintaining or altering positions, lifting and handling objects, and executing specific gestures). Accessibility entails a pathway that can be navigated independently, along with the capacity to utilize services with optimal autonomy.
- d) "Visual disability" or vision impairment is defined as the inability to perceive images that continues despite treatment (such as optical correction, surgery, or medication). The damage may occur in the eye, optic pathways, or the occipital lobe of the brain. This condition can be either congenital or acquired. Supportive aids, including oral and Braille tools with suitable (tactile/sensory) devices, as well as human assistance, are beneficial.
- e) "Psychological disability" refers to a mental health condition that results in mental, emotional, and affective disorders, or personality disorders, without affecting cognitive abilities.

The concept of accessible tourism

The concept of accessible tourism encompasses five key factors: the dimensions of disability, levels of support required, access facilitated by universal design, the prior travel experiences of individuals with disabilities, and their socio-economic conditions; collectively, they play a crucial role in the accessible tourism development.

Figure 1. The concept of accessible tourism according to Boes (Authors)



- *Dimensions of disability* refer to various typologies and degrees of physical and mental limitations and challenges faced by both children and adults, and are primarily categorized into three main aspects of disability: impairment, partial or complete limitation.
- *Support requests* encompass a diverse range of persons with varying levels of support needs: independent individuals, those requiring minimal support, those

needing medium to high support, and individuals who necessitate a very high level of assistance, e.g., "tourists with disabilities typically travel with 2 to 3 companions" (UNWTO), as they often encounter difficulties when navigating unfamiliar environments.

- *Universal design* facilitates an enjoyable tourist experience by creating products, services, communications, programs, and tailored environments at minimal cost, ensuring accessibility for all individuals, including children and those with disabilities, without the necessity for modifications or specialized designs; thus, it is grounded in seven principles of usability: equity (suitable for all), flexibility (accommodating a wide range of preferences), simplicity (easy to comprehend), visibility (regardless of ability), error tolerance (minimizing negative impacts), low physical effort (efficiency), and appropriately sized spaces for access and use (accessibility).
- *Tourist experiences of people with disabilities* encompass feelings of fear, discomfort, and irritability, highlighting the significance of multisensory tourism, e.g., blind persons engage in tourism through their entire body, relying on all their senses, particularly auditory and tactile, and occasionally on their guide dogs; furthermore, they may encounter exclusion regarding access to information, navigation, or interactions with non-disabled individuals at their destination. Therefore, it is crucial to create an engaging environment that ensures the availability of information, facilitates easier navigation, and fosters community support to enhance the tourist experience for people with disabilities. The factors affecting the cultural tourism experience for individuals with disabilities can be categorized into external and internal influences. External factors are: physical and social elements, multisensory media, interactive and dynamic exhibits, the theme and perceived value of heritage, product availability, the presence of guides, engagement, knowledge acquisition, and the pursuit of experiences. In contrast, internal factors encompass motivation, knowledge, fatigue, emotions, perception, and self-identity. Key variables that contribute to a positive experience for tourists with disabilities include: informativeness (both virtual and physical); sensory engagement (touch, smell, sight); stimulators (descriptions, audio, specialized guides, physical models, and miniature replicas); knowledge, attitude, and training (the behavior culture of tourism workers and other tourists towards individuals with disabilities, along with training in appropriate actions and conduct); orientation and navigation (signposts, maps, companions); internal factors (individual character and self-confidence).
- *Socio-economic opportunities* including factors such as age, language, income, employment, education, standard of living, available funds for travel, and the duration of stay at the destination. Developed nations typically exhibit a high standard of living, a significant proportion of elderly individuals, and a prolonged life expectancy. Furthermore, an increase in the participation of individuals with disabilities in tourism is anticipated. Given that many of these individuals are either unemployed or earn low incomes, their inclusion in tourism necessitates the implementation of various benefits for vulnerable groups (subsidies, product discounts, and preferential transport tickets, etc.).

Universal characteristics of accessibility in tourism

Accessible tourism is an ongoing effort to ensure that tourism destinations, products and services around the world are accessible to all people, regardless of their physical limitations, disability or age. It includes both publicly and privately owned tourism sites.

Improvements benefit not only people with disabilities, but also their companions, as well as all people. Accessibility in tourism is a social right that concerns all citizens. Darcy and Dickson define accessible tourism as "a segment of tourism that focuses on providing easy access for all individuals participating in the industry" (Boes, 2014).

However, "inaccessible environments create barriers that often hinder the full and effective participation of persons with disabilities in society on an equal basis with others" (WHO, 2024), and "25% of persons with disabilities report challenges when it comes to their travel, compared to only 10% of persons without disabilities" (IGLU, 2024). Challenges for persons with disabilities may include: lack of information about accessible facilities, services, equipment rentals and tourist attractions; inaccessible booking services and related websites; untrained professional staff able to inform and advise on accessibility issues; lack of accessible airports and transfer facilities and services; inaccessible streets and transport services; lack of adapted and accessible hotel rooms, restaurants, shops, toilets and public places; lack of barrier-free attractions and other destination-related services; tourism segment reviews and travel promotion stories (CBI, 2022).

Accessibility is a prerequisite for the full realization of human rights and the inclusion of persons with disabilities in society and development. "An accessible environment is a starting point in understanding the principle of inclusiveness and is an inevitable factor in the realization of human rights based on equality" (Bjelopoljak and Kafedžić, 2018). The UN and the Council of Europe Action Plan "Full Participation of Persons with Disabilities in Society" (Boes, 2014) advocate the full integration of people with disabilities into the cultural life of society. "Progress in improving social participation can be achieved by addressing these barriers and empowering people with disabilities in their daily lives" (WHO, 2024). "Accessibility can be understood as the provision of flexible facilities and environments, whether virtual or physical, to meet the needs and preferences of each user. For people with disabilities, this can be any place, space, object or service that is easy to approach, reach, enter, exit, communicate with, understand or otherwise use" (USAID, 2022). Hence, Darcy and Buhalis stated that "accessible tourism involves collaborative processes between stakeholders that enable people with accessibility requirements, including mobility, vision, hearing and cognitive dimensions of access, to function independently and with equity and dignity through the delivery of universally designed tourism products, services and environments" (Boes, 2014). Consequently, the World Tourism Organization promotes the adoption of accessibility and universal design principles, which can reduce investment expenses while generating job opportunities for individuals with functional diversity. This approach also enhances the variety of tourism products, making tourism companies more sustainable. Inclusive policies facilitate the development of accessible tourism options. Entrepreneurs who embrace a "design for all" philosophy can provide high-quality services that improve their market positioning by catering to the needs of a broader spectrum of travelers.

According to Porto et al. (2019), the most important criteria for access for people with disabilities to UNESCO sites in South America and Oceania are: availability of information (on official portals, in research publications, travel guides, as well as on informal blogs, etc.), access to the location (arrival, personnel to assist tourists with disabilities, parking for people with disabilities, free circulation, accessible toilets), and tourist use (the possibility of participating in the main tourist activity with the availability of aids, e.g. caddies and wheelchairs, sign language, videos with subtitles, tactile sign language, audio guide, Braille, tactile maps, etc., or through adapted content – activities for children with mental disabilities, accessible programs, etc.). According to CBI (2022), for European tourists with disabilities, the most important aspects of accessibility when

traveling and staying at a destination are: transportation to and from the destination (53%), availability of reservation services (53%), nature (48%), safety (48%) and availability of information at the destination (47%), accessibility of toilets, availability of parking facilities, accessible elevators, furniture and lighting, and mobility within the building (hotel or museum).

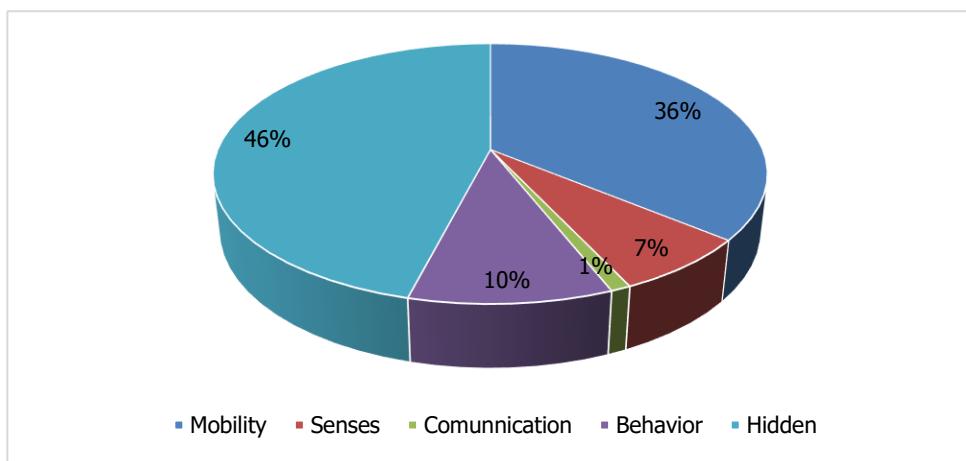
International organizations (UN Tourism, ONCE and UNE Foundation, European Network for Accessible Tourism ENAT, Sage Travelling and ISTO Impulsa Igualdad) advocate for the ISO-21902 accessibility standard in tourism (UNWTO, 2024b), which offers strategic guidelines and practical recommendations for delivering accessible tourism experiences that cater to the specific accessibility needs of all customers, ensuring that infrastructure, products, and services are made accessible. This collection of guides emphasizes the essential elements of this tool for administrations, accommodation facilities, transport facilities, and tourism resources, along with their application in companies and services. Tour operators, travel agencies, and travel agents are pivotal in assisting customers in selecting arrangements that best align with their specific accessibility needs. These companies and professionals can utilize the international tool to apply accessibility criteria, regardless of whether they operate from a physical location, online, or through a combination of both channels. Accessibility training, criteria, and standards are crucial for comprehending each client's needs, gathering and conveying key information, and anticipating additional services for users to fulfill their accessibility requirements. "Accessibility for all to tourism facilities, products, and services should be a central part of any responsible and sustainable tourism policy. Accessibility is not only about human rights. It is a business opportunity for destinations and companies to embrace all visitors and enhance their revenues" (UNWTO, 2024a). Accessible guide provides: tools for identifying and eliminating all types of accessibility barriers in products and services; promoting destinations and companies that undertake accessibility improvements; how to ensure the integrity of the tourism value chain; raising awareness among the general public; suppliers and service providers; training of tourism and travel professionals; analyzing competitors' offerings and understanding market trends; gaining knowledge about the benefits and business opportunities that accessible tourism brings; how to optimize customer service in travel agencies and improve product design; marketing and promotion; how to provide a quality accessible experience and excellent customer service; and, guidelines for joint work with organizations of persons with disabilities. According to the World Tourism Organization (UNWTO, 2024b), the characteristics of universal accessibility in tourism are:

- a) New revenue streams, innovations and improved business results
- b) Equality, diversity and inclusion
- c) Understanding the integrity of the accessible tourism value chain
- d) Providing infrastructure, products and services suitable for all people
- e) Environments enjoyed by both tourists and locals
- f) Improvements in people's comfort, safety, life quality and wellbeing
- g) Changing mindsets by fostering the sector's interest in accessibility
- h) Consumer loyalty and worker satisfaction
- i) Coordination between administrations, private sector and local communities
- j) Working with knowledgeable, experienced, and certified accessibility experts
- k) Training and continuing education of professionals in the tourism sector
- l) Quality of service and quality of life.

Geographical development of accessible tourism in the world

"Accessible tourism represents a specialized segment of the tourism industry that has experienced significant growth over the past ten years, influenced by various factors: heightened awareness of human rights, a growing elderly population (aged 65 and above), an increase in individuals with disabilities, a rise in disabled tourists, the beneficial economic effects, advancements and challenges in tourism development and construction, tourism's role in promoting social inclusion for people with disabilities, and the advocacy efforts of the World Tourism Organization along with other international bodies that support the equal involvement of persons with disabilities in tourism activities" (Žunić et al., 2024). According to the World Health Organization (WHO, 2024), 1.3 billion people – about 16% of the world's population – have a significant disability. This number is increasing in part due to the aging population and the increasing prevalence of non-communicable diseases. The World Tourism Organization (UNWTO, 2024a) stated that almost 50% of people over the age of 60 have a disability. It is estimated that 2/3 of people with disabilities in developed countries will have the means to travel. "Persons with disabilities, due to the environment they encounter, suffer from limitations in their relational abilities and have special needs during travel, accommodation and other tourism services, especially people with physical, sensory and intellectual disabilities or other health conditions that require special care, such as the elderly and others in need of temporary assistance. The potential market of persons with disabilities in the EU is more than 80 million people (130 million including senior citizens and accompanying persons) and the economic impact of travel by persons with disabilities reaches 58.7 billion dollars in the USA (USAID, 2022).

Figure 2. Demand for accessible tourism from people with disabilities by type of disability, according to CBI (Authors)



Within the European Union, more than 70% of the 80 million persons with disabilities can afford to travel and enjoy tourism. In Asia and the Pacific, the potential market size is 690 million people, and in Latin America and the Caribbean this figure reaches 85 million people (UNWTO, 2024c).

According to the graph of demand for accessible tourism, taking into account the recognized type of disability, the most common are people with motor (mobility)

difficulties, followed by psychological (behavioral) and sensory difficulties, while people with intellectual (communication) difficulties participate the least.

Table 2. Key statistical data on the demand for accessible tourism in the EU in 2012 according to the CBI (Authors)

Number of total trips	People with disabilities	People 65+ with disabilities
Day trips	169.9 million	225.6 million
Day trips to destinations outside the EU27	4.2 million (2.5%)	1.1 million (0.5%)
Average total spending	74.4 EUR	81.6 EUR
Overnight stay trips	169.7 million	217.6 million
Overnight trips to destinations outside the EU27	21.2 million (12.5%)	15.7 million (7.2%)
Average total spending	798 EUR	852 EUR

The most common travel motives for people with disabilities travelling to the EU are interest in local culture, nature or sightseeing opportunities (61%). The most popular activities during their holidays are: shopping, going out (having dinner at a local restaurant or café and tasting local food and drinks), and sightseeing and walking (over 60%), followed by social activities and spending time with family or friends (59%), and cultural visits (museums, monuments, art, heritage), walking, hiking or running, and swimming and sunbathing (over 40%).

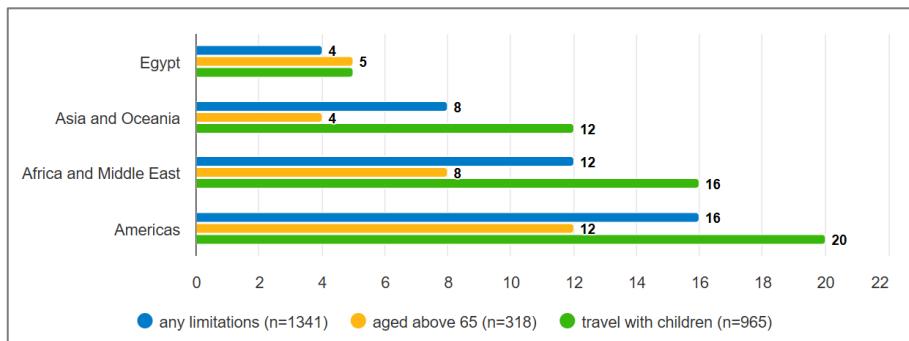
The market niche of accessible tourism is continuously growing. The largest markets for accessible tourism in Europe are: France, UK, Germany, Spain, Netherlands, and Sweden, and more recently Austria, Portugal (Ponta Delgada), and Italy (Rome).

Table 3. The largest accessible tourism markets in Europe according to CBI (Authors)

EU country	Number of trips in millions (including day trips and overnight stay trips)
France	161.1
UK	156.0
Germany	121.4
Spain	54.8
Netherlands	39.5
Sweden	32.3

According to the table of the largest accessible tourism markets in Europe, France is the country that leads in the number of tourist trips by people with disabilities.

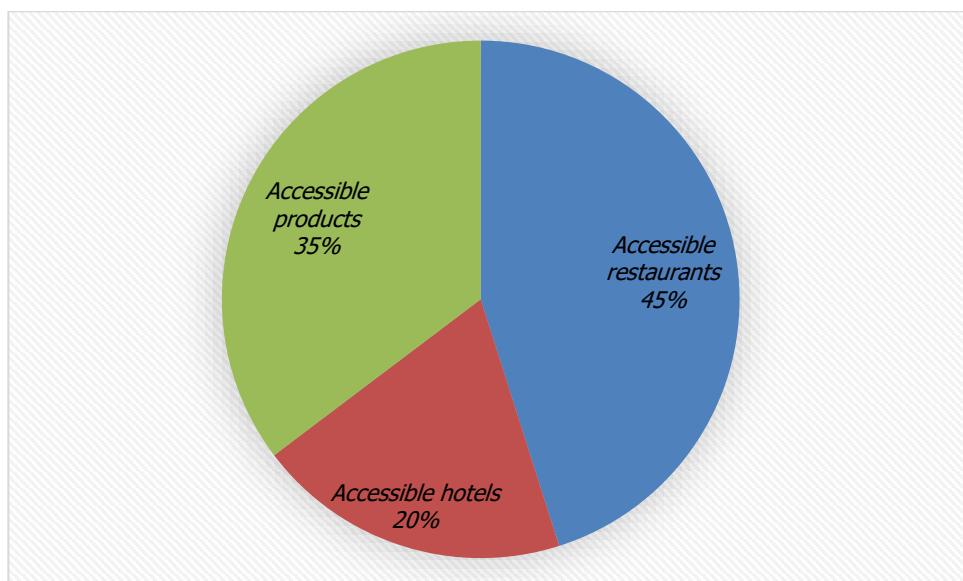
Figure 3. Destinations visited outside the EU27 according to CBI (Authors)



According to the graph of visited destinations outside the European Union, the favorite regions for people with special accessibility needs were both the Americas, and Africa and the Middle East. Globally, China (61 million), the United States (32 million) and Brazil (32 million) were the most important destinations. Egypt was the only individual country outside the EU27 with a share of 5% or more.

In the study by Porto et al. (2019), at the level of sampled locations (Brazil, Argentina, Australia, New Zealand), Australia has the highest percentage of World Heritage Sites (UNESCO) fully accessible to tourists with disabilities (26%), Brazil and Argentina 20%, while in New Zealand there is no site identified with suitable characteristics. Australia is the country with the highest accessibility for visitors with disabilities, where the tourism accessibility index has increased from 45% (1990) to 60% (2015) along with continuous economic growth.

Figure 4. Structure of accessible tourist facilities across Europe according to IGLU (Authors)



Based on the configuration of accessible tourist amenities throughout Europe, restaurants exhibit the highest level of accessibility, with nearly half of total being suitably equipped to serve individuals with disabilities. Over one-third of tourism

products, concerning the diverse activities available to individuals with disabilities during their vacations in European destinations, are accessible. However, merely one-fifth of hotels are modified to meet the specific needs of individuals with disabilities.

Table 4. The most accessible tourism destinations in Europe according to IGLU (Authors)

City	Country	% of Accessible Restaurants	% of Accessible Hotels	% of Accessible Things To Do	Total Score	Accessibility Average Score (%)
London	United Kingdom	50.5	9.4	30	89.9	30
Paris	France	46.1	23.5	19.2	88.8	29.6
Amsterdam	Netherlands	28.7	8.8	39.2	76.7	25.6
Bern	Switzerland	30.1	17.9	22.9	70.9	23.6
Oslo	Norway	22.4	24.8	17.9	65.1	21.7
Dublin	Ireland	34	10.6	16.7	61.3	20.4
Vienna	Austria	22.5	10	25.8	58.3	19.4
Reykjavik	Iceland	30.8	8.4	18.8	58	19.3
Madrid	Spain	26.4	13.3	17.9	57.6	19.2
Rome	Italy	43	4	8.8	55.8	18.6

According to the table of the most accessible destinations in Europe, London (UK) is one of the most popular tourist destinations with the highest combined average of accessible restaurants, hotels and tourist activities of 30%, making it the capital of accessible tourism in Europe.

Accessible tourist infrastructure and services - accessible tourism product

"Considering the guidance provided by the World Tourism Organization, spatial planners and institutions responsible for tourism development planning (ministries, departments, institutes, municipalities, tourist associations, tour operators, hoteliers, etc.) can implement substantial modifications in tourism development strategies, ensuring the equal participation of persons with disabilities in tourism. The trends toward adapting the tourism offering encompasses specific adjustments across its key components: accommodation facilities, travel organization, and supplementary services in the tourist destination" (Žunić et al., 2024).

According to ISTO (2024), key recommendations for organizers of accessible tourism include information, transportation, safety, trained staff, signage, and mapping of services:

- a) digital informativeness via social media,
- b) identification of means of transportation to the event (reserved parking spaces; shuttle bus; wheelchair parking; accessible public transportation),
- c) safety (trained staff, informing staff about visitors with disabilities, good trail lighting, preparedness for adverse weather conditions),
- d) training of workers (coordinators for people with disabilities, trained reception staff: tickets, catering, information, hiring volunteers for support, etc.),
- e) signaling (road signs, room, toilet location, etc., informative timetables, textual and pictorial explanations) and sign language symbols,
- f) reception map (with a view of roads, areas, individual facilities and services).

Internal and external routes should facilitate the movement of people with disabilities, for example paths should be accessible to people in wheelchairs, people with walking difficulties, people with visual impairments and people who do not have walking difficulties. Stairs and lifts must comply with applicable laws. The reception area should have a lowered section for people in wheelchairs or of short stature. It should also be equipped with an induction loop magnet for people with hearing impairments. Depending on the theme of the event, if the presence of a dog could pose a problem in terms of hygiene or safety, the organizer must provide a place for the animal to stay during the owner's visit and indicate it on the website. Assistive devices can be offered (and displayed at the reception and on the website): wheelchairs, scooters, folding chairs, helmets or any other type of comfortable tool or equipment. Assistance for following the event must be clearly announced and demonstrated on all communication materials and at the reception. Protocols for visitors with disabilities in museums, etc. need to be adapted. It is particularly important to maintain effective communication between tour operators and travel agencies and other service providers, so that clients with specific requirements can be advised on their travel decisions. The specificities of tactile and sensory impairment require that tourist sites have touch screens and other similar operating devices, as well as warnings of the risks of very hot or icy surfaces, very sharp objects, hot or icy food and drinks, smoke, air pollutants, allergens, etc.

Table 1 provides a more detailed overview of the accessibility variables in tourism for individuals with disabilities, categorized by the type of disability. Identified potential barriers include physical, health-related, social, virtual, psychological, and organizational obstacles, among others. Additionally, it outlines possible solutions, referred to as facility benefits, for tourist journeys and destinations for people with disabilities. These solutions primarily encompass specialized infrastructure, inclusive travel arrangements, and support from trained personnel during tourist excursions and at tourist locations.

Table 5. Applicative model of accessibility on a tourist trip or site depending on the type of disability (Authors)

Type of disability	Barriers to tourist travel or on the tourist site	Facilitations/ Benefits
❖ Auditory (deafness)	<ul style="list-style-type: none"> ➢ Informational and communication (e.g., oral announcements instead of textual ones) ➢ Deficiency of the auditory loop system ➢ Noisy environment and poor acoustics in the room ➢ Poor lighting ➢ Acoustic evacuation alarms 	<ul style="list-style-type: none"> ➢ Textual information ➢ Special hearing loop systems that enable sound amplification directly to the person's hearing aid ➢ Suitable light for lip reading ➢ Pictograms ➢ Acoustic assessment of the space ➢ Evacuation alarms with light signaling ➢ Audio guides and smartphone apps
❖ Cognitive (intellectual)	<ul style="list-style-type: none"> ➢ Lack of knowledge ➢ Health (physical and psychiatric dependence) ➢ Interactive (insufficient ability to face the challenge and communication) ➢ Social (social maladjustment) ➢ Financial ➢ Psychological (attitude, feelings, emotion control) ➢ Organizational (transportation, accommodation, stay, law and regulations) ➢ Architectural ➢ Lack of equipment and supplies ➢ Lack of staff support ➢ Inadequacy of the tourist offerings 	<ul style="list-style-type: none"> ➢ Simplified well-structured information ➢ Pictograms ➢ "Easy reading" manual and instructions ➢ Quiet spaces
❖ Motor (mobility)	<ul style="list-style-type: none"> ➢ Economic (accompanying costs, equipment rental, lack of budget accommodation, low employment) ➢ Architectural (non-standard construction or ruins) ➢ Physical infrastructural inaccessibility (transportation, accommodation, on-site) ➢ Lack of knowledge and accurate information ➢ Reduced tourist experience ➢ Attitudinal or attitudes (prejudice, fear, bigotry, discrimination, insecurity, discomfort and 	<ul style="list-style-type: none"> ➢ Accessible elevators ➢ Toilet ramps ➢ Disabled access throughout the site ➢ Walking aids, strollers or scooters for rent on the site ➢ Resorts ➢ Staircase handrails ➢ High counters or display cases with exhibits ➢ A regular reminder of physical distance ➢ Audio guides and smartphone apps

	intolerance) ➢ Communication (language, terminology, communication and understanding) ➢ Lack of training for staff	
❖ Visual (blindness or low vision)	➢ Architectural (e.g., uneven stairs, low ceiling or doorways, narrow passages) ➢ Poorly visible information (small font, low color contrast) ➢ Sudden noise	➢ Information in Braille or large print ➢ Equipment with sound signaling mechanisms ➢ Operators with "touch" safari (sound, touch, taste and smell) ➢ Special trails for the blind (e.g., <i>PPC Discovery Trail</i> , e.g., Addo Elephant National Park) ➢ Equipped with (radio) beacons ➢ Audio guides ➢ A regular reminder of physical distance ➢ Reduction of obstacles (avoid unnecessary furniture) ➢ Acceptance of guide dogs for the blind and partially sighted
❖ Psychological (mental difficulties)	➢ Lack of will, changeable mood and unwillingness to travel ➢ Fear and insecurity ➢ Irritability (due to waiting, etc.) ➢ Lack of funds because they mostly live on benefits without much surplus ➢ Lack of familiarity with rights (subsidies, preferential travel tickets, right to travel assistance) ➢ Congestion - traffic jams or congestion on the site (e.g., panic and suffocation) ➢ Staff may ignore them because they don't look disabled ➢ Unavailability of <i>Dial-a-ride</i> advanced service for booking transport to the destination for people with disabilities (priority is given to physical rather than mental impairments) ➢ Difficulty understanding complex information at bus stops	➢ Building self-confidence ➢ Routine and planning (web information and knowledge of bus numbers, routes and times) ➢ Safety and control (method of operation, required companions, and staff support) ➢ Accessibility and finance ➢ Positive tourist experiences ➢ Organized trips (through agencies, etc.) ➢ Private transportation (taxi, etc.) ➢ Ecotourism sites (due to less congestion) ➢ Mental health support

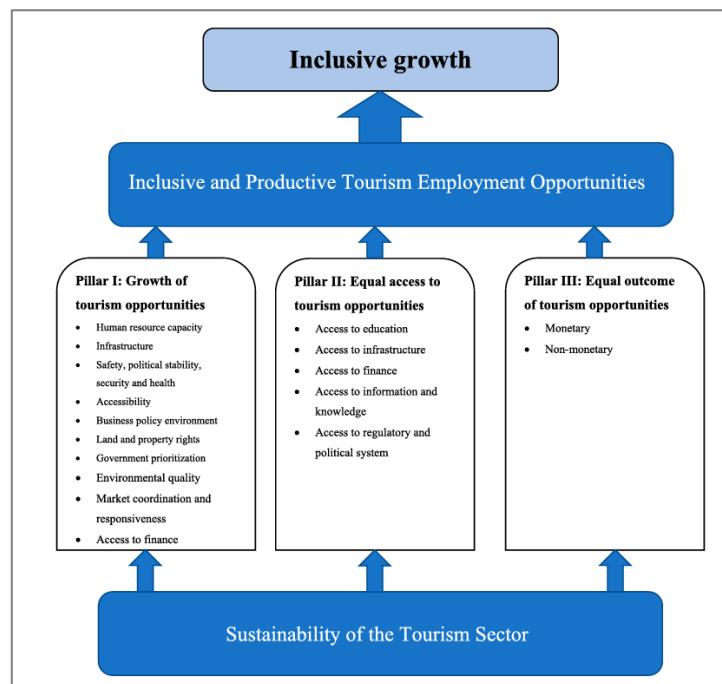
Accessibility in the tourism industry through the employment of people with disabilities

Tourism, in addition to contributing to creating opportunities for the participation of people with disabilities in tourist travel, can also provide opportunities for their inclusion in the employment or education sector, etc.

"Tourism can foster the socio-cultural empowerment of communities with disabilities by creating accessible employment environments. The tourism and hospitality industries create many employment opportunities for millions of people worldwide in various fields such as accommodation, food and beverage, restaurants, canteens, cafes, fast food outlets, pubs, nightclubs, bed and breakfasts, motels, hotels, resorts, lounges, catering, airlines, airports, planes, ships, boats, cruises, land transportation such as trails, buses, travel agencies, tour companies, natural and cultural attractions such as national parks, caves, monuments, museums and galleries, theaters, concerts, festivals, carnivals, conferences, fairs and exhibitions" (Aynalem et al., 2016).

As stated by Bakker (2019), the attributes of the tourism industry enable contributions to enhanced inclusion in both developed and developing countries. The tourism industry possesses the potential to foster inclusive growth by providing productive employment opportunities, ensuring equitable access to these opportunities, and achieving fair outcomes from tourism activities (both revenue-generating and non-revenue-generating). While many obstacles to enhancing inclusion stem from long-standing factors, such as economic, cultural, and political circumstances, tourism policymakers and researchers can utilize the inclusive growth framework to promote a sustainable tourism sector.

Figure 5. Diagnostic framework for inclusive tourism-led growth according to Bakker (Authors)



The inclusive tourism framework enhances the comprehension of tourism planning within the framework of an inclusive growth strategy. It serves as a tool to facilitate evidence-based decision-making regarding tourism development matters for governments, tourism policymakers, and development agencies, while also offering guidance in the formulation of effective tourism policies.

"The tourism industry needs to integrate people with disabilities as owners, managers, and employees within the industry. This requires clear communication of information about accessible tourism, targeted professional development, adaptation of existing facilities or design and creation of new infrastructure, availability of support services at locations in destinations for people with disabilities, and continued education through training and workshops for employees" (USAID, 2022).

Development of inclusion in tourism of Bosnia and Herzegovina - employment and education of persons with disabilities

In the case of Bosnia and Herzegovina, a blooming tourism destination "with the third highest tourism growth rate in the world in 2019" (Žunić et al., 2023), a five-year project for fostering sustainable tourism in the region has been established in collaboration with the United States Agency for International Development (USAID). This project is designed to stimulate economic growth within the tourism sector, enhance employment opportunities, and provide sustainable incomes for individuals and businesses associated with tourism, while also addressing social inclusion matters. Furthermore, the Disability Inclusion Plan (USAID, 2022) represents the inaugural document in the tourism sector that promotes awareness of the necessity for an inclusive environment and highlights the importance of integrating equity into all facets of life. It acts as a resource for authorities and organizations tasked with fostering positive transformations, not only in the hiring process but also in the development of inclusive tourism destinations. The plan encompasses a variety of information-driven proposals targeted at a broader spectrum of stakeholders. It is essential to cultivate and advocate for tourism as an activity that welcomes all individuals who wish to engage and enjoy tourism experiences. Through specialized training and employment initiatives, every person with a disability will be acknowledged and appreciated for their abilities and expertise, rather than perpetuating disability stereotypes. Through this initiative, the USAID Tourism project aims to pave the way for the comprehensive implementation of the UN Convention on the Rights of Persons with Disabilities and the Optional Protocol within the tourism sector in Bosnia and Herzegovina by reinforcing the principles of inclusion and the "Tourism for All" philosophy.

Projections suggest that by the year 2027, there will be 8,100 job openings in the tourism sector, driven by an increase in both domestic and international tourist numbers. The accommodation (30%) and restaurant (20%) subsectors are expected to experience the highest demand. Given that a significant percentage of tourism service users are individuals with disabilities, their inclusion is advantageous not only for them but also for the tourism industry as a whole. The objective is to enhance the enabling environment for competitiveness by fostering the inclusion of persons with disabilities as employees and business owners within the tourism sector, while also expanding employment and educational opportunities in this field. "The employment of individuals with disabilities in tourism in Bosnia and Herzegovina is constrained by a lack of awareness among potential employees and employers, insufficient educational services for persons with disabilities, and workplaces that are not accessible" (USAID, 2022). Nevertheless, the diversity of tourism offerings, including restaurants, travel agencies, hotels, and spa centers, suggests a broad spectrum of job opportunities within the sector, with the most in-

demand positions: kitchen and restaurant assistants, chefs, waiters, physiotherapists, masseurs, as well as roles in administration and marketing, entrepreneurship opportunities related to tourism, such as crafts (creating souvenirs and artwork), organizing events, food production, providing tour guide services, etc. According to representatives of tourism companies in Bosnia and Herzegovina (USAID, 2022), employment opportunities for people with disabilities are in the following areas: kitchen assistant and delivery person, horticulturalist, online assistants, support workers, night watchman, photographer, and tour guides. Individuals with disabilities can contribute significantly to the tourism service sector by leveraging their unique personal and professional attributes in alignment with job requirements.

A person who has not acquired the knowledge and skills necessary for work in tourism has the opportunity to acquire the necessary knowledge by attending educational programs for work in tourism, which are implemented in Bosnia and Herzegovina by accredited educational institutions where a diploma is obtained, which represents formal education. For managerial jobs in tourism, education can be obtained at higher and higher education institutions. There are a large number of centers and institutions in the country where a diploma in the field of tourism can be obtained, for example, the geographical study of tourism at the University of Sarajevo (Faculty of Science, Department of Geography), taking into account that the University of Sarajevo has also established an Office for Support with Students together with the Department for Students with Disabilities, as well as an expert pedagogical team for communication.

Recommendations for fostering accessible tourism in Bosnia and Herzegovina, which entail collaboration among public and governmental authorities, organizations advocating for individuals with disabilities, the private sector, as well as educational institutions and training centers, encompass the creation of conducive environments for competitiveness, enhancement of human capital, development of tourism products and experiences, along with destination branding and marketing.

CONCLUSION

Accessible tourism refers to a form of tourism that takes place in areas designed with accessible features, which include universal infrastructure, simplified services, and products tailored for all individuals, including those with disabilities, contributing to a positive experience for tourists.

This emerging trend in the tourism industry provides numerous benefits, and beyond its cost-effectiveness, accessible tourism is a "booster" of social cohesion, as significant collaborative efforts are made to integrate all individuals into tourism activities, irrespective of their varying abilities or limitations (physical or mental). Accessible tourism encourages empathy and support for persons with disabilities, enhances educational growth and cultural interaction, increases employment opportunities, promotes humanity, and encourages volunteerism, while also presenting challenges in the construction, communication, and programming sectors, etc.

The global community has acknowledged the rising number of individuals with disabilities, particularly the growing elderly population; consequently, it is anticipated that their participation in tourism will rise, especially in developed nations where socio-economic conditions favor travel and necessitate reforms in staff training and the adaptation of tourism infrastructure.

The inclusion of individuals with disabilities remains a pertinent issue across all sectors, including tourism. The tourism industry presents various opportunities for engagement in tourism development, encompassing employment, education, and travel. Persons with

disabilities have different requirements based on their specific disabilities, prompting initiatives to implement universally designed solutions that cater to everyone: individuals with disabilities, the elderly, children, and pregnant women, while minimizing costs and creating equitable opportunities for easier navigation within adapted environments.

International organizations advocate for accessible tourism, as well as the skills and tools necessary for the guided sustainable development of tourism for all people. Recommendations directed at tour operators primarily encompass aspects of informativeness and the organization of tourist travel and accommodation, along with the mapping of products and services, which depend on specific accessibility attributes: sensory experiences, demonstrations, professional staff support, personal escorts, legislation, accessible infrastructure, and so forth.

Accessible tourism represents a contemporary and dynamic phenomenon characterized by continuous development, although it exhibits spatial disparities, as it progresses most rapidly in developed regions of the world (with America at the forefront), while also emerging in developing nations that heavily rely on tourism and are recognized as prestigious tourism destinations (a positive example of Egypt).

An inclusive framework and methods of accessible tourism will facilitate the incorporation of accessibility elements for everyone across various destinations globally, while fostering collaborative efforts among key stakeholders, which is crucial for integrated planning and the sustainable development of (accessible) tourism.

Persons with disabilities are central to the concept of accessible tourism, which encompasses not only their inclusion in travel experiences but also their potential for employment within the tourism industry. Accessible tourism specifically aims to establish a universal infrastructure that caters to all individuals, including those with disabilities, the elderly, pregnant women, and children. The concept of accessible tourism extends beyond merely developing infrastructure tailored to various disabilities; it also considers the experiences and specific needs of this particularly vulnerable demographic, along with their socio-economic conditions, thereby enhancing equal opportunities for participation in tourism activities. The efforts of international organizations and researchers in the realm of accessible tourism provide significant scientific and practical contributions, as they refine methodologies for creating universally accessible designs in tourism destinations globally, whether concerning transport, accommodation, cultural venues, natural sites, or workplace environments.

The model of accessibility applied to tourist sites or trips discussed in this paper highlights various opportunities for enhancing accessible tourism and establishing essential infrastructure for persons with disabilities in Bosnia and Herzegovina, as well as in any other destination globally that lacks such supportive elements; this is evident in the significant social impact of this paper. This paper is qualitative in nature, predominantly focusing on fundamental content that primarily educates about contemporary trends in accessible tourism, which is one of the most important phenomena worldwide as it has fostered increasing relationships within society by enhancing collaboration among diverse stakeholders at all levels, particularly within the tourism industry, spatial (and tourism) planning, construction and architecture, and the economy; it provides examples of numerous destinations worldwide that are investing in improving accessibility and inclusion in tourism. Additionally, a review of Bosnia and Herzegovina is presented, which is currently in the early stages of developing and implementing inclusion in the tourism sector in partnership with USAID, where the education or employment of persons with disabilities in the tourism industry is particularly emphasized.

However, the study did not encompass substantial original survey research (aside from informal interviews with individuals who are visually impaired, deaf-disabled, or have mobility challenges), to enhance the representativeness of the findings. Consequently, future research should concentrate on investigating a broader group of individuals with disabilities concerning their travel experiences and preferences for navigation and accommodation at the destination, to gather more comprehensive data significant for the creation of a higher quality accessible tourism product. Proposed (targeted) and more extensive survey research would facilitate the identification and cataloging of actual barriers present at the most frequented tourist locations in Bosnia and Herzegovina, thereby aiding in the formulation of strategic documentation for the management of sustainable tourism development, while considering the establishment of suitable infrastructure that accommodates all individuals, irrespective of their physical or mental limitations. Given that Bosnia and Herzegovina represent an emerging tourism destination, the development of accessible tourism will be imposed as its primary responsibility.

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The Four Layers of Diversity: A multidimensional approach to inclusive culture in the workplace

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REVIEW PAPER

ABSTRACT: In the context of globalization and an increasing demand for sustainable inclusive practices, understanding diversity in the workplace requires a multidimensional approach. This article presents and analyzes the Four Layers of Diversity model (Gardenswartz & Rowe, 2003), which encompasses four interrelated layers of identity: personality, internal, external, and organizational dimensions. Through critical engagement with existing diversity theories, the article emphasizes the importance of recognizing less visible dimensions of identity, such as personal experiences or organizational position. Research findings indicate that traditional approaches—focused primarily on visible characteristics—often overlook the complexity of identity, resulting in superficial organizational solutions. This article lays the foundation for developing strategies that promote equitable access to resources and participation, including inclusive hiring, onboarding processes, and the mitigation of unconscious bias. The Four Layers model is reaffirmed as a valuable framework for shaping inclusive organizational policies and practices. The article also highlights the need for continuous training of management and employees on diversity issues, as well as the integration of the model into everyday decision-making processes, thereby enhancing organizational resilience and contributing to long-term sustainability.

Keywords: *diversity, inclusion, organizational culture, Four Layers Model, identity, human resources, diversity management*

INTRODUCTION

In an era marked by globalization and rapid transformation, the importance of creating inclusive workplaces and organizations, as well as an inclusive society as the ultimate goal, is increasingly emphasized. But what does this truly mean? How can we determine whether a work environment is genuinely inclusive? While diversity among employees is not a new phenomenon, the central challenge remains how to recognize, respect, and effectively integrate that diversity in ways that benefit both the individuals within the organization and the organization itself as an economic entity. According to researchers Nishii (2013) and Shore et al. (2011), the experience of inclusion in the workplace is closely tied to a sense of belonging and the ability to remain authentic while engaging in productive and fulfilling work. In other words, it is not enough to offer people a seat at the table, it is equally important that they feel free to be themselves, to contribute, and to create. When diversity is acknowledged only on a superficial level, without deeper understanding, its full potential remains untapped. Conversely, when diversity is actively fostered and integrated across all organizational levels, both operational and strategic, the outcomes include enhanced creativity, improved decision-making, and a more

resilient organizational culture (Cox and Blake, 1991; Ely and Thomas, 2001; Mor Barak, 2015). Problems arise when diversity is reduced to easily observable traits such as gender, age, or skin color, while a broad range of less visible but equally significant individual differences is overlooked. This neglect risks creating environments that are seemingly equal yet structurally discriminatory, where real needs are ignored and individual characteristics are diminished. This is where the Four Layers of Diversity model, developed by Gardenswartz and Rowe (1998), proves especially valuable. This model conceptualizes identity as a multi-layered structure composed of four interconnected dimensions: personality, internal, external, and organizational. It is important to note that this model did not emerge arbitrarily, but rather as a practical response to the complexities of diversity management, and it is closely aligned with theoretical approaches. The model is built upon earlier work by pioneers Marilyn Loden and Judy Rosener who, in 1991, emphasized the need for strategic diversity management. Loden had previously, in 1978, introduced the concept of the "glass ceiling," which highlights barriers to women's advancement, while Rosener explored how different leadership styles could either foster or hinder inclusion. Gardenswartz and Rowe extended this foundation by recognizing the critical importance of understanding how various identity dimensions interact and shape everyday relationships and decisions within teams and organizations. Their model draws attention to the often-overlooked invisible layers of identity that significantly impact how individuals feel and perform in the workplace. In today's rapidly evolving and globally connected organizational landscape, the Four Layers model offers a pathway for moving beyond corporate rhetoric toward meaningful change. This article gives particular attention to research focused on the internal, external, and organizational dimensions of identity, as well as to intersectional approaches that explore how overlapping identity features shape employees' everyday experiences.

PERSONALITY AS A FOUNDATIONAL DIMENSION OF DIVERSITY

At the core of the Four Layers of Diversity model (Gardenswartz and Rowe, 2003) lies personality, which refers to the unique traits of an individual, including behavioral patterns, emotional responses, and modes of interaction with others (Gardenswartz and Rowe, 2003; Robbins and Judge, 2019). Although personality is considered a relatively stable and partly inherited characteristic, it is also shaped by external influences such as life experiences, upbringing, education, and the work environment (McCrae and Costa, 2008). Within the diversity framework, personality represents the innermost layer, serving as the foundation that influences how individuals perceive and interpret all other dimensions of identity. Unlike visible characteristics in the workplace such as gender, age, or functional status, personality is not readily observable. It manifests through how people communicate, make decisions, resolve conflicts, and collaborate within teams. Including personality in diversity analysis allows for a deeper understanding of differences that are not immediately apparent, yet significantly shape team dynamics, leadership styles, and employee engagement (Barrick et al., 2013; Hogan and Holland, 2003). Organizations that recognize the significance of personality tend to develop more flexible working practices and leadership styles that respond to the diverse personalities present within the workplace. Instead of applying a one-size-fits-all approach, such organizations tailor their support to individual needs, enabling authentic expression and fostering a stronger sense of belonging. This approach enhances engagement and encourages innovation, while also reducing turnover and improving retention. On the other hand, when personal differences are overlooked, misunderstandings, diminished team cohesion, and reduced effectiveness may occur (Barrick et al., 1998; Earley and

Mosakowski, 2000). If differences in emotional stability or communication styles are not acknowledged early on, tensions may arise that hinder effective collaboration within teams. These tensions often lead to lower cohesion and increased stress among group members, which can negatively impact team dynamics and overall productivity. Effectively managing diverse personalities requires a careful balance, recognizing individuality while maintaining shared goals and values. Personality should not be seen as a barrier, but rather as a resource. When the work environment is sufficiently flexible to accommodate different personality types, individual differences become a source of strength, creativity, and mutual understanding.

INTERNAL DIMENSIONS OF DIVERSITY: IDENTITY AND PERCEPTION

According to the Four Layers of Diversity model (Gardenswartz and Rowe, 2003), internal dimensions of diversity encompass characteristics that are largely immutable or difficult to change over the course of a lifetime. These include age, gender, ethnic and racial background, physical ability, and sexual orientation. These dimensions have a profound impact on how individuals perceive themselves, how they are perceived by others, and what position they hold within both organizational and societal contexts. Because they are deeply rooted, these dimensions often serve as the basis for discrimination, while at the same time representing a key to understanding inclusion. One of the most salient internal dimensions is chronological age. Age is more than a number; it reflects generational differences, work styles, values, and assumptions. For example, older employees are often perceived as less adaptable to change, whereas younger employees may be seen as less reliable due to their limited experience (Posthuma and Campion, 2009). Nevertheless, each generation brings distinct strengths—some offer stability and strategic thinking, while others contribute freshness and technological agility (Parry and Urwin, 2011). Organizations that promote intergenerational dialogue through mentoring and joint projects tend to foster richer working environments (Boehm et al., 2014). Gender is another highly visible and often heavily burdened dimension of diversity. While awareness of gender diversity in professional life has grown, significant barriers persist. These include the “glass ceiling,” which refers to invisible obstacles that prevent women from reaching top leadership positions (Loden, 1985), and the “glass cliff,” which suggests that women are more likely to be appointed to leadership roles during periods of crisis, when the risk of failure is higher (Ryan and Haslam, 2005). At the same time, men working in female-dominated professions may face pressure to assume leadership roles for which they may not be adequately prepared, a phenomenon known as the “glass escalator” (Williams, 1992). Mere acknowledgment of gender diversity is not enough, concrete measures such as transparent promotion pathways, work-life balance policies, and awareness-raising on gender and sexual diversity are necessary (Eagly and Carli, 2007). Ethnicity and race also shape professional experiences through language, cultural norms, appearance, and social perception. Racial discrimination, rooted in historical inequalities and systems of power, continues to exert a strong influence on employment opportunities, hiring practices, and career advancement. While the phrase “We are all part of the human race” is often heard, practitioners emphasize that recognizing shared humanity does not eliminate the need to address structural injustices and inequalities (Bonilla-Silva, 2018). Members of ethnic and racial minorities frequently encounter obstacles in recruitment, promotion, and social acceptance. However, ethnic diversity within teams can foster innovation, but only when there is space for equitable participation and expression (Cox, 2001). Organizations that

value intercultural sensitivity can actively contribute to a more just society by adopting anti-discrimination policies and offering training in intercultural competencies, thereby creating a work environment that acknowledges and values ethnic diversity (OECD 2023). Physical ability is most often associated with disability, but can also include other factors such as reduced mobility, temporary injuries, chronic illnesses, and daily variations in coordination, strength, and stamina. These are closely linked to social and institutional barriers that hinder inclusion. The social model of disability (Oliver, 1990) highlights that it is the environment, rather than the health condition itself, that restricts participation and full inclusion. Organizations are encouraged to provide accessible workplaces, flexible schedules, and technical support to remove these barriers and enhance professional participation (Santuzzi and Waltz, 2016; Schur et al., 2014). Although sexual orientation is a deeply personal aspect of identity, it also significantly affects an individual's professional experience, opportunities, and sense of safety. Members of the LGBTQ+ community often conceal their identity out of fear of discrimination, which can negatively impact their productivity, health, and team dynamics (Tilcsik, 2011). While many countries have introduced legal protections against discrimination, cultural contexts continue to play a crucial role in the acceptance of sexual diversity (Herek, 2009). Organizations that promote inclusive policies tend to foster safer work environments, greater job satisfaction, and innovation. Internal dimensions of diversity are not a matter of individual choice, yet they fundamentally shape daily experiences in the workplace. Understanding their interrelation is essential for designing effective strategies and practices that promote inclusion, equity, and organizational resilience, especially in the face of ever-evolving social complexity.

EXTERNAL DIMENSION OF DIVERSITY: SOCIAL FACTORS AND PROFESSIONAL EXPERIENCES

External dimensions of diversity encompass aspects of identity shaped by social circumstances and life experiences. These include, for example, religious affiliation, marital and parental status, education, physical appearance, geographic location, and work experience. In contrast to internal dimensions, external dimensions may appear more changeable, yet they often remain stable due to their deep roots in broader societal contexts. Religious affiliation, increasingly present in public discourse, has until recently been largely excluded from diversity management frameworks within workplaces. Organizations that accommodate the religious needs of employees, for instance, by providing prayer spaces or flexible work hours during religious observances—demonstrate respect and understanding for different personal and cultural needs. In societies where religion plays a prominent role, this topic can be sensitive, but it also creates opportunities for interfaith dialogue (Horowitz, 2000; Lederach, 1997). Social perceptions of parenthood and marital status also significantly influence workplace dynamics and attitudes toward employees. For example, married mothers often face penalties due to the assumption that they are less committed to their work, while married fathers are typically viewed as more stable and reliable (Correll et al., 2007; Williams and Dempsey, 2014). Parenthood, particularly motherhood, further amplifies these discrepancies. The phenomena of the "motherhood penalty" and the "fatherhood bonus" illustrate how parenthood differently impacts men and women in professional contexts (Budig and Hodes 2010). In addition, unmarried individuals may be informally discriminated against, receiving fewer benefits such as bonuses, tax relief, or time off, and often face greater expectations for flexibility, simply because they are not married. Inclusive policies such as flexible working hours, parental leave, and mentorship support can significantly

improve engagement among working parents (Mor Barak, 2015). However, if not carefully implemented, such measures may exacerbate existing inequalities and lead to perceptions of unfairness within the workplace. Educational background, including the institutions individuals have attended, also has a substantial impact on professional opportunities, though it does not necessarily reflect the full scope of their capabilities. Access to education is often determined by economic and social conditions. Individuals from more privileged backgrounds are more likely to attend prestigious schools (Bourdieu, 1986), while others may be disadvantaged despite their potential. The same holds true for professional experience—work history in well-known organizations is often more highly valued, even when it is not qualitatively richer (Granovetter, 1973; Rivera, 2012). This creates a cycle of privilege that continues to favor those already within the system. Socioeconomic status and geographic location are closely connected to education and professional experience. These factors affect access to employment, resources, and economic mobility (Becker, 1993). Individuals from lower socioeconomic backgrounds often face reduced access to educational and networking opportunities, while those with social capital benefit from relationships that open doors to elite professional positions (Bourdieu, 1986). Geographic location further exacerbates inequality: urban areas typically offer greater access to education and services, while rural regions often lack infrastructure and professional development opportunities (Florida, 2017; OECD 2021). In this context, mobility can be both a tool and a barrier, since many are unable to relocate due to financial or family constraints (Shucksmith, 2018). These two dimensions frequently intersect, further limiting social mobility. Physical appearance, although not a fixed category, also significantly influences how employees are perceived. Appearance shapes first impressions, and in professional contexts, these impressions may carry undue weight. Research shows that more physically attractive individuals tend to earn more, while those who deviate from social norms often face unspoken penalties (Hamermesh and Biddle, 1994; Rhode, 2010). Phenomena such as the "beauty premium" and "lookism penalty" highlight how factors like body size, height, grooming, and attire influence hiring, pay, and promotion opportunities. Similarly, hobbies may influence workplace perceptions. Some activities, such as tennis or the arts, align more easily with dominant organizational cultures, while others may be met with skepticism or misunderstanding (Shore et al., 2018). The relationship between hobbies and cultural or social capital (Granovetter, 1973; Rivera, 2012) illustrates the need for organizations to recognize and value diverse lifestyles among their workforces. Organizations that appreciate such authenticity foster healthier and more creative work environments. External dimensions of diversity may not always be immediately visible, but their impact runs deep. They emerge from a complex interplay of personal choices and social contexts. When organizations take these dimensions seriously, they can create environments in which individuals from all backgrounds have genuine opportunities to succeed. Diversity is not merely a matter of fairness, it is a strategic asset that enhances organizational quality, resilience, and humanity.

ORGANIZATIONAL DIMENSION OF DIVERSITY: STRUCTURE, POWER, AND ACCESS TO RESOURCES

Every workplace organization functions as a unique organism. It possesses its own rules, dynamics, priorities, and both visible and invisible boundaries. When we speak of the organizational dimension of diversity, we refer to characteristics related to an individual's position within the structure and internal dynamics of the organization. This includes functional role, hierarchical status, team affiliation, union membership, work location, length of service, and area of expertise. Unlike personal characteristics,

organizational diversity emerges from institutional frameworks and shapes access to resources, power, and information. Within the same organization, employees may have fundamentally different experiences, not necessarily because the system is unequal, but because their positions within it vary. Functional status and hierarchical position significantly affect access to resources and information. For instance, individuals in upper management generally enjoy greater autonomy and access to key information (Thomas and Ely, 1996; Ely and Meyerson, 2000), whereas employees at operational levels often feel excluded. This vertical distance shapes both authority and the experience of belonging. Inclusive policies must therefore be sensitive to hierarchical context to ensure equitable opportunities for participation, aligned with individuals' areas of responsibility and competence (Shore et al., 2011; Nishii, 2013). Intersectional effects deepen these disparities. For example, a woman from a minority ethnic group in a lower hierarchical position may experience multiple forms of exclusion simultaneously. These overlapping experiences of marginalization reinforce each other, creating additional barriers (Mor Barak, 2015). Therefore, inclusive policies must not be generic; they must account for hierarchical context to provide everyone with a genuine opportunity to be seen and included. Moreover, affiliation with a team or department creates specific microcultures, including shared norms, values, and communication habits. Although diversity can promote innovation, without collaboration it may lead to the development of a silo mentality and knowledge hoarding within teams (Roberson, 2019). When knowledge becomes confined to groups, the departure of an individual may result in the loss of essential expertise. Successful organizations recognize the importance of so-called boundary spanners—individuals who connect different teams and facilitate knowledge flow (Tushman and Scanlan, 1981). Without such individuals, conflicting priorities may emerge, and some voices may remain unheard (Barakat et al., 2024). In environments marked by pronounced hierarchical differences and limited communication across departments and management levels, employees often develop informal forms of association to increase their visibility and influence. Union membership and employee councils are also part of organizational diversity. While their traditional role has been to advocate for workers' rights, they are increasingly involved in promoting diversity and social justice (Freeman and Medoff, 1984; Hyman, 2001). However, these bodies must also be inclusive to effectively represent a diverse workforce (ETUI 2021). At the same time, affiliation with unions or councils may carry stigma or discomfort. Frequent media portrayals of strikes or protests may reinforce the perception of opposition between these associations and employers. In the age of increasingly flexible work arrangements, work location is a relevant aspect of organizational diversity. Employees who work remotely, in the field, or from regional offices often experience professional isolation and limited access to career development opportunities (Golden et al., 2008; Morganson et al., 2010). Working "in the shadows" can result in a weaker sense of inclusion, lower organizational commitment, and reduced motivation (Baumeister and Leary, 1995). In addition to location, tenure influences the level of inclusion through the development of organizational knowledge, social capital, and psychological safety. Longer tenure often brings increased confidence, broader networks, and greater influence. New employees tend to withhold their opinions until they feel secure within the organizational culture, whereas long-serving employees are generally more comfortable expressing themselves and exerting influence (Cable et al., 2013; Fang et al., 2017). Inclusive onboarding processes that introduce individuals to both the job and the organizational culture can help bridge this gap. The role and perception of one's profession also shapes workplace experience. For example, technical and financial professions often carry more authority, while fields like human resources or administration are perceived as softer and less central (Ashcraft, 2013; Ferdman and Deane, 2014). Gender and class stereotypes

further influence professional identity. Women in technical roles or men in caregiving sectors may still be perceived as “unnatural” representatives of their professions (Heilman, 2012; Eagly and Karau, 2002). These symbolic frames limit mobility and affect employees’ sense of belonging. The organizational dimension of diversity often remains overshadowed by more visible identity markers. Yet it plays a central role in structuring access to power, information, and visibility within the organization. Recognizing this dimension requires understanding that inclusion is not solely about identity, it is about the structural conditions that shape how identity is enacted in everyday organizational life.

CONCLUSION

In today’s business environment, diversity is increasingly recognized as a driver of organizational development and competitive advantage. However, a key question remains: how deeply do we truly understand its full complexity? Numerous scholars argue that when diversity is acknowledged and actively integrated, it can enhance organizational performance, increase innovation, and improve decision-making processes (Cox and Blake, 1991; Ely and Thomas, 2001; Mor Barak, 2015). On the other hand, when diversity is viewed solely through the lens of visible characteristics—such as gender, age, or ethnicity—approaches to inclusion may become oversimplified and ultimately ineffective. Such a limited understanding neglects the invisible yet essential aspects of identity, including personal experiences, life circumstances, educational and socioeconomic background, emotional traits, and professional challenges that shape daily work life. Recognizing diversity within organizations is essential for building inclusive work environments, yet this process must also respect the privacy of employees. Diversity should be understood and appreciated through both visible and invisible dimensions of identity, including experience, values, and positionality, while safeguarding individual boundaries. Through clear policies that recognize and integrate diversity, organizations can promote inclusion without compromising privacy, enabling employees to feel safe and respected in expressing their identities. Rethinking diversity and intentionally building inclusive cultures contribute to workplaces that are more humane, accessible, and responsive to the real needs of employees. The layered complexity of identity is powerfully illustrated in an inclusion workshop where participants were asked to describe themselves without mentioning their name, gender, or profession. Responses such as “I’m the first in my family to attend university,” “I’ve lived with a chronic illness since childhood,” or “This is my first job” revealed the depth of personal stories far beyond standard demographic categories typically used in organizational analyses. These examples demonstrate that identity is multifaceted and often invisible in standard classifications yet plays a crucial role in shaping professional experiences and interpersonal dynamics. This is why many scholars and practitioners in organizational development and human resources emphasize the need for more nuanced approaches to diversity, ones that go beyond formal categories and embrace identity complexity (Shore et al., 2011; Nishii, 2013). It is precisely from this need for a comprehensive understanding of identity that the Four Layers of Diversity model by Gardenswartz and Rowe (2003) emerged. This model conceptualizes identity through four interconnected layers: personality, internal dimensions (such as gender and age), external dimensions (such as education, marital status, and socioeconomic background), and organizational dimensions (such as job position, team affiliation, and hierarchical status). In doing so, the model offers a dynamic framework that highlights how individual traits intersect with structural conditions. In practice, this model can significantly inform organizational policies and practices. It can serve as a guide for developing inclusive hiring procedures

that do not privilege linear career paths but instead recognize diverse life trajectories. It also provides a foundation for onboarding programs that address insecurity and accommodate the needs of various employee profiles, as well as for training on unconscious bias, intersectionality, and belonging. Furthermore, it offers insights into how to structure work environments that are not solely shaped by formal rules, but also by everyday communication and team dynamics. This approach not only helps foster fairness, but also enhances resilience, innovation, and engagement across the organization. The Four Layers of Diversity model offers a conceptual foundation for further research into the interplay of identity dimensions, the perception of diversity across professional contexts and stages, and the strategic development of sustainable inclusive cultures. Rather than relying on isolated projects or symbolic gestures, organizations that adopt this model embrace diversity as an ongoing process. This process entails restructuring power dynamics, redefining organizational values, and creating genuine opportunities for participation among all members of the workforce. In a world marked by social divisions, global crises, and the urgent need to reimagine workplaces, this model provides a concrete tool for balancing belonging and authenticity, as well as structure and flexibility. Ultimately, diversity should not be treated as a managerial problem to be solved through regulations and policies, but rather as an opportunity for organizational learning, growth, and evolution. Organizations that embrace this mindset become more resilient, more creative, and more human, ready to face today's challenges and act responsibly toward the future.

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Interactive teaching methods and their impact on student motivation

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REVIEW PAPER

ABSTRACT: Contemporary teaching is increasingly moving away from traditional methods and shifting toward interactive approaches that make students active participants in the learning process. Interactive methods, based on collaboration, dialogue, and critical thinking, enable multidirectional communication and contribute to greater student engagement and motivation. This paper is of a review nature and relies on a qualitative analysis of the literature. The methodological framework involved a systematic search of scientific sources in Google Scholar, ERIC, and ResearchGate, conducted from January to March 2025. Keywords were used in English and Bosnian/Croatian (interactive teaching methods, student motivation, active learning, cooperative learning, engagement). Studies published in the last 20 years (2004–2024) were considered, with exceptions for classical authors (e.g., Bonwell & Eison, 1991). After reviewing more than 60 sources, 27 met the criteria of scientific rigor, relevance, and methodological validity. The analysis was conducted using a qualitative approach through thematic grouping and comparative interpretation of findings. The analysis identified significant interactive methods: case study, role-playing, debate, brainstorming, simulation, Socratic dialogue, gamification, and project-based learning. These methods substantially contribute to the development of intrinsic and social motivation among students through engagement, collaboration, autonomy, and content relevance. However, their implementation also brings challenges, such as increased preparation demands, organizational difficulties, and potential uneven student participation. Interactive methods represent an effective tool for enhancing student motivation and learning quality. Their successful implementation requires continuous professional development for teachers and institutional support. Only through systematic application and strengthening educator competencies can interactive teaching become an integral part of daily pedagogical practice.

Keywords: *interactive teaching, student motivation, active learning, cooperative learning, case study, role-playing, socratic dialogue*

INTRODUCTION

Contemporary teaching is increasingly moving away from traditional forms of instruction and turning toward approaches that encourage active student participation, collaboration, and critical thinking. In this context, interactive teaching occupies a central role as it enables multidirectional communication between teachers and students, as well as among the students themselves, significantly enhancing learning quality and student engagement (Bonwell & Eison, 1991; Prince, 2004).

Interactive teaching methods represent a set of didactic and methodological procedures that place students at the center of the educational process. They facilitate knowledge

acquisition through discussion, idea exchange, practical activities, and reflection. Unlike the passive role of students in the traditional model, here students become active researchers, critics, and creators of knowledge (Bonwell & Eison, 1991). Given this potential, it is important to examine more deeply which types of interactive methods are most prevalent in teaching, how they are applied, what advantages and disadvantages they bring, and what is their concrete impact on student motivation.

Methodological Framework

The study has a review character and relies on a qualitative analysis of the literature. The methodological framework was designed to ensure systematic collection and interpretation of sources. The main criteria used were the scientific rigor of the studies, their relevance to contemporary didactics, and the focus on interactive teaching methods and their connection to student motivation. The search was conducted between January and March 2025, using the academic databases Google Scholar, ERIC, and ResearchGate. Keywords were applied in English and Bosnian/Croatian: interactive teaching methods, student motivation, active learning, cooperative learning, and engagement. Studies published in the last 20 years (2004–2024) were considered, with exceptions for classical authors regarded as foundational (e.g., Bonwell & Eison, 1991). The selection process involved reviewing more than 60 sources, of which 27 met the inclusion criteria. Excluded were non-peer-reviewed works, popular-science sources, and studies lacking sufficient methodological rigor. The analysis was conducted using a qualitative approach through thematic grouping and comparative interpretation of findings. This approach allowed different theoretical models and classifications of interactive methods to be examined in relation to each other.

TYPES OF INTERACTIVE TEACHING METHODS

Interactive methods involve forms of teaching in which the student is an active participant in the educational process, and knowledge is acquired through mutual communication, collaboration, and the exchange of ideas among students, as well as between students and the teacher (Suzić, 2005). Unlike the traditional approach, interactive teaching is based on multidirectional communication, the construction of shared knowledge, and the development of social and cognitive competencies.

In the professional literature, multiple classifications of interactive methods can be found, which complement each other..

Bonwell and Eison (1991) argue that active learning, which forms the foundation of interactive teaching, is based on engaging students in meaningful activities. They categorize methods into two main groups: discussion-based methods (e.g., debate, guided discussion, panel) and problem-oriented methods (case studies, role-playing, simulations, solving authentic problems in teams). These methods enable students to develop skills in expressing their own opinions, argumentation, and teamwork, significantly contributing to their intrinsic motivation. Discussion-based methods strengthen students' social and communication skills, while problem-oriented methods foster critical thinking, creativity, and the ability to apply knowledge practically. Both categories enhance intrinsic motivation, as students recognize their personal involvement and the relevance of what they are learning. Contemporary research emphasizes that the combination of discussion and problem-based methods is particularly effective, as it simultaneously develops cognitive, social, and emotional competencies (Prince, 2004; Freeman et al., 2014). This confirms that interactive methods are not merely an alternative to traditional lecturing but are a key tool for cultivating engaged and autonomous learners.

A similar classification is offered by Orlović Lovren (2012), who divides interactive methods according to the nature of educational interaction into: verbal methods (dialogue, brainstorming, Socratic conversation), situational-problem-solving methods (case studies, role-playing, simulation), and inquiry-based methods (project-based learning, heuristic discussion, experiments). This classification emphasizes different learning functions, ranging from developing verbal fluency and critical thinking to creativity and complex problem-solving. Analysis shows that verbal methods particularly encourage students to express their opinions and reflect, thereby enhancing their self-confidence and communication competencies. Situational-problem-solving methods connect theoretical knowledge with practice, allowing students to experience real roles and take responsibility for decision-making. Inquiry-based methods, on the other hand, emphasize autonomy, perseverance, and the development of scientific thinking, contributing to the formation of long-term motivation and intrinsic interest in learning. Compared to Bonwell and Eison's (1991) classification, this approach places additional emphasis on the research and investigative aspect of learning. This is especially important in contemporary educational contexts, where students are expected not only to be passive recipients of knowledge but active researchers who construct knowledge through experience and experimentation. Research shows that this approach increases engagement and long-term satisfaction with learning (Hmelo-Silver, 2004).

In the context of pedagogy, Suzić (2005) particularly emphasizes the social aspect of learning and defines interactive methods as those in which learning occurs through social interaction. He identifies a range of methods that support this idea, such as teamwork, the jigsaw method, the "learning together" method, cooperative project-based methods, collaborative learning, and cooperative scripts. Suzić emphasizes that a lesson can be considered interactive only if these methods dominate its structure, while occasional use does not alter its fundamental framework.

According to Osmić and Tomić (2002), the degree of interactivity of a teaching method depends not only on its basic form but also on the way the teacher implements it. Thus, even traditional methods can acquire an interactive character if applied in the context of cooperative learning, idea exchange, and collaborative problem-solving. For example, a classic lecture can be transformed into an interactive activity by incorporating discussion, open-ended questions, or team-based problem-solving tasks. This approach allows for the modernization of existing methods without completely abandoning their traditional structures, which in practice proves to be a realistic and sustainable step toward introducing interactivity into teaching. It facilitates teachers' transition to contemporary teaching models while making students more active participants in the learning process. Furthermore, it demonstrates that interactivity is not strictly tied to the choice of method but rather to the teacher's pedagogical style and the way they facilitate the learning process (Brookfield & Preskill, 2016; Prince, 2004). Osmić and Tomić's contribution lies in emphasizing the flexibility and adaptability of teaching methods, which is particularly important in the context of diverse educational environments and resource limitations.

Although different authors use various criteria for classification, a common characteristic of all interactive methods is the active participation of students, with a focus on collaboration and the development of critical thinking. This makes them not only learning methods but also tools for empowering students as independent and responsible actors in education.

FREQUENTLY USED INTERACTIVE METHODS IN CONTEMPORARY TEACHING

In contemporary didactics, interactive methods play a significant role in empowering students as active participants in the learning process. Their application enables the development of higher cognitive abilities, social skills, and intrinsic motivation. Unlike traditional methods, which involve the transmission of knowledge from teacher to student, interactive methods require multidirectional communication, collaboration, and the exchange of ideas (Gillies, 2016). Below are the most commonly used methods recognized in educational theory and practice as effective.

Case Study

The case study represents a learning method based on the analysis of real or fictional situations from practice. Students, individually or in groups, analyze a specific problem, explore possible solutions, and draw conclusions. This method promotes critical thinking, decision-making skills, and the connection between theory and practice (Prince, 2004). Through this approach, students learn to reflect on the causes and consequences of problems, view situations from different perspectives, and develop well-reasoned opinions. It also fosters collaboration, as students often work in small groups where each member contributes through analysis and ideas. In the school context, the case study method is particularly useful in subjects that address social and real-life topics, such as civic education, sociology, medicine, psychology, and economics. For example, in civic education, students may analyze cases of human rights violations, while in medical schools, this method can be used to study real clinical situations and make diagnostic and therapeutic decisions. This type of engagement increases the relevance of the curriculum and student motivation for learning.

The interpretation of these findings indicates that the case study has a dual significance: on one hand, it contributes to cognitive development, as students learn to analyze complex information and draw well-founded conclusions, while on the other hand, it enhances intrinsic motivation through a sense of purpose and the applicability of knowledge (Ryan & Deci, 2020). When students recognize that the solutions they reach are connected to real-life situations, their engagement and willingness to actively participate in learning increase. This confirms that the case study functions not only as a method for acquiring knowledge but also as a powerful tool for fostering student motivation.

Role-playing

Role-playing involves simulating real-life situations through assuming different roles. In this way, students learn through experience, developing empathy, emotional intelligence, and social skills. By actively participating in everyday or specific life scenarios, students enhance their ability to understand others' perspectives, navigate social interactions more effectively, and build confidence in expressing their own viewpoints. This method is particularly useful in subjects that involve social interactions, conflicts, professional dilemmas, and ethical challenges (Clapper, 2010). The teacher's role is to prepare the context and rules of the activity, carefully design age-appropriate scenarios, and ensure a safe and supportive environment for expression. The most crucial part of this method comes after the activity: reflection, a group discussion in which students analyze the feelings, behaviors, and decisions of the characters, gaining deeper insights and transferring the experience to real-life situations (Clapper, 2010). In primary school, role-playing can be used in lower grades to develop communication and social skills through simple scenarios, such as resolving classroom conflicts, visiting the doctor, or practicing traffic safety. In higher grades, it can be expanded to topics in history (e.g., "acting out")

historical figures), biology (e.g., doctor and patient roles), or language (e.g., interviews, ordering in a restaurant). In this way, the method not only enriches the learning process but also contributes to the development of a positive classroom climate and the acquisition of key competencies for life and work in the community.

Interpretation of the findings indicates that role-playing has a dual significance: on one hand, it contributes to cognitive development, as students, through active participation in simulated situations, learn to understand different perspectives, analyze behaviors, and make thoughtful decisions; on the other hand, it strengthens intrinsic motivation by providing a sense of purpose and practical applicability of learned knowledge (Clapper, 2010). When students recognize that the experiences from role-playing reflect real life, their engagement, self-confidence, and readiness for active learning increase. This confirms that role-playing functions not only as a method for acquiring knowledge but also as a powerful tool for developing students' social, emotional, and motivational competencies.

Debate

Debate is a structured discussion in which students represent different viewpoints on a given issue, present arguments, and attempt to persuade the audience or a jury. This method develops logical thinking, argumentation skills, attentive listening, and constructive dialogue (Bonwell & Eison, 1991). Through active participation and teamwork, students acquire metacognitive skills and learn to critically evaluate their own and others' perspectives (Zohar & Barzilai, 2013). Debate further equips them for researching reliable sources and developing media literacy. In elementary school, the method can be adapted to the age group through simple, everyday topics, promoting tolerance and clear communication. Even younger children develop logical reasoning and expressive skills through debate (Kuhn, 2018). In secondary school, debates involve more complex topics and require the teacher to take an active role as a facilitator, guiding the process and fostering reflection (Kennedy, 2007). Beyond enhancing learning, debate increases student motivation and strengthens their sense of competence (Marttunen et al., 2005).

Participation in debates not only develops fundamental cognitive skills such as logical thinking and argumentation, but also guides students toward a deeper understanding of decision-making processes and the analysis of different perspectives. Through teamwork and research of reliable sources, students learn to critically evaluate both their own and others' viewpoints, further fostering metacognitive growth and critical thinking (Zohar & Barzilai, 2013). Presenting arguments in front of an audience or a jury not only enhances their self-awareness and sense of competence, but also strengthens intrinsic motivation by demonstrating that their ideas have impact and value. In this way, debate becomes more than a method for acquiring knowledge, functioning as a dynamic tool for developing social, communication, and motivational competencies, while preparing students for active and responsible participation in social interactions.

Brainstorming

Brainstorming is a creative method for generating ideas within a short period of time, without immediate evaluation of their quality. It is used in the initial stages of learning to stimulate divergent thinking, while in later stages, the ideas are analyzed and selected to develop concrete solutions (Orlović Lovren, 2011). This method fosters a sense of community in the classroom, encourages collaboration among students, and empowers them to express their opinions freely, even when they are unsure about the correctness of their suggestions. In a non-judgmental environment, students develop creativity, self-confidence, and a willingness to work in teams, which is particularly important in the early stages of education and for children who are typically quiet or hesitant to speak publicly.

Brainstorming functions as a catalyst for creative thinking and innovative learning, as students in a safe and supportive environment learn to express ideas without fear of criticism. This method not only develops divergent thinking but also strengthens social and emotional competencies, including collaboration, self-confidence, and a sense of belonging in the classroom (Orlović Lovren, 2011). In the initial stages of learning, free idea generation fosters creativity and the inclusion of all students, while later analysis and selection allow students to apply what they have learned in concrete solutions, thereby enhancing their critical thinking and teamwork skills. Particularly valuable is that brainstorming enables students who are usually reserved or uncertain to actively participate, contributing to an inclusive and participatory classroom climate.

Simulation

This method involves complex interactive activities that imitate real systems, processes, or events, allowing students to take active roles in imagined yet realistic situations. During a simulation, students make decisions, respond to changes, and bear the consequences of their choices in a safe and controlled environment, without the risks present in real life. This method is particularly useful in vocational and technical schools, where students can practice practical skills in simulated professional conditions (Kolb, 2015). However, simulations are also applicable in primary schools, through recreating traffic situations, managing imagined ecological projects, or simulating parliamentary work. Through this form of learning, students develop problem-solving skills, planning, decision-making, teamwork, and responsibility, while learning how to transfer acquired knowledge to new and more complex contexts.

The simulation allows students to learn experientially by actively taking on roles in realistic yet safe situations, thereby developing cognitive, social, and practical competencies (Kolb, 2015). Making decisions and responding to changes in a controlled environment teaches them responsibility and the anticipation of the consequences of their actions, while teamwork and planning foster collaboration and problem-solving skills. The application of simulation across different educational contexts, from vocational schools to primary education, demonstrates its flexibility and its ability to connect theoretical knowledge with practical application. In addition to increasing engagement and motivation, simulation also prepares students for real-life and professional situations, enabling them to transfer acquired experience to new and more complex contexts.

Socratic dialogue

Socratic dialogue is a method based on posing carefully designed questions that guide students toward deeper reflection, critical examination of their own views, and independent discovery of knowledge. In this process, the teacher does not act as a traditional conveyor of information but as a facilitator of thinking, who, through a series of successive questions, encourages students to analyze, argue, and connect different concepts (Paul & Elder, 2006). This method is particularly effective in subjects such as philosophy, ethics, civic education, language, and literature, where students are expected to think critically, make value judgments, and formulate their own conclusions. However, it is also applicable in natural sciences and mathematics when the goal is to foster a deeper understanding of concepts, processes, and principles (Chesters, 2012). In primary education, Socratic dialogue can be adapted to the students' age through simpler yet intellectually challenging questions that stimulate curiosity and discussion, such as: "Why do we think something is fair?" or "What does it mean to be a good friend?" In this way, early skills of argumentation, listening, and critical thinking are developed within a safe and supportive learning environment.

Socratic dialogue develops the ability for deep reflection and critical examination of one's own views, as students, through carefully posed questions, learn to connect concepts, analyze arguments, and independently reach conclusions (Paul & Elder, 2006). In this method, the teacher acts as a facilitator of thinking rather than a traditional source of information, which fosters intrinsic motivation and active learning. The application of Socratic dialogue across different subjects—from philosophy and ethics to natural sciences and mathematics demonstrates its flexibility in developing skills of analysis, argumentation, and value-based judgment (Chesters, 2012). Particularly in primary education, simpler yet intellectually challenging questions allow students to develop early skills in critical thinking, active listening, and discussion within a safe and supportive environment, thereby laying the foundation for lasting intellectual and social growth.

Project-based learning

Although often treated as a broader approach, project-based learning is a method that involves a series of steps: independent research, planning, execution, and presentation of a specific task or problem. Projects are usually multi-day or multi-month activities and require teamwork, interdisciplinarity, and the use of various sources of information, including out-of-school resources (Thomas, 2000). This method allows students to actively participate in the learning process, take responsibility for their work, and connect theoretical knowledge with practical experiences. Through project work, students develop essential competencies such as self-regulation, time management, collaboration, critical thinking, and the ability to present and argue their results. Project-based learning also enhances student motivation by enabling them to explore topics that are interesting and relevant to their everyday lives. In primary school, projects can be adapted to the students' age, focusing on simpler yet creative and investigative tasks that stimulate curiosity and teamwork. In upper grades and secondary schools, projects can become more complex, involving interdisciplinary themes and deeper exploration (Bell, 2010).

Analyzing the findings on project-based learning, its dual impact on students becomes evident. On one hand, this method contributes to cognitive development, as students, through independent research, planning, execution, and presentation of tasks, develop critical thinking, organizational skills, self-regulation, and argumentation competencies (Thomas, 2000; Bell, 2010). On the other hand, project-based learning strengthens students' motivation and social skills by enabling teamwork, the selection of topics that interest them, and the connection of theory with practical experience. It is particularly significant that, through the various phases and complexity of projects, students learn to take responsibility for their own work, solve problems, and apply acquired knowledge in real-life and professional contexts. In this way, project-based learning confirms its value not only as an educational method but also as a tool for developing essential life and professional competencies.

ADVANTAGES AND DISADVANTAGES OF IMPLEMENTING INTERACTIVE TEACHING METHODS

The implementation of interactive teaching methods in the classroom brings a range of advantages, including increased student motivation, higher levels of engagement, and the development of critical thinking, communication skills, and teamwork abilities (Prince, 2004; McKeachie & Svinicki, 2014). However, their implementation is not without challenges, as it requires more demanding preparation by teachers, time constraints, logistical barriers, and the possibility of uneven student participation in activities (Barkley et al., 2014; Bonwell & Eison, 1991).

Table 1. Advantages and Disadvantages of Interactive Teaching Methods

Advantages	Disadvantages
Increased student motivation and engagement	Greater need for additional preparation and effort from teachers
Development of critical thinking and creativity	Organizational complexity, especially in larger groups
Improvement of social and communication skills	Uneven participation of students in group activities
Practical application of knowledge and connection to real-life situations	Time constraints and limited availability of necessary resources
Individualized learning and adaptation to different learning styles	Resistance from students accustomed to traditional methods

The presented interactive teaching methods offer numerous advantages that significantly enhance the quality of learning and student development. Increased student motivation and engagement result from active participation in the learning process, while the development of critical thinking and creativity enables students to analyze information, solve problems, and generate innovative solutions. Furthermore, these methods improve social and communication skills through teamwork, collaboration, and constructive exchange of ideas. The practical application of knowledge and its connection to real-life situations further strengthen students' ability to transfer theoretical understanding into everyday or professional contexts, while individualized learning allows adaptation to diverse learning styles and abilities, fostering an inclusive and participatory classroom environment (Prince, 2004; McKeachie & Svinicki, 2014).

On the other hand, the implementation of these methods can be challenging. They require additional preparation and commitment from teachers, careful planning, and organization, particularly in larger groups. Uneven student participation in activities, time constraints, and limited resources can hinder effective application. Additionally, students accustomed to traditional methods may initially exhibit resistance to active and participatory learning (Barkley et al., 2014; Bonwell & Eison, 1991).

Despite these challenges, it is evident that the advantages of interactive teaching methods outweigh their limitations. They not only enrich the learning process and strengthen students' key competencies, but also prepare them for independent, critical, and collaborative engagement in real-life and professional contexts.

THE IMPACT OF INTERACTIVE METHODS ON STUDENT MOTIVATION

Interactive teaching methods significantly influence student motivation by enabling active participation, expression of opinions, collaboration with peers, and the connection of learned content to real-life situations. Each method contributes specifically to this process, depending on its characteristics and manner of implementation.

The case study method allows students to examine real or simulated situations and make decisions based on the analysis of information. This approach fosters a sense of competence and content relevance, thereby enhancing intrinsic motivation. Students become more engaged as they understand the purpose of the task and can apply knowledge in real-world contexts (Amelia et al., 2024). Case studies motivate through intrinsic factors because students recognize the practical applicability of their knowledge. The process of analyzing and making decisions in real or simulated situations strengthens their sense of competence and engagement. Students perceive the content as meaningful, which increases their willingness to participate actively and deepens cognitive motivation.

Role-playing provides students with the opportunity to assume different roles and view problems from multiple perspectives. This fosters emotional engagement, empathy, and creativity, which directly impact students' emotional motivation. Research indicates that this method reduces anxiety and increases confidence in expressing personal opinions (Aladwan, 2024). Role-playing emphasizes the emotional and social dimensions of motivation. By experiencing different perspectives, students develop empathy, emotional involvement, and creativity, while anxiety decreases and confidence in expressing opinions grows. Consequently, students strengthen their sense of self-efficacy, which directly enhances motivation for active participation and expression of viewpoints.

Simulations allow students to experiment with decisions and actions within a safe environment. They enhance engagement by involving students actively in the learning process, while providing rapid and clear feedback. This form of learning particularly motivates students who prefer visual and hands-on tasks (Kefalis et al., 2025). Simulations foster practical and experimental motivation, especially for learners who thrive through visual and experiential activities. The immediate and clear feedback strengthens engagement and satisfaction with the learning process, while the safe environment reduces fear of mistakes, further enhancing intrinsic motivation.

Socratic dialogue develops critical thinking skills and encourages students to engage in deeper reflection on a topic. Through guided discussion, students express and critically examine their viewpoints, which fosters a sense of autonomy and recognition. This feeling of being active and equal participants in the learning process positively impacts their motivation for learning and inquiry (Vasalampi et al., 2021). This method emphasizes autonomy and cognitive motivation. Students perceive themselves as equal contributors, which increases their motivation for exploration and critical reflection. Active participation in argumentation and reflection enhances self-confidence in their abilities and strengthens intrinsic motivation.

Methods that incorporate elements of game-based learning have a strong motivational effect, especially for students who struggle to find intrinsic motivation in traditional classroom settings. Features such as points, challenges, and visual progress create a positive emotional experience, enhancing attention and achievement motivation (Sailer & Homner, 2020). Gamification specifically boosts emotional and achievement-driven motivation. Points, challenges, and visual progress provide a rewarding and engaging experience, encouraging perseverance. This approach is particularly effective for students who find it difficult to develop intrinsic motivation in traditional environments, as it transforms learning into a fun and motivating process.

Project-based learning fosters long-term motivation because students have the freedom to choose their approach and mode of presenting a task, which enhances their sense of control over learning. Additionally, the tangible outcomes of their work further increase their sense of achievement and the perceived usefulness of acquired knowledge (Chen & Yang, 2019). Collaborative work in projects also develops the social dimension of motivation through cooperation, idea exchange, and mutual support. Project-based learning combines autonomy, competence, and social motivation. Freedom of approach strengthens students' sense of control over learning, while tangible results enhance the feeling of achievement and relevance. Through teamwork, the social dimension of motivation is cultivated: collaboration, idea sharing, and mutual support further increase student engagement.

Accordingly, interactive methods significantly contribute to the development of student motivation by empowering autonomy, enhancing competencies, and strengthening the sense of belonging. Various types of motivation—from intrinsic to social—can be

deliberately nurtured through the appropriate method, creating a positive and stimulating learning environment.

CONCLUSION

Interactive teaching methods represent a key tool for enhancing contemporary educational processes, particularly when examined through the lens of student motivation. Their application promotes greater student engagement, the development of critical thinking, collaborative learning, and a positive classroom climate. Research consistently confirms that the use of these methods increases students' intrinsic motivation, fosters a sense of competence, and facilitates deeper knowledge acquisition.

However, the successful integration of interactive methods into teaching does not depend solely on the choice of techniques but also on the teacher's willingness to adopt the role of a facilitator and engage in continuous professional development. In this regard, the implications for educational practice are clear: it is essential to strengthen teachers' pedagogical competencies through training, workshops, and the sharing of best practices, thereby enhancing their ability to plan and implement interactive methods in alignment with educational goals and student needs.

Professional development should focus on fostering reflective practice, understanding educational psychology, and mastering concrete techniques for conducting interactive lessons. Simultaneously, schools and educational institutions must provide support in terms of time, resources, and motivation to make this approach sustainable and an integral part of everyday teaching. Only in this way will interactive methods move beyond sporadic use and become the foundation of an empowered and motivating educational practice.

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The connection between social networks and organizational culture

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REVIEW PAPER

ABSTRACT: The aim of this research was to determine the extent to which the use of social networks reflects on organizational culture in the IT sector in Bosnia and Herzegovina and whether there is a connection between them. Starting from theoretical assumptions about the role of social networks in shaping organizational norms, attitudes, values and experiences, a research model based on two hypotheses was developed. The empirical research was conducted using an online questionnaire method via the Google Forms platform, and the sample included 230 employees of IT organizations selected by simple random sampling. Data analysis was performed in the SPSS and Microsoft Excel software packages. The results obtained show that the use of social networks significantly affects certain indicators of organizational culture, which confirmed hypothesis H1. Furthermore, a connection was established between organizational culture and social networks (H2). These findings confirm the importance of understanding social networks as factors that contribute to the formation of organizational identity, communication patterns and interpersonal relationships within IT organizations. The research has practical implications for management, HR staff and digital experts, especially in the context of managing organizational culture in a digital environment. But also for the academic community in the context of organizational behavior, management, communication studies, etc. It is recommended to expand future research to other sectors in order to compare the results obtained.

Keywords: *social networks, organizational culture, employees, IT sector, Bosnia and Herzegovina*

INTRODUCTION

Social media is increasingly influencing employee behavior and engagement within organizations. Organizations use it not only to attract and retain employees, but also to strengthen their own brand and corporate identity. It is particularly important to explore the connection between the influence of social media and organizational culture, as digital communications shape values, norms, and interpersonal relationships within organizations. This is especially evident in the IT sector, which is facing rapid and continuous change, and in Bosnia and Herzegovina, the IT sector is experiencing significant growth. According to Martin (2006, as cited in Arslan and Zaman, 2014), "organizational culture determines the ways in which an organization operates and how its members shape events within and outside the organization." Aryani and Widodo (2020) state that "organizational culture reflects the values, beliefs, and behavioral norms that are understood, accepted, and shared by members of an organization, and is always specific and unique." Most online users are active on social media, although few people are familiar with more than one

platform beyond those they use daily (Taprial & Kanwar, 2012). Zarrella (2010) points out that "social networks enable accessible and effective marketing activities that can have a significant financial impact on business". Miller et al. (2016) state that "social networks should not be viewed only as communication platforms, but also as content spaces with regional differences, which requires comparative research". Given all of the above, the aim of this research is to examine the connection between the use of social networks and organizational culture in IT organizations in Bosnia and Herzegovina. Special attention is paid to identifying differences in organizational culture indicators that may be related to social networks. Based on theoretical and empirical foundations, the following hypotheses were set: H1 - there are differences in organizational culture indicators that are influenced by social networks; H2 - there is a connection between organizational culture and social networks. Since this topic has not been sufficiently researched, this research has theoretical and practical value, providing insight to managers, HR experts and digital experts into the management of social networks and the shaping of organizational culture in the IT sector. It may also be important for the academic community in the context of organizational behavior, management, communication studies and the like.

LITERATURE REVIEW AND HYPOTHESES

Given the specificities of the IT sector, such as high dependence on digital tools, frequent virtual collaboration, and emphasis on transparent communication, the connection between social networks and organizational culture is a particularly important research topic. Before defining the research model and objectives, it is necessary to review how the literature describes social networks and organizational culture and their connection.

Social networks are essentially technologies that have increased the social interaction of individuals on the Internet. Websites associated with social networks have gained great importance in recent years, as they use blogs, videos, images, and bulletin boards to enable users to communicate more easily and frequently. The development of these technologies began with simple messaging systems, and later many graphical functions were integrated. Platforms such as YouTube, MySpace, Facebook, Orkut, and Flickr have enabled users to express their ideas more easily (Mack, 2008, according to Arslan and Zaman, 2014). A comparison with traditional media further highlights the transformative role of social networks. Zarrella (2010) states that traditional media are one-way communication systems, while new web technologies enable easy creation and distribution of user-generated content. Blogs, tweets and videos can reach millions of users without high costs. The literature highlights eight previously most popular forms of social networks: blogs, microblogs (Twitter), social networks (Facebook, LinkedIn), media sharing sites (YouTube, Flickr), social tagging and voting platforms (Digg, Reddit), review sites (Yelp), forums and virtual worlds (Second Life). Today, the growth in popularity of Instagram, Snapchat, TikTok and others is also highlighted, especially among Generation Z.

Social networks have characteristics that connect them to both interpersonal and mass communication. They most often involve the use of digital technology to enable public or semi-public communication. Humphreys (2017) identifies six key attributes of social media: social presence, temporal structure, media richness, permanence, repeatability and mobility. In the modern communication environment, social networks form a hybrid form of communication. They occupy a space between traditional mass communication and private pair communication, enabling interaction in different group sizes and levels of privacy. This form of communication is recognized in the literature as adaptive or scalable social connectivity (Miller et al., 2016). Along with technological changes, the ways in which social networks are used are also changing, which particularly affects the business sector.

Understanding the concept of organizational culture is key to connecting social networks and organizational behavior. Marker (2010) defines organizational culture as a set of shared values, norms, and rituals that emerge through long-term experiences of organizational members. Individuals in an organization are influenced by the values, norms, and beliefs of the group and their behavior is shaped by them. Nazir and Zamir (2015) highlight two main sources of organizational culture formation: norms and values promoted by senior management and previous experiences of employees. It is through the institutionalization of these experiences that organizational myths emerge that transmit collective knowledge and values. Although there is no single definition of organizational culture in the literature, most authors agree on several common characteristics. Organizational culture is socially constructed, historically conditioned, multidimensional and difficult to change. It encompasses cognitive and symbolic layers and develops exclusively within an organizational group (Akpa et al., 2021). Therefore, each organization must define its own culture adapted to the context and employees.

Social networks play a significant role in the business environment. Al-Hamam and Baqutayan (2013) emphasize that they are used to create and maintain social connections and exchange experiences, which facilitates communication and collaboration, key elements of organizational life. Due to their widespread use, social networks permeate various aspects of organizational functioning. Arslan and Zaman (2014) argue that their use can have a strong impact on organizational culture, while Canessa and Riolo (2003) emphasize that a strong organizational culture enables more effective use of communication media. Mohanan and Amutha (2023) emphasize that social networks can have a positive effect on employee attitudes and behavior and contribute to organizational efficiency. However, some authors warn that the greater transparency, openness and free discussion that social networks encourage may conflict with the existing cultural values of the organization (Leidner and Kayworth, 2006, according to Arslan and Zaman, 2014). This perspective suggests that the impact of social networks is not unambiguous, but depends on the structure and values of each organization.

The literature review shows that social networks can serve as a mechanism for strengthening organizational culture, but also as a factor that introduces new challenges, which is why it is necessary to further investigate how these processes are specifically manifested in IT environments. Also, due to constant technological changes and the increasing role of social networks in business, there is a need for additional research into this relationship, as limited insight has been provided so far. Accordingly, the following hypotheses were set:

H1: there are differences in organizational culture indicators that are influenced by social networks;

H2: there is a connection between organizational culture and social networks

RESEARCH MODEL AND OBJECTIVES

In IT organizations, social networks are becoming a key channel for communication and information exchange, which can have a significant impact on organizational culture. The research problem is therefore to understand how social network characteristics shape norms, attitudes, values, and experiences of employees in the IT sector in Bosnia and Herzegovina.

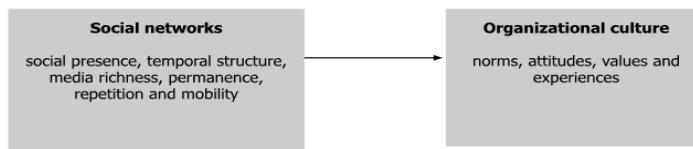
Based on a literature review, with particular emphasis on Humphreys (2017) and Nazir and Zamir (2015), a conceptual model (Figure 1) was developed with a unique operationalization of the two variables through a combination of indicators defined in this study. Although the literature offers various theoretical frameworks for individual studying

social networks and organizational culture, the application of such a combination in a model has not been recorded so far.

The model clearly defines two main variables:

- Social networks that include six attributes: social presence, temporal structure, media richness, permanence, repetition, and mobility. These attributes determine the way employees communicate and interact and potentially shape cultural patterns within the organization.
- Organizational culture that includes norms, attitudes, values, and shared experiences of employees, which together determine behavioral patterns and the way knowledge is shared in the organization.

Figure 1. Research model (authors). The arrows in the model show the direction of influence: social network characteristics can shape elements of organizational culture. For example, greater social presence and mobility can enhance trust and collaboration, while the permanence and repetition of content contribute to the institutionalization of knowledge and shared experiences.



The research objectives arise from the problem and the model. The general objective of this research is to examine the impact of social networks on organizational culture in IT organizations. The specific objectives are:

- To analyze the characteristics of social networks and the way they are used, taking into account their key attributes: social presence, time structure, media richness, permanence, repetition and mobility.
- To investigate the elements of organizational culture, including norms, attitudes, values and experiences, and the changes that occur under the influence of the use of social networks.
- To determine the connection between the characteristics of social networks and the elements of organizational culture, in order to identify the mutual connection between these two variables.

RESEARCH METHODOLOGY, DATA COLLECTION AND RESULTS

The research was conducted using an online survey questionnaire (Google Forms) in order to fulfill the research objectives and test the set hypotheses. Organizations from the IT sector in Bosnia and Herzegovina participated in the research, and employees were randomly selected for participation. Data collection lasted 2.5 months.

The organizations were first contacted and explained to them the aim of the research, anonymity and the way to fill out the survey questionnaire. Each organization was instructed to apply simple random sampling among employees. This was realized by instructing organizations to extract a list of all employees from the employee database, apply a random number generator (random.org) to select a certain number of employees, and only selected employees receive a link to the survey questionnaire.

In Table 1, you can see the structure of respondents, i.e. employees of IT organizations. A total of 230 employees of IT organizations in Bosnia and Herzegovina participated in the research. The largest share is made up of respondents aged 25–35 (41.7%), while the lowest share is made up of people over 55 (4%). The sample consists of 53.5% men and 46.5% women.

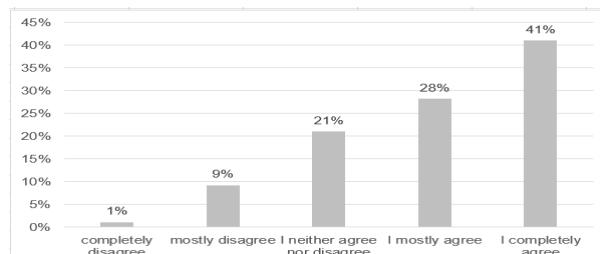
Table 1. Respondent demographic variables (authors)

Age	N	%
25	72	31.3
25-35	96	41.7
36-45	43	18.7
46-55	10	4.3
Over 55	9	4
Sex		
Female	107	46.5
Male	123	53.5
Education		
High school	22	9.6
Bachelor	103	44.8
Master'	100	43.5
PhD	5	2.1
Work experience in an organization		
Less than 5 years	26	11.3
5-10	54	23.5
10-15	75	32.6
More than 15 years	75	32.6

A Likert scale was used to measure attitudes (from "strongly disagree" to "strongly agree"). The data were processed using SPSS and Excel. The survey questionnaire contained 28 statements, but in this section only representative statements are presented for clarity because they best illustrate the relationships in the model. These are: T1: The use of social networks has changed significantly in the last three years in this organization; T2- The use of social networks will change significantly in the next three years in this organization; T3: Social networks are effectively included in internal communication and the development of organizational culture; T4: Employees in this organization use social networks to share professional experiences, knowledge and values; T5: This organization actively encourages the creation of positive norms and values associated with the use of social networks; T6 Organizational rules and norms define acceptable use of social networks.

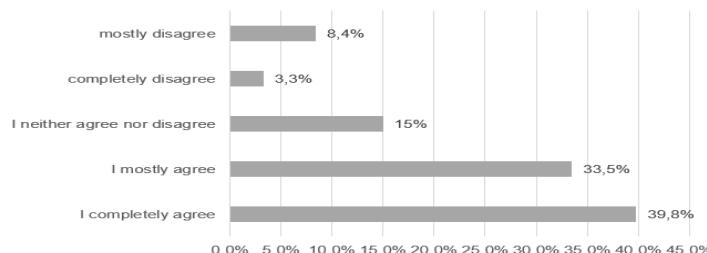
Analysis of responses to statement T1 indicates a predominantly positive attitude of employees of IT organizations. A smaller proportion of respondents disagree (3.8% strongly disagree and 2.1% mostly disagree), while 10.7% take a neutral position. The majority of participants agree, with 60.2% mostly and 23.2% completely agreeing with the stated statement. The results related to statement T2 confirm a similar pattern. Negative attitudes are relatively rare (1.8% completely and 3.1% mostly), while 15.4% of respondents remain neutral. The largest proportion of participants, 72.7%, mostly agree, and an additional 7% completely support the statement, indicating a high level of positive perception. The distribution of responses to statement T3 is shown in Chart 1, which provides a visual insight into employees' assessments of the extent to which social networks are effectively integrated into internal communication and the development of organizational culture.

Chart 1. T3: Social networks are effectively included in internal communication and organizational culture development (authors)



In the context of statement T4, a somewhat more pronounced dispersion of opinions is observed. A total of 11.4% of respondents state that they completely disagree, and 13.2% that they mostly disagree. A neutral position is taken by 7.7% of employees. However, the majority of participants express agreement: 33% mostly and 34.7% completely agree with the statement, which suggests that the perception of the positive impact of social networks is relatively stable. Opinions on statement T5 are shown in Chart 2, which illustrates in more detail the extent to which employees assess that the organization actively encourages the creation of positive norms and values associated with the use of social networks.

Chart 2. T5: This organization actively promotes the creation of positive norms and values related to the use of social networks (authors)



The responses to statement T6 indicate a somewhat more balanced distribution, although positive attitudes prevail again. 5% (completely) and 8.8% (mostly) of the respondents express a negative opinion, while 23.2% have a neutral attitude. The remaining part of the participants express agreement: 36.1% mostly and 26.9% completely, which further confirms the recognized importance of social networks in the organizational context.

Analysis of demographic variables (t-test and ANOVA) shows that respondents with more than ten years of work experience perceive a more significant influence of social networks on organizational culture ($t = 2.87$, $p = .005$). Also, respondents with a higher level of education (master's degree and above) estimate a greater influence of social networks than those with a lower level of education ($F = 4.15$, $p = .018$).

To test H1 ("differences in organizational culture indicators according to the level of social network use"), a one-way ANOVA ($N = 230$) was used. The analysis showed statistically significant differences: norms, $F(2,227) = 4.32$, $p = .015$; attitudes, $F(2,227) = 5.21$, $p = .007$; values, $F(2,227) = 3.87$, $p = .022$. This confirms H1. For H2 ("the connection between the characteristics of social networks and organizational culture"), Pearson's correlation was applied. The results show a positive correlation between social

presence and norms ($r = .42$, $p < .01$), time structure and attitudes ($r = .36$, $p < .01$), media richness and value ($r = .39$, $p < .01$), and permanence, repetition and mobility with employee experiences ($r = .31\text{--}.38$, $p < .05$). Therefore, H2 is confirmed.

Table 2 Obstacles to the connection of social networks and organizational culture (authors)

	Average grade	Standard deviation	Median
<i>Fear of surveillance</i>	2.61	1.40	3.00
<i>Reputational risk</i>	1.81	1.13	1.00
<i>Shifting the boundaries between private and business life</i>	2.90	1.43	3.00
<i>Bypassing the hierarchy</i>	2.71	1.44	3.00
<i>Replacing formal and informal</i>	1.81	1.13	1.00

The survey respondents emphasized that the least obstacle is reputational risk with an average score of 1.81, while the greatest obstacle is the shifting boundaries between private and professional life with an average score of 2.90, as can be seen in Table 2.

LIMITATIONS, IMPLICATIONS AND CONCLUSIONS

Based on the reviewed literature, it can be concluded that social networks and organizational culture can be interconnected through various mechanisms of communication, collaboration and information sharing. The literature suggests that social networks can influence certain indicators of organizational culture, but also that culture influences the way social networks are used.

This research examined the connection between the characteristics of social networks and organizational culture in the IT sector in Bosnia and Herzegovina. The results show that employees perceive social networks as a relevant tool for communication, knowledge exchange and shaping organizational values, which confirms both hypotheses – that there are differences in the indicators of organizational culture that are influenced by social networks (H1) and that there is a connection between them (H2). Additionally, respondents with longer work experience and higher education more strongly recognize the influence of social networks, which suggests that professional maturity and the level of competence shape the perception of digital communication tools.

However, the results must be interpreted with certain limitations. The research was conducted exclusively in the IT sector, and the data were collected through self-assessments, which may limit a deeper understanding. Therefore, future research should incorporate a mixed methodology – a combination of quantitative and qualitative approaches – to gain a more comprehensive insight. It is particularly recommended to supplement the study with interviews with managers of IT organizations, who could provide additional information on policies, organizational practices and the strategic role of social networks. Despite the limitations, the results offer valuable implications. For practice, they can help organizations develop clearer digital communication guidelines and strengthen organizational culture. For theory, the research confirms the need for a deeper study of the role of social networks as factors shaping organizational behavior in modern technological environments.

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Human potential as a factor of organizational competitiveness

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REVIEW PAPER

ABSTRACT: In recent times, researchers and practitioners have been placing great importance on the concept of talent management. Organizations around the world have recognized the crucial role of talent — employees as carriers of business processes and as a factor directly and indirectly linked to organizational competitiveness. Today's knowledge-intensive business environment emphasizes the importance of human resources and encourages viewing them as a rare and hard-to-replace organizational asset that shapes the organization's brand itself. The purpose of this paper is to provide a critical overview of the theoretical framework of talent management, with a particular focus on the role of talent reviews in a strategic context. An analysis was conducted on methodological issues in the study of talent management, and key trends were identified that currently influence — and will continue to influence — the practice and study of talent management in the future.

Keywords: *talent management, organizational competitiveness, human resource management, brand management, strategic management.*

INTRODUCTION

Talent management emerged in the 1990s as a strategic response to changes in the business environment. Today, talent management is recognized as a key factor of competitive advantage. Organizations are developing plans and processes to monitor and manage the talents of their employees, including attracting and hiring qualified candidates with competitive experience, managing and defining competitive salaries, providing training and development opportunities, performance management processes, and programs for retention and advancement. Terms such as "war for talent" and "knowledge economy" have further emphasized the importance of researching and implementing talent management, making it an essential topic in business practice over the past two decades. Nevertheless, academic literature is still trying to catch up with and explore the complexity and dynamics of this topic, leaving talent management a partially underdeveloped and underexplored concept in the scientific sense. Specific talent management activities can influence an organization's reputation, employee performance results, motivation and job satisfaction, employee's fluctuation, and ultimately, overall organizational success. Understanding the importance of talent management can be beneficial for developing effective human resource management strategies as well as building a strong organizational reputation that attracts new talent and retains existing employees. Given the dynamic nature of today's labor market, this paper aims to fill current gaps in the literature on talent management. There is no doubt that attracting, developing, and retaining talent has emerged as one of the most critical issues facing

organizations worldwide. Organizations with a clearly strategy will place a strong focus on talent management, as the departure of highly qualified and skilled employees can have a negative impact on that organization, primarily reflected in the reduced level of expertise and the quality of work processes within the organization, which can hinder the achievement of set organizational goals. Today, the concept of talent management is no longer viewed as a traditional practice, but rather as an essential component that can significantly contribute to gaining competitive advantage and strengthening the reputation of the organization.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Talent management has become a key area in the modern approach to human resource management, with the aim to attract, develop, and retain employees who deliver above-average performance and possess high potential. According to that, talent management can be described as the activities and processes which involve the systematic attraction, identification, development, engagement, retention, and deployment of those talents who have value to the organization, in order to achieve strategically sustainable success. (Boudreau & Ramstad, 2005; Collings & Mellahi, 2009; Scullion et al., 2010). Since the publication of the book "*The War for Talent*" in 2001, workforce differentiation has been considered a key element of talent management (Michaels et al., 2001). Following the initial definition of talent by the management consulting firm *McKinsey & Company* in 1998, through the publication of the aforementioned book "*The War for Talent*", scholars and practitioners began to focus on the talent management approach (Chambers et al., 1998). In order to gain industry leadership, organizations strive to invest in human capital by attracting, developing, and retaining employees (Boxall & Steenveld, 1999). Organizations have begun investing in internal selection, attraction, and development of talent in order to create an internal system composed of future leaders (Gallardo-Gallardo et al., 2020; Wolfswinkel & Enslin, 2020). The fundamental assumptions of talent management are that not all employees have the same impact on organizational effectiveness. The principles of workforce differentiation suggest that, instead of applying an equal approach to all employees, the employer should invest disproportionate resources in those employees whom disproportionately high returns are strongly expected from (Gelens et al., 2013). Such principles are mostly based on the Pareto principle, which suggests that 20% of an organization's employees contribute to 80% of its value (Swailes, 2013). This very approach represents the foundation of the elitist model of talent management, in which key positions and employees are identified as strategic resources (Son et al., 2020). Scientists (Scholars) and practitioners have been claiming for a long time that talent management practices enable organizations to establish seamless talent pipelines through recruitment, selection, compensation, promotion, training and development, internal mobility and in that way, they create significant new opportunities (Huselid & Becker, 2011). According to Ulrich (2007), talent consists of competence, commitment, and contribution. Tansley et al. (2007) defined talent as an individual who makes a difference to organizational performance. By combining different perspectives of a talent—which refer to qualities such as ability, capacity, commitment, competence, contribution, experience, gifts, knowledge, performance and potential, patterns of thinking, feeling or behavior, and skills of people result in high performance and high productivity, which facilitate the achievement of organizational goals. Cruz (2013) has begun with an etymological analysis of the term "talent" to establish the historical background of the terminology which is used today in the talent management literature. As the author's analysis shows, within the literature we can distinguish between

conceptualizations of talent as an “object” and as a “subject”, as well as between “exclusive” and “inclusive” approaches. The work concludes that there is significant diversity in the use of the term “talent” within the academic literature, and that talent management literature is often quite normative in the sense that different groups of authors consistently advocate for a single definition of talent, without considering alternative meanings. A common criticism of talent management research has been the suggestion that it lags behind in providing vision and direction to organizations in this field (Al Ariss et al., 2014; Cappelli & Keller, 2014; Cascio & Boudreau, 2016), more than a decade after talent management had emerged as a topic of interest in practice (Gallardo-Gallardo et al., 2015; McDonnell et al., 2017). However, over the past decade, talent management has emerged as one of the fastest-growing disciplines in the field of management (Collings et al., 2015). Nevertheless, many questions remain — especially those which are related to what is happening in practice and above all why it is happening (Thunnissen & Gallardo-Gallardo, 2017). Surprisingly, there is little knowledge about how talent management is imagined, implemented, and developed within organizations — not to mention its outcomes and effectiveness. It has been suggested that this can be explained by the fact that talent management is typically designed and implemented as a rational and instrumental process, separated from its organizational context and the interconnected participants. (Thunnissen et al., 2013). Organizations focused on success and profit have concentrated on new methods of hiring, selecting, and retaining valuable employees, as well as on their advancement to key positions (Harsch & Festing, 2020; Björk et al., 2022). The issue of talent management is therefore of interest to a wide range of different groups, not just to academics and human resource (HR) professionals. The Economist Intelligence Unit (2006) found that the majority of CEOs explicitly stated that talent management is too important to be just left to HR, while a report by the Boston Consulting Group (2007) identified talent management as one of the five key challenges for HR in the European context. The findings of BCG were based not only on those capabilities that executives expect to be the most important in managing human capital, but also on those in which they believe their organizations are the weakest. Therefore, it is likely that this field will be relevant, among others, to scholars and practitioners in the areas of strategic management, human resources, and organizational behavior. Son et al. (2020) defined talent management as the activities and processes that involve the systematic identification of key positions that contribute differently to the organization’s sustainable competitive advantage, the development of a group of talents with high potential and high performance to fill those roles as well as the development of differentiated human resource architecture to facilitate the filling of those positions with competent employees and ensure their continued commitment to the organization. Gallardo-Gallardo et al. (2017) aimed to present concepts of talent management by conducting a comparative study of 30 organizations in Sweden using in-depth interviews. The study defined talent management and its characteristics as: subject versus object, inclusive or exclusive, innate or acquired, and inbound or outbound. Five key talent management practices were identified: recruitment, talent’s identification and development, career management and succession planning as well as the management of talent retention. Based on the collected responses, four types of talent management were identified: elitist, humanistic, competitive, and entrepreneurial. Since the study was conducted only through interviews with representatives of Swedish organizations, its results cannot be generalized; but still, they can serve as a starting point for future empirical research in the field of talent management. In their review of the empirical literature on talent management (Thunnissen & Gallardo-Gallardo, 2019), the authors found that although research has been conducted across a wide range of context (i.e., countries and organizations), the impact of contextual factors—as well as

the role of interest group within specific contexts—on the conceptualization and implementation of talent management, has largely been overlooked. Sandeepanie et al. (2020) conducted a systematic literature review of 96 articles published between 1990 and 2019 in order to identify and clarify the concepts of talent, talent management and talent management practices. The study revealed that talent management is considered very similar to good practices within human resource management functions. Due to the current confusion about the definition of the concepts, it is difficult to identify the significance and importance of talent management for organizations. The authors propose their own definitions of talent and talent management adapted from Lewis and Heckman (2006) and identify talent management practices which differ depending on the area of operation of each organization. Swailes (2020) focuses on the effects of exclusive talent management practices, the hypothesis that shape talent management as well as the study of employee responses to such elitist practices. Using empirical studies, current theories, and ethical principles, the author suggests a definition of talent management and three main hypotheses: the existence of talented individuals, the accurate identification of talent within the organization, and the existence of a connection between talent management and organizational performance. The first hypothesis is confirmed, as talented people are presented in many sectors. The second was confirmed, emphasizing that specific conditions should be fulfilled which could assist managers in identifying and measuring talent within an organization without violating ethical principles. The third hypothesis shows that the use of talent management practices contributes to organizational success. Using a review of forty articles, Mohapatra and Behera (2020) analysed talent management from four perspectives related to talent management practices, namely acquisition, development, and retention of talents. The analysis confirms the fact that talent management practices contribute to the identification and development of talented individuals as well as their development and the organization can build a talent database from which it can select its future leaders. Regarding acquisition and retention of talents, the analysed studies showed that there is a need to adopt more effective recruitment and selection methods to hire the most valuable individuals, and that there is a significant relationship among talent management practices. The need of organizations in all sectors to expand their search for valuable employees has emerged along with the development of artificial intelligence, globalization, and digitalization, as well as the lack of qualified workforce in certain sectors (Richard & Lemaire, 2023; Zhang, Su & Liu, 2023).

TRENDS AND FUTURE DIRECTIONS IN TALENT MANAGEMENT

Although talent management is closely connected to business and corporate strategies (Farndale et al., 2010; Kim & Scullion, 2011), its context remains complex, challenging, and continuously evolving for many organizations (Vaiman et al., 2017). Due to this complexity, talent management needs to be studied more in different contexts and environments and the focus should be expanded to a broader perspective of targeted groups (Collings, 2014). Development activities are another important factor in retaining key employees - talents. Such activities include training, rotation, and work in multidisciplinary teams, which encourage the development of broader knowledge and mobility within the organization. Organizations need to create a talent culture that enables formal career development opportunities and strategic career-oriented plans. (Mohan et al., 2015). A workplace based on values and standards which talented employees can identify with and enable them to make progress and a significant contribution through optimal performance, can be described as a workplace with a strong organizational talent culture (Masale, 2020). Sharma and Sharma (2010) claim that

common values and norms help employees to focus on organizational priorities and lead their behavior. Talent management research is still focused on the meso organizational level of analysis, with limited attention given to studies at the individual level or factors at macro-level (Sparrow, 2019). The need to solve these criticisms will be crucial for the future development of the topic. Talent management has been characterized as a phenomenon which attempts to move from a "growing" to a "mature" stage (Dries, 2013; Gallardo-Gallardo et al., 2015). Better-contextualized research on talent management will help in gaining a deeper understanding of its application, as contextualization identifies the boundary conditions or limitations surrounding the generalization of research findings (Teagarden et al., 2018). Talent management cannot be analyzed in isolation, as it is in fact the product of a specific organizational and broader social context. The previous statement is supported by contextually grounded human resource management (HR) models (Paauwe, 2004; Paauwe & Farndale, 2017), which claim that influence of internal and external factors on strategic human resource management systems and their effectiveness. Barkhuizen and Schutte (2016) developed a model of a talents' career lifecycle to guide the management of talented employees' careers from its beginning to its end. This validated model (Gumede, 2019; Shipena, 2019) consists of eight phases (i.e., leaders' mindset about talent, talent branding, talent inclusion, talent engagement, talent development, talent performance management, talent compensation, and talent retention) and through each phase demonstrates the embedding of stronger job identification among employees through various talent management interventions. Painter et al. (2018) claim that values and norms form the foundation of ethical practices for talent management. According to Beheshtifard and Rahimi-Nezhad (2012), an individual's perception and professional identity in the workplace are led by the way they are treated within the organization. In a modern organization, talent branding becomes a key tool for attracting and retaining top professionals. Generation Z employees, as a digitally literate and socially engaged group, can be used as brand advocates to help attract top talent to organizations in the current "war" for talent (Patwa et al., 2018). The organizations need to develop a talent brand (which consists of convincing components of the organizational and employment brand) with which current and potential employees can identify with (Saurombe, 2017). The organization's talent brand is therefore an essential catalyst for attracting top talent. Even before an employee joins the organization, talent branding, if done well, can result in the first level of identification with the organization. A comprehensive review of the scientific literature points to the key dimensions of talent management, the challenges in identifying and assessing talent, the importance of their retention, and new trends shaping the future of this field. Traditional approaches, methods, and metrics are often insufficient for recognizing the modern skills required for today's modern workplaces, which requires innovative approaches and the digitalization of processes. Strong market competition and high turnover further emphasize the need for proactive retention strategies and continuous investment in employee development. Talent management should be based on relevant practices that connect theory and practice, respond to challenges of the global labour market, and actively involve all organizational stakeholders. Among the latest trends in talent management are the integration of digital technologies, the application of artificial intelligence, the encouragement of diversity as well as adaptation to the new economy and remote work. Organizations which keep pace with market changes and integrate these innovations into the talent management concept demonstrate greater responsiveness to market demands and resistance to changes, find it easier to attract and retain talent, and thus maintain their competitive position. This approach does not only contribute to the organization's competitive advantage but also enables the

sustainable growth as well as development of human potential in the dynamic business environment of the 21st century.

CONCLUSION

Employee retention is one of the main challenges faced by organizations trying to remain competitive. Therefore, the organizations must recognize that their employees play a key role in the success of the organization. Employers need to recognize the strategic value of all employees and develop systematic approaches that include motivation, development, and retention of employees. Human resource managers need to continuously update and improve policies related to talent management. Organizations can, for example, use internal talent pools and implement reward systems aimed at recognizing and valuing employee contributions. In this way, an organizational framework is created which encourages engagement, reduces turnover, and enables the development of key competencies within the organization itself. Historically speaking, the golden age of traditional talent management after World War II was based on a standardized approach to employment, development, and rotation of personnel within large corporations. Traditionally, the efforts of talent management were focused on filling leadership positions which were assumed to have the most significant impact on organizational success. In the contemporary context, this approach shows significant limitations, especially in economies which are in transition like Bosnia and Herzegovina, which are characterized by high emigration of qualified personnel, the lack of systematic talent development, and limited resources for strategic human capital management. For all these reasons, a shift is needed toward more agile, adaptable, and modern talent management models. There is great interest for talent management, but a deficit of representative and systematic data of actual talent recruitment and retention practices. It is essential to adopt a holistic approach to talent management research that goes beyond descriptive analyses and incorporates the development of theoretical frameworks with contextually relevant variables. Research questions should be clearly defined, and the theoretical foundations expanded to include models from strategic management, organizational theory, and strategic human resource management. An example of such an integrative approach is the dynamic talent management model developed by Thunnissen and Gallardo-Gallardo (2017), which has proven useful for understanding the complex interactions between individual and organizational factors. Even with a huge interest from researchers in emerging fields, very little is known about new practices in talent management. Therefore, there is a need to conduct research within the context of talent management, as such studies not only contribute to the academic field but also provide guidance to employers and human resource managers in shaping talent management strategies and building the organization's brand and reputation.

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The demographic picture of social reality

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REVIEW PAPER

ABSTRACT: The demographic situation of Bosnian-Herzegovinian (BiH) society is more than alarming. It is visible in a trend of emigration, especially of young, educated, and working-age people. If we add other indicators related to population movements, natural increase, birth rate, and mortality, the picture becomes clearer. Thus, the data point to the need for comprehensive economic, social, and demographic measures in order to change the current state and relations in this important sphere of society. As things currently stand, it is evident that there is neither political initiative nor meaningful programs that take these elements as the foundation for social action to reverse the process and create the preconditions for existence and life, particularly for young people, in their home country.

Keywords: demographic trends, birth rate, emigration, natural increase, education, employment, population policy, political, economic, social, and democratic reforms.

THE CURRENT DEMOGRAPHIC SITUATION OF BOSNIA AND HERZEGOVINA AND MIGRATION TRENDS

The aging of the population threatens the sustainability of the pension and healthcare systems, while the shrinking labor force negatively affects economic potential. According to the Federal Bureau of Statistics (2020), which projected population developments for the period 2020–2070, urgent measures are needed to mitigate the consequences. Kadusic & Suljić (2019) also point to the need for urgent change, particularly because of the forced migrations during 1992–1995, which altered the entire demographic structure of the country.

For quite some time, statisticians and economists have been warning about the negative trend of population growth in Bosnia and Herzegovina and about large-scale migrations. These have been conditioned by numerous reasons rooted in our turbulent past and uncertain present. Migrations are almost a natural state of Bosnia and Herzegovina. That has been so since the nineteenth century as large-scale migrations were present in the region. At the same time, immigration from various parts of the former state were also present. This was characteristic during the period of the Kingdom of Serbs, Croats, and Slovenes, continuing up until Bosnia and Herzegovina became an independent state at the end of the twentieth century.

The largest influx of population was seen from Serbia and Montenegro, particularly Sandžak, although immigration from other parts of the former Yugoslavia was not negligible. The reasons for migration were manyfold, with economic motives being dominant, though not the only ones. Economic migration was accompanied by agrarian reforms and the reduction of arable land for the existing population, predominantly Bosniak, which was hit hardest by these measures. Political pressures also played a role, especially in regions where non-indigenous populations were settled, particularly during

industrialization, when increased labor demand drew workers into towns and industrial centers.

Alongside political and religious reasons for migration, by the mid-twentieth century there was also a wave of economic exodus, primarily of young and working-age people. They moved from underdeveloped and economically backward regions of our country to developed European countries. That trend has continued to this day, becoming increasingly intensive. Consequently, migrations are a very significant factor in the demographic reality of BiH society. If we add the wartime period of 1992–1995, which saw mass exodus, forced displacement, expulsions, and ethnic cleansing, followed by weak or almost non-existent return after the war, the migration situation becomes not only current but also alarming, both for theory and political practice.

According to official data from the entity-level statistical bureaus, the 2013 population census recorded 3,531,159 inhabitants in Bosnia and Herzegovina (Agency for Statistics of Bosnia and Herzegovina, 2013 Census summary). From 2013 until today, about 152,300 people, or 4.31% of the total population, have left the country (according to entity-level estimates). If we add to this the estimates of international institutions, which state that 51.3% of young people want to leave Bosnia and Herzegovina, the picture becomes even more disheartening.

A survey by the British magazine *The Economist* ranked Bosnia and Herzegovina first in Europe for youth emigration, with more than fifty percent of young people wishing to leave the country (Sarajevo Times, 2023). These data should concern not only state structures but also all other social institutions that significantly influence the position of young people in society.

An inadequate economic and educational system, political instability, and the dominance of nationalism as the main social value depress young people and further fuel their exodus. This is true for all regions of Bosnia and Herzegovina, regardless of ethnic or territorial belonging. Thus, the gap between people's needs and actual conditions is enormous.

People are interested in a better economic and social system, education for professions with real prospects and demand both at home and abroad, and an educational model that is recognized. Education today is both a personal and need of the system as a whole. Young people should contribute to progress through work and innovation, rather than being tied down by party or ethnic affiliation.

As a post-conflict country, Bosnia and Herzegovina also suffers from political instability, institutional inefficiency, and economic underdevelopment, which further encourage emigration. Nationalism, as the ruling and dominant idea – rather than social and economic progress – is equally destructive for all ethnic groups and the entire country, as confirmed by data collected by entity bureaus about youth departure and their reasons (Federal Bureau of Statistics, 2022).

Official statistics, however, must be taken with caution, as they are incomplete and refer to varying levels and timeframes. According to international organizations dealing with migration research, Bosnia and Herzegovina's population has drastically declined since 2013.

Our analysis does not cover forced migrations during and immediately after the 1992–1995 war. Those migrations represent a separate subject requiring in-depth study of the reasons for poor return, as well as socioeconomic, cultural, educational, and existential motives for refugees' continued life abroad. Instead, our focus is on the post-census (2013) migration period, which has shown steady growth. We highlight the era of transition and democratization, which should have strengthened Bosnia and Herzegovina economically,

democratized governance and institutions, and created conditions for a new socio-economic system in which young people would seek their prospects at home rather than through another exodus.

That the situation is neither favorable nor motivating for young people and their stay in Bosnia and Herzegovina is confirmed not only by statistical but also by economic and demographic data from both international and Bosnian institutions. To illustrate our hypotheses, we will use a comprehensive analysis conducted by Benjamin Redžić (2023). His study provides a fuller picture of emigration trends in Bosnia and Herzegovina. The analysis examined the population numbers for each municipality and city based on data collected by the entity statistical institutes and the state statistics agency, together with data from the 2013 census. Since this involves population estimates, the analysis points to approximate rather than exact figures, meaning that the numbers may fluctuate. The ordering of data included in the analysis was based first on an overview of the cantons and regions from which the largest numbers of people emigrated, then the cantons and regions with the lowest emigration, and finally the cantons and regions where the indicators show population growth (the case of Sarajevo Canton). Given the methodology and data used by the above-mentioned author, we consider it reliable and important as a basis for questioning the causes and consequences of such an emigration process for the social situation and relations throughout Bosnia and Herzegovina.

Posavina Canton

By mid-2021, Posavina Canton had 40,422 inhabitants, which is 3,031 or 6.98% fewer compared to 2013. The largest population decline in this canton was recorded in Odžak. It is estimated that by mid-2021 Odžak had 18,570 inhabitants, which is 1,402 or 7.45% fewer than in 2013. In Posavina Canton, no municipality or town recorded a population increase compared to the 2013 census.

Canton 10 ili Herzeg-Bosnian Canton (Livno Canton)¹

By mid-2021, Canton 10 had 78,596 inhabitants, that is, 5,531 or 6.58% fewer than in 2013. The largest population decline was recorded in Drvar. By mid-2021, Drvar was estimated to have 5,856 inhabitants, a decrease of 1,180 or 16.77% compared to 2013. No municipality or town in Canton 10 recorded a population increase compared to the 2013 census.

Bosnian-Podrinje Canton

By mid-2021, Bosnian-Podrinje Canton had 28,382 inhabitants, which is 1,352 or 5.68% fewer than in 2013. The largest decline was recorded in the municipality of Pale, which had 793 inhabitants by mid-2021, 111 or 12.28% fewer than in 2013. No municipality or town in this canton recorded a population increase compared to 2013.

Herzegovina-Neretva Canton

By mid-2021, Herzegovina-Neretva Canton had 214,523 inhabitants, a decrease of 7,484 or 3.37% compared to 2013. The largest decline was recorded in Prozor, with 13,271 inhabitants by mid-2021, or 1,009 (7.06%) fewer than in 2013. No municipality or town in this canton recorded a population increase compared to 2013.

¹ Henceforth Canton 10.

Una-Sana Canton

By mid-2021, Una-Sana Canton had 264,248 inhabitants, which is 9,013 or 3.30% fewer than in 2013. The largest decline was recorded in Bosanski Petrovac, estimated at 6,237 inhabitants by mid-2021, a drop of 1,191 or 16.25% compared to 2013. No municipality or town in this canton recorded a population increase compared to 2013.

Central Bosnia Canton

By mid-2021, Central Bosnia Canton had 247,000 inhabitants, which is 7,586 or 2.98% fewer than in 2013. The largest decline was recorded in Kreševo, with 4,883 inhabitants by mid-2021, a decrease of 390 or 7.4%. No municipality or town in this canton recorded a population increase compared to 2013.

Zenica-Doboj Canton

By mid-2021, Zenica-Doboj Canton had 354,285 inhabitants, a decrease of 10,148 or 2.79% compared to 2013. The largest decline was in Vareš, with 7,501 inhabitants by mid-2021, or 1,391 (15.64%) fewer than in 2013. The only municipality in this canton with population growth was Tešanj, which had 43,797 inhabitants by 2021, an increase of 734 or 1.70% compared to 2013.

Tuzla Canton

By mid-2021, Tuzla Canton had 434,424 inhabitants, which is 10,604 or 2.38% fewer than in 2013. The largest decline was recorded in Kladanj, with 11,415 inhabitants by mid-2021, a decrease of 933 or 7.55%. No municipality or town in this canton recorded a population increase compared to 2013.

West Herzegovina Canton

By mid-2021, West Herzegovina Canton had 92,704 inhabitants, which is 2,194 or 2.31% fewer than in 2013. The largest decline was recorded in Ljubuški, with 26,922 inhabitants by mid-2021, or 1,262 (4.48%) fewer than in 2013. No municipality or town recorded a population increase compared to 2013.

Sarajevo Canton

The only canton where population growth was recorded is Sarajevo Canton. By mid-2021, it had 419,918 inhabitants, which is 6,325 or 1.53% more than in 2013. The largest decline was seen in the municipality of Stari Grad, with 24,565 inhabitants by mid-2021, a decrease of 2,341 or 6.52% compared to 2013. Population growth was recorded in the municipalities of Vogošća, Trnovo, Iliđa, Ilijaš, and Novi Grad. The largest growth was seen in Vogošća, which had 20,087 inhabitants by mid-2021, an increase of 2,744 or 10.42% compared to 2013.

Prijedor Region

The Prijedor Region had 127,181 inhabitants up to 2021, which is 21,215 or 14.30% fewer than in 2013. The largest population decline in this region was recorded in Oštra Luka. It is estimated that by mid-2021, Oštra Luka had 2,084 inhabitants, which is 702 or 25.20% fewer compared to 2013. In the Prijedor Region, no increase in population was recorded compared to the last census of 2013.

Doboj Region

By 2021, the Doboj Region had 195,574 inhabitants, which is 28,215 or 16.16% fewer than in 2013. The largest population decline in this region was recorded in Pelagićevo. It

is estimated that by mid-2021, Pelagićevo had 3,752 inhabitants, which is 1,468 or 28.12% fewer than in 2013. No municipality in the Doboj Region recorded a population increase compared to the 2013 census.

Bijeljina Region

By 2021, the Bijeljina Region had 242,754 inhabitants, which is 24,314 or 9.28% fewer than in 2013. The largest population decline in this region was recorded in Srebrenica. It is estimated that by mid-2021, Srebrenica had 11,068 inhabitants, which is 2,341 or 17.46% fewer than in 2013. No municipality in the Bijeljina Region recorded a population increase compared to the 2013 census.

Trebinje Region

By 2021, the Trebinje Region had 88,198 inhabitants, which is 7,809 or 8.12% fewer than in 2013. The largest population decline in this region was recorded in Novo Goražde. It is estimated that by mid-2021, Novo Goražde had 2,544 inhabitants, which is 773 or 24.80% fewer than in 2013. No municipality in the Trebinje Region recorded a population increase compared to the 2013 census.

East Sarajevo Region

By 2021, the East Sarajevo Region had 88,932 inhabitants, which is 5,468 or 5.79% fewer than in 2013. The largest decline in this region was recorded in Višegrad. It is estimated that by mid-2021, Višegrad had 8,968 inhabitants, which is 1,682 or 15.77% fewer than in 2013. The only municipality in this region to record population growth was East New Sarajevo, which by 2021 had 12,225 inhabitants, or 1,613 (15.65%) more than in the 2013 census.

Banja Luka Region

By 2021, the Banja Luka Region had 247,100 inhabitants, which is 19,559 or 4.83% fewer than in 2013. The largest population decline in this region was recorded in Kneževi. It is estimated that by mid-2021, Kneževi had 8,034 inhabitants, which is 1,759 or 17.96% fewer than in 2013. Population growth in this region was recorded in Petrovac, East Drvar, and Banja Luka. Of these, the greatest increase was in Petrovac, which had 600 inhabitants by 2021, or 239 (66.21%) more than in the 2013 census.

Brčko District

By 2021, Brčko District had 81,910 inhabitants, which is 774 or 0.94% fewer than in 2020. Compared with the 2013 census, the population of Brčko District decreased by 1,606 or 1.92%.

Bosnia and Herzegovina Overall Data

By 2021, the Federation of Bosnia and Herzegovina had 2,168,602 inhabitants, which is 50,618 or 2.28% fewer than in the 2013 census. Republika Srpska had 1,128,309 inhabitants, which is 100,414 or 8.17% fewer than in 2013. Bosnia and Herzegovina as a whole had 3,378,821 inhabitants, which is 210,205 or 5.95% fewer than in 2013.

Based on these estimates, it can be concluded that only a very small number of municipalities and cities recorded a population increase by 2021 compared to the 2013 census. These are: Vogošća, Trnovo, Ilići, Ilijaš, Novi Grad Sarajevo, Tešanj, Petrovac, East Drvar, and Banja Luka (Redžić, 2023).

If we add to these figures the migrations that were even more massive between 1995 and 2010, both economic and those caused by the new territorial organization of the state, which led to further migration, a more complete picture of Bosnian and Herzegovinian emigration can be seen. According to valid estimates, since 2013, when the population stood at 3.5 million, more than 500,000 people have left Bosnia and Herzegovina (Fokus.ba, 2021). According to the 1991 census, Bosnia and Herzegovina had 4.3 million inhabitants, and if we compare the 1991 census with that of 2013 and add migration estimates up to 2022 (Federal Office of Statistics, Statistical Yearbook 2022), the data is even more devastating and the causes far more complex. Such an analysis would require a much more extensive study that would take into account wartime deportations and casualties, as well as ethnic cleansing and expulsions, and the weak or slow return of exiles to their pre-war residences. To this must also be added the destruction of economic and industrial capacities and the loss of jobs in the processes of transition and privatization, which significantly affected the movement of the working-age population, not only abroad but also within the country toward more developed economic centers.

Migration is not specific only to Bosnia and Herzegovina. It is a trend seen in the surrounding countries as well. The shortage of labor in European countries stimulates economic and social migration not only from Bosnia and Herzegovina but also from the Western Balkans. To this must be added the widespread availability of information technology, the mobility of goods and capital, and the consequent increased demand for workers. It is no longer a novelty that a large number of people, especially young people, are leaving BiH in search of livelihoods in developed European countries. That the reasons are multiple and that this exodus is alarming not only from an economic but also from a demographic perspective is confirmed by the fact that many places are being completely abandoned, with entire families emigrating. Added to this, the liberalization of work visas and the demand for labor in Germany, Austria, Croatia, and other European countries ensures that this trend will continue, and even increase.

From a demographic perspective, this is devastating for Bosnia and Herzegovina. The number of working-age people is decreasing, young and educated workers are leaving, and the vital productive population is disappearing. Bosnia and Herzegovina is thus left as a country of the elderly and of people unable to be carriers of significant change in the sphere of labor and workforce, which lags behind the needs of Europe's developed markets and their industries.

MIGRATIONS IN BOSNIA AND HERZEGOVINA: THE PRESENT SHAPED BY THE PAST

Truth be told, Bosnia and Herzegovina has not faced large-scale migrations only in this observed period. We could say that this process had been intense since the end of the nineteenth century and throughout almost the entire twentieth century. In our past, migrations varied in intensity and causes. They were not triggered only by natural or socioeconomic circumstances but also by violence, that is, war, expulsions, and forced deportations from properties and places of residence (used as a war objective) as well as various administrative reforms.

Such migrations are noteworthy not only for the acts themselves, that is, the use of force, agrarian reforms, and other methods of pressure but also for the form and rate of returns to pre-war dwellings. The extent to which people returned to their pre-war properties is an indication of how far-reaching the ethnic cleansing project was.

Periods of both near and distant history were marked by low birth rates, depopulation, negative migration balance, and rapid demographic aging, caused by falling fertility rates,

the emigration of young people, and the extension of average life expectancy. Migration in earlier years, especially in the second half of the twentieth century, was characterized by movement from rural areas to industrial and urban centers. This practice was common up to the 1980s, in a period marked by industrial development in Bosnia and Herzegovina and its demand for labor. However, this does not mean that its development was dynamic and crisis-free. Times of industrial crisis and low wages also contributed to external migrations from Bosnia and Herzegovina to more developed European countries.

The largest wave of labor migration from Bosnia and Herzegovina took place between the 1960s and 1970s. In that wave, working-age people left the country while their families stayed behind in Bosnia and Herzegovina. Such forms of migration essentially strengthened the country's economic system, as well as that of their families, improving their economic and social status. These migrations were temporary, economically motivated, and did not affect the demographic structure and natural population growth.

Migrations in the mid-twentieth century should be distinguished from those that occurred at the end of the nineteenth and in the first half of the twentieth century. Bosnia and Herzegovina also experienced emigration during the twentieth century, particularly between WWI and WWII. Those emigrations were not the result of socioeconomic factors but primarily of ethno-religious and administrative measures, namely agrarian reforms that seized land and reduced rights to arable land and property ownership. That migration period was marked by the emigration of entire families to other countries, which significantly altered birth rates as well as the national and religious composition of Bosnia and Herzegovina's population. To this fact we can add the massive influx of rural populations into industrial centers in the second half of the twentieth century, which also significantly changed the national and religious composition of many areas and settlements in Bosnia and Herzegovina.

The demographic profile of Bosnia and Herzegovina's population is, of course, complemented by other statistical factors and indicators, such as birth and death rates and natural population growth (Čičić, 2019). For example, according to the 1948 census, BiH had 2,564,308 inhabitants; in 1953, 2,847,459, which meant a population growth of 11.044% or 2.1% annually compared to the previous census period. By 1981, the census recorded 4,124,256 inhabitants, with an average annual growth rate of 1%. By the 1991 census, BiH had 4,377,033 inhabitants, with an average annual growth of 0.6%. When compared with the 2013 census, a significant decline is evident: in 2013 BiH had 3,531,159 inhabitants.

Data from the 2013 census should be taken with caution for several reasons. A large number of residents have since changed their place of residence. Many emigrants have first acquired dual citizenship and later only citizenship of their host countries. There has been significant population movement within BiH from one entity to another (Federation of BiH and Republika Srpska, and vice versa), as well as a large exodus of young people for economic reasons, leaving the country precisely in the period after the last census. The result has been an altered population structure of the resident population.

What can be noticed from this census chronology is that by 2013 there were only 3,531,159 inhabitants. Despite the reservations about the validity of the data, it is clear that the number of inhabitants fell by 19.3% compared to the 1991 census. Not only has the total population decreased, but its qualitative features differ from previous censuses: a significant share of elderly people in the population, declining birth rates, large-scale rural-to-urban migration, fewer marriages, more deaths than births, increasing divorce rates, and other features important for the structure of the population.

According to World Bank data, the overall percentage of emigration for Bosnia and Herzegovina in 2010–2019 was 44.5%, ranking it 16th in the world out of 214 countries measured. On the other hand, according to BiH's Ministry of Security and the Ministry for Human Rights and Refugees, the total number of emigrants born in BiH and residing abroad is 1,691,350. World Bank data (1,638,113) differ because they consider only the first generation of migrants (Čišić, 2019). Regardless of discrepancies, it is clear that nearly one-third of Bosnia and Herzegovina's population has emigrated, carrying out their professional and working lives abroad. The study shows that most emigration from BiH is directed toward Germany, Austria, Croatia, and Slovenia.

These indicators contradict the prevailing political discourse, which focuses on ethnic and national identity, perpetually emphasized by nearly all political actors in Bosnia and Herzegovina. Rarely have we heard leading politicians advocate for democracy and human rights, democratization of elections and decision-making, citizen participation in important social and political processes, reform of the education system, or democratization and rationalization of the labor market. These issues fall outside their interests, and citizens serve only as voters, not as partners in governance. Young people, clearly, seek a different environment than the one offered in their home country. They want knowledge, work, and ability to be valued, not party loyalty or ethnic affiliation, which are today's dominant criteria.

A valuable study on migration (Fočo, 2021: 233–238), which we have reviewed in detail, underlines the need to halt the outflow of especially young people from BiH. Its importance lies not only in its empirical analysis of such a significant issue as our society's demographic picture and intense emigration processes but also in its recommendations for future strategies and policies that must be undertaken transparently at all levels of government and by other societal actors concerned with demographic and population policies.

The authors of the Study on Emigration from BiH innovatively propose solutions in the sphere of socioeconomic reforms, involving comprehensive measures that could yield short-term results as well as long-term sustainable strategies in line with developed European economies and BiH's own potential. A new feature of these proposals is the creation of a stimulating environment to retain skilled labor, currently marginalized and neglected in employment policies. Such neglect drives young and educated people to leave, rather than stay, in their homeland. Added to this must be a change in the political environment, whose consequences are most acutely felt by the young.

Another important proposal concerns a new approach toward the diaspora and the right of return for those who emigrated for socioeconomic reasons. Until now, authorities have only sporadically addressed this question, mainly as a justification for their policies. Now, significant changes are urgently needed to stimulate and encourage return. All these measures also require a shift in the country's social environment. Empty rhetoric must be abandoned as it fosters, rather than reduces, conflict and division. What must come to the forefront are knowledge, work, and education. In short, a new value system is necessary to stop emigration and to prevent Bosnia and Herzegovina from losing its working-age and capable population.

Having in mind the data as well as the big picture of social affairs, it is understandable why young people see their future outside the present social order and imposed value system. In today's reality, young people are particularly vulnerable to right-wing extremism, which denies them opportunities to prove themselves through work and knowledge. The ruling elites value their contribution only through party loyalty and ideological conformity, criteria opposed to the values young people want to realize as they

strive to keep pace with time, scientific-technological progress, and the education system that accompanies it.

Young people want to work, live from their work, and have a social environment that allows them to exist and advance in their own country. They do not want divisions, political insecurity, or social instability, which the ruling elites constantly incite by provoking conflicts of varying scope and content. Young people's discontent with the present condition is confirmed by their low or virtually nonexistent turnout in elections (Federal Institute of Statistics, Statistical Yearbook 2022). They are aware that elections bring no change, only legitimacy to the politics of division and hopelessness. Political leaders' promises are hollow, social processes are deteriorating, young people have no jobs, nor do they see a future in the existing political and social circumstances of their homeland. High unemployment affects them most, as they cannot reconcile themselves with being a burden on their parents during their most productive years, unable to use their knowledge and education for productive purposes. Given their digital awareness and access to media, their critical attitude toward the imposed social reality is understandable. Young people their knowledge is neither recognized, valued, nor used by their own society and system. Thus, it is clear why they envision their future elsewhere, where they can pursue their work, social, educational, and other needs free of political pressures and mediators.

It is therefore unsurprising that over half of them wish to continue their working and even life existence outside Bosnia and Herzegovina. The ruling political elites do not even attempt to offer an alternative that would enable their retention and existence in the country. Obsessed with power, they fail to consider the lives, lifestyles, needs, and interests of their citizens, especially young people. In the imposed value system, people have accepted being objects of nationalist politics instead of subjects of social change (Rusovac, 2015). The prevailing social model has sunk into a materialistic outlook on life, where solidarity, responsibility for processes and events, livelihood, and human potential are lost. People are trapped in obsessions measured by political and ethnic values, rather than by the needs of life, work, and existence in the dynamics of global developments.

HOW TO STOP THE EXODUS AND CREATE CONDITIONS FOR THE SURVIVAL OF THE WORKING-AGE POPULATION IN BOSNIA AND HERZEGOVINA, ESPECIALLY YOUNG PEOPLE

In order to reverse the negative trend of emigration, it is necessary for the state to undertake a series of economic, social, and demographic measures. Concerning economic measures, first and foremost, the working, earning, and business environment must be radically changed. It is essential for the state to secure conditions for employment for young people. Educated young people seek employment through a clear and consistent economic system in which the labor sphere will be liberalized and they will be able to find jobs without prior conditions and complex procedures such as mandatory traineeships, work experience, deprivation of income, and other diverse administrative and bureaucratic obstacles to starting work and generating income. This is what concerns young people the most. Employment procedures, as well as termination procedures, must be simplified. The current rigid labor legislation is a serious obstacle to the normalization of labor market functioning. Present solutions for establishing employment are a legacy of the past, where workers' and unions' rights dominated, along with state interference in regulating the labor market. If the commitment is to a free market, then the labor market must constitute its essential foundation. Alongside the liberalization of labor, liberalization of earnings is also crucial. Current models severely limit income and the contribution young people wish to make in their own country. To liberalize earning potential, the tax system and contributions, which currently jeopardize both the economy and opportunities for work and income, must

be simplified. The state has taken the standpoint of imposing restrictions and prescribing nearly all possible models instead of creating preconditions for people to earn through their labor and freely invest and manage their earned capital. This is connected to the burden of rigid, demotivating taxes that reinforce the stereotype that salaries in the real sector cannot surpass political or governmental wages, which for many years have held primacy as a measure of value and job desirability. How else can one explain that young people, especially in the IT sector, can earn significant salaries abroad, while at home they face countless restrictions and impossibilities in realizing both employment and earnings for the same work? This inevitably requires major reform of monopolistic funds that currently operate without accountability and without adequately providing services. Chief among these are health insurance funds, pension and disability insurance, unemployment contributions, and numerous other unnecessary structures that drain wages and contributions, burden companies and workers, and provide little return in services. Such parasitic and monopolistic institutions operate irrationally, irresponsibly, and with minimal effect, especially for users of their services. What benefits do health service users have today when they are treated as objects, not subjects, of health funds and institutions that bear no responsibility for their performance nor are rationally organized to deliver the services their users need? Besides an irrational health sector, workers are faced with only one dimension of pension and disability insurance, that is, the generational system. Other options and interests, even if necessary for workers themselves, are excluded from public policy. Adding to this are contributions for employment and other institutions, making it clear that the burdens on the economy and workers are excessive and demotivating, leaving no space for young people to launch their own businesses more freely or to attract foreign capital through their labor and knowledge. Considering that deductions burden both company profits and employees' personal income, the irrationality of the tax system becomes clearer, pointing to an urgent need for reform that stimulates work and earnings rather than monopolistic institutions that collect revenues without providing adequate or expected services. These few funds and institutions, cited more illustratively than exhaustively, drain income and wages, though in truth a comprehensive analysis of all contribution burdens is needed, as well as bold government action to break with the outdated practice inherited from the past of financing unnecessary and highly irrational institutions.

Therefore, it is necessary to push more forcefully and comprehensively toward transitioning from one system to another. In Bosnia and Herzegovina, transition stopped halfway: ownership transformation was carried out, while the remaining institutional, especially social, system remained on outdated foundations not only in financing but also in service provision. The changes that occurred were cosmetic rather than substantive. Insufficient transition in the social sector slows down transition in the economic system, thereby preventing the establishment of a free market and stalling the development of labor and wage markets. The most significant factor in economic and social transition is the tax system and fiscal policy, monopolized by the state, which political structures are unwilling to give up in favor of a functional economic and social system for society as a whole.

A series of reform measures must also be undertaken in the domain of demographic, i.e., population policy. Currently, measures are mostly partial, focusing on stimulating maternity benefits. In population policy, it is essential to establish both long-term and short-term measures to encourage birth rates. Above all, it is necessary to create economic conditions for young people to marry with the goal of encouraging fertility and population growth. A set of measures must be implemented to provide the economic and social conditions for reproduction, support for childbirth and childcare, as well as political and

security conditions that allow young people to build their lives in their own country rather than abroad.

In addition to population policy, strong reforms are needed in the country's education system. This is particularly urgent at the secondary level, which under current conditions represents the weakest link. The existing practice of privileging comprehensiveness and theoretical content over practical knowledge and skills must be abandoned. The dominance of theory over practice produces an unskilled workforce unable to perform effectively in the labor process. Educational reform is a necessity of technological progress, requiring stronger workforce planning by companies and faster adjustment of curricula to labor market needs. It is also necessary to liberalize the education system and allow young people to choose their professions. The current system is burdened by stereotypes and entrenched perceptions about certain professions and curricula, with little opportunity to acquire practical knowledge. Significant changes are needed here, with options for combining educational programs and content to prepare students for employable professions and employment opportunities. If young people are to be retained in the education system, education must be accessible and competitive with European standards and diploma recognition. The current practice is unsustainable, and the rigid system must be abandoned, as it produces unnecessary profiles irrelevant to the labor market.

The necessary measures are not only those that would create conditions for youth survival, but also more profound reforms that will allow work, knowledge, and skills to come to the fore regardless of age. Conditions must be created to attract foreign capital and investment, thereby laying the groundwork for economic and social progress benefiting all citizens. A decisive shift is therefore needed from the inherited planned economy toward a free market of capital, labor, and earnings. Ownership transition alone has not been sufficient and has failed to produce even approximately the expected results. These are only some indicators of the changes necessary to alter the demographic profile of Bosnian society. Transition is a complex and slow process, but comprehensive reforms must be accelerated in order to create a favorable environment for the work and survival of a large share of the population. Concrete measures and transitional processes depend on the competence of actors who must drive change and make their own environment promising and attractive for life and survival, especially for young, working-age people. Otherwise, young people will continue to seek better lives abroad and emigrate even more intensively from Bosnia and Herzegovina. According to Kadusic & Suljić (2019), the lack of population policy is the main reason for economic and demographic instability. Economists rightly warn that human resources are the most important resource of the 21st century and that most economies rely precisely on the abilities and potential of young people for the cultural, economic, and social development of the country.

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Cognitive functions and neurotransmitters

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REVIEW PAPER

ABSTRACT: Preserved cognitive function is the basis of the proper functioning of each individual, both in everyday life and daily obligations, and in solving complex tasks. The role of chemical substances - neurotransmitters, in the formation of adequate responses is indisputable. However, there are a number of factors that affect the imbalance in the concentration of neurotransmitters and processing of received information, the formation of thoughts and conclusions, the emotional and physical response to them. Neurotransmitters have been shown to play an important role in controlling cognitive functions by altering the action potential and impulse transmission along neurons on the postsynaptic membrane.

Although a large number of neurotransmitters and their functions have been discovered so far, acetylcholine, serotonin, norepinephrine, dopamine, GABA and glutamate have been shown to play the most important role in the formation and control of cognitive function. Control of information reception and processing, memory, and concentration are highly dependent on the maintenance of serotonin, dopamine, norepinephrine, and GABA levels, while learning motivation and attention depend largely on dopamine and glutamate levels.

Keywords: *cognitive functions, neurotransmitters, acetylcholine, dopamine, serotonin*

INTRODUCTION

In order to form an appropriate response to exogenous and endogenous influences, it is essential to maintain balance both within the cells themselves and in their interactions, as well as in the substances responsible for the proper transmission of impulses. These substances are known as neurotransmitters. By releasing neurotransmitters from the presynaptic nerve fiber into the synaptic crack enables their binding to the membrane of the subsequent neuron and the transmission of signals which may be either excitatory or inhibitory. Any kind of disturbance (disorder) in the concentration of neurotransmitter may lead to disorder of one or more cognitive functions. On the basis of understanding the role and modes of action of each neurotransmitter individually, a number of disorders have been identified, as well as appropriate therapeutic guidelines which have been aimed at achieving complete recovery or symptoms relief of the affected individual.

COGNITIVE FUNCTIONS

Cognitive functions are a set of mental processes involved in acquiring knowledge through thinking, experience, and the senses. It can be said that cognition includes perception and reaction, the reception and comprehension of information, the processing and storage of received information, as well as the formation of an appropriate response (Cambridge Cognition, 2021). More cognitive domains are involved in the formation of the final behavior, including:

1. Social cognition – to recognize the emotions based on facial expressions, a bias in shaping responses based on the recognized emotion
2. Thinking and making decisions – working memory, planning, modifying responses, and suppression of inappropriate responses.
3. Memory – short-term and long-term memory
4. Attention – focusing attention to an event, action, or information, or ignoring them.
5. Psychomotor response – vigilance(alertness) , making decisions , and the movements.

There are four parts of the brain responsible for maintaining cognitive functions:

1. The frontal cortex is the anterior part of the brain responsible for attention, concentration and task performance, and it is regulated by norepinephrine.
2. The limbic system is the part of the brain mostly responsible for coordinating emotions, and anatomical or chemical disturbances in this region lead to emotional instability and attention disorders.
3. Basal ganglia: receive and direct information with the aim of cognition coordinating. Disturbances within this region cause attention disorders , focus, and emotional stability.
4. The reticular activating system is the main relay system for many incoming and outgoing signals. Disorders of the reticular activating system result in an inability to transmit information to other parts of the brain (Zhao et al., 2014).

For assessing cognitive functions , written tests, completed by patients themselves , were used for a long time. Today, one of the used techniques is the computerized method known as CANTAB (Cambridge Neuropsychological Test Automated Battery). It is a touchscreen-based technique consisting of 25 tests, allowing patients to select responses easily in order to assess their thinking, visualization, memory, and learning. CANTAB was developed at the University of Cambridge in 1980 (Sahakian et al., 1988).

Cognitive impairments are usually classified into three domains:

1. Conceptual domain, which includes memory, reading, writing, solving mathematical problems, and acquiring knowledge
2. The social domain includes the ability to communicate, maintain friendships and social contacts, as well as empathy and social judgment;
3. The practical domain refers to an individual's ability to manage finances, achieves work habits, maintains personal care, organizes work tasks, takes part in recreation, and similar activities.

Learning and Memory

Learning and memory are complex cognitive processes, where memory can be divided into short-term memory, which stores (retains) information for a limited period, and long-term memory, which / stores (retains) information over a longer period, such as driving a car or riding a bicycle. Some of the tests used to assess memory and learning abilities include the Wechsler Memory Scale, the Wide Range Assessment of Memory and Learning, the California Verbal Learning Test, the Revised Hopkins Verbal Learning Test, Pattern Recognition Memory (PRM), and Verbal Recognition Memory (VRM) (Cambridge Cognition, 2021).

Wakefulness and Attention

Wakefulness and attention refer to an individual's ability to direct, keep, and divide attention. Attention is a cognitive and behavioral process of concentrating on specific information and ignoring other irrelevant information, for that person, at the same time (Zhang, 2019). Tests used to assess wakefulness and attention include the Conners' Continuous Performance Test, the Test of Variables of Attention, Reaction Time (RTI), and Rapid Visual Information Processing (RVP).

Executive Functioning

Executive functioning refers to an individual's comprehensive ability to plan and set priorities, organize, make decisions, switch from one task to another, respond to received information with appropriate actions, and modify / change habits. If there is any kind of damage in this area of cognitive functioning, the individual will have difficulties performing complex tasks and continuing interrupted tasks (Cambridge Cognition, 2021). The following tests are used to assess executive functioning: Delis-Kaplan Executive Function System, Multitasking Test (MTT), and Stop Signal Task (SST).

NEUROTRANSMITTERS

Brain functioning is, among other things, enabled by chemical processes that occur with the help of substances that transmit impulses between neurons, known as neurotransmitters. Up to now, over 40 different neurotransmitters have been studied. If a substance could be considered a neurotransmitter, it had to fulfill four criteria (Kerage et al., 2019):

1. It must be synthesized in neurons.
2. It must be released from the presynaptic neuron terminal in a concentration which is sufficient to elicit a specific response—either excitation or inhibition—on the postsynaptic membrane
3. The resulting response of the body should reflect the function of the chemical substance.
4. There are automatic mechanisms in the body for their removal.

Neurotransmitter Emission and Synaptic Transmission

Neurons communicate with each other through electrical and chemical signals. Each neuron consists of three main parts: two extensions and the cell body, or neuron soma. The extensions of a neuron are divided into dendrites and axons. Dendrites are short, branched extensions that transmit stimuli to the neuron. Axons are long, odd extensions that transmit impulses from the soma to the next neuron. Signal transmission between neurons is a strictly regulated process that occurs at the level of the presynaptic neuron, the synaptic crack / cleft, and the postsynaptic neuron. Within the presynaptic neuron, there is a specialized vesicles at its terminal where specific neurotransmitters are stored. When the membrane potential of the presynaptic terminal changes, voltage-gated calcium (Ca^{2+}) channels open, allowing calcium ions to enter the terminal. This causes the specialized vesicles release neurotransmitters into the synaptic cleft through the process of exocytosis. Neurons are separated from each other and cannot directly transmit chemical or electrical signals. When the neurotransmitter transmission process begins, neurons come within a distance of 20–50 nm of each other. Neurotransmitters released into the synaptic crack/cleft tied to the postsynaptic neuron membrane, specifically to the receptors on the postsynaptic membrane. Depending on the type of receptors they tied to and what kind of changes in membrane potential they have cause, neurotransmitters can act as excitatory or inhibitory substances (Hyman, 2005). On the postsynaptic membrane,

neurotransmitters tie to two types of receptors: ligand-gated ion channels, which allow the rapid flow of ions directly across outer cell membrane, and G-protein-connected receptors, which trigger chemical signaling events within the cell (Hyman, 2005).

According to their structure neurotransmitters are classified into:

1. Amino acids – fast synaptic transmitters that can be either excitatory or inhibitory. This group includes GABA, glutamate, glycine, and aspartate;
2. Amines – slow synaptic transmitters, which can also be either excitatory or inhibitory. The most important ones are norepinephrine, epinephrine, serotonin, and histamine;
3. Other neurotransmitters – chemical substances which cannot be classified into any of the previous groups based on their characteristics, such as acetylcholine (Sembulingam & Sembulingam, 2012).

According to their function, neurotransmitters are divided into two groups :

1. Excitatory neurotransmitters – chemical substances whose role is to activate the cells and stimulate impulse transmission.
2. Inhibitory neurotransmitters – chemical substances responsible for inhibiting the transmission of impulses from the presynaptic to the postsynaptic membrane. The most significant neurotransmitter in this group is GABA (Sembulingam & Sembulingam, 2012).

Acetylcholine

Acetylcholine is the name of a substance which is synthesized in nerve terminals from Acetyl CoA and choline, and the entire reaction is catalyzed by choline acetyltransferase. It is found in all motor neurons and brain neurons. Neurons that contain acetylcholine are referred to as cholinergic neurons. Large amounts of acetylcholine are found in the medial septal nucleus of the brain and in the basal nucleus (nucleus basalis). Beside that, certain amounts of acetylcholine are found in the brain stem, specifically in the pedunculopontine nucleus and the laterodorsal tegmental nucleus. The activity of acetylcholine in the synaptic cleft is regulated by the presence of acetylcholinesterase, which degrades acetylcholine into acetate and choline, from where choline is retransmits back to the presynaptic neuron to be used for the re-creation of acetylcholine. Although most previous theories focused on the action of acetylcholine at the place of its release, new theories suggest that acetylcholine has the ability to transmit through brain tissue and performs its function beyond the place of release. This is indicated by the mismatch of values between the acetylcholine clearance at the place of release in relation to its effect (Picciotto et al., 2012).

Serotonin

Research has shown that the highest concentrations of serotonin are found in the raphe nuclei of the pons and along the brainstem, from where projections extend to the forebrain regions responsible for the regulation of sleep and wakefulness. A part of serotonin is also found in the gastrointestinal tract and within platelets (Sanger, 2016). The presence of the amino acid tryptophan is essential for serotonin synthesis and it is found in foods such as red meat, nuts, dairy products, and seeds. Researches have shown that only about 5% of total tryptophan is converted into serotonin, which is attributed to the localization of tryptophan hydroxylase exclusively in the brain, enterochromaffic cells and platelets (Mohammad-Zadeh et al., 2008). The main place of serotonin synthesis is the raphe nuclei, which are located medially within the brainstem and mesencephalon. They affect the

maintenance of attention, sleep, activation mechanisms, as well as the regulation of emotions and mood (Walker & Tadi, 2021).

Serotonin levels vary and depend on the amount of tryptophan ingested through food. It has been found that a diet deficient in tryptophan, among patients in remission after SSRI treatment, led to a recurrence of depressive symptoms; therefore, nutrition along with regular medication, is considered crucial for the complete recovery of patients (Werneke et al., 2016).

Dopamine

Dopamine is a neurotransmitter of brain tissue that does not cross the blood-brain barrier. Besides that it is primarily produced in the brain, dopamine secretion has also been detected in the pancreas and immune system cells. A characteristic of this neurotransmitter is that it is used only at the place of its production, and due to the impermeability of the blood-brain barrier to dopamine, its usage in the treatment of cognitive disorders does not relieve symptoms. Dopamine synthesis occurs in two steps: the first step is the conversion of the amino acid tyrosine into the substance L-DOPA, and the second step is the conversion of L-DOPA into the final product – dopamine. The neurotransmitter dopamine is described as a substance that acts as the main motivator, provides a sense of pleasure, and is involved in motor skills. Dopamine is produced by dopaminergic neurons, which are primarily located in the substantia nigra and the ventral tegmental area of the midbrain, as well as in the arcuate nucleus of the hypothalamus. The highest number of dopamine receptors is located in the dentate gyrus of the hippocampus and in the subventricular zone (Bhatia et al., 2021). Since a certain amount of dopamine is also secreted in the gastrointestinal tract, it is included in regulating digestion and affects intestinal motility. Low dopamine levels are associated with the constipation.

Norepinephrine (noradrenaline)

Norepinephrine is a neurotransmitter and hormone which is secreted at the nerve endings of the sympathetic nervous system and in the adrenal medulla. Together with adrenaline, dopamine, and cortisol, it participates in the regulation of stress and emotional states. Norepinephrine was discovered by Swedish physiologist Ulf von Euler in the mid-1940s, and in 1970 he was awarded by a part of the Nobel Prize in Physiology for this discovery (Sanger, 2016). Norepinephrine, also called noradrenaline, is formed through the decomposition of several chemical substances. First, phenylalanine is converted into tyrosine, which is then converted into L-DOPA, the precursor of dopamine. In the process of norepinephrine synthesis, its connection with dopamine becomes evident, highlighting how both neurotransmitters mutually participate in the regulation of the stress response. Norepinephrine is released in the greatest amounts from the ends of sympathetic nerve fibers and for this reason, it is primarily characterized as a neurotransmitter.

However, as a hormone, norepinephrine is involved in the regulation of blood pressure. Norepinephrine secretion decreases during sleep, and after awakening, or in response to stress and/or danger, its levels increase. Studies, which were conducted on participants, have shown that norepinephrine levels depend not only on the intensity of stress to which an individual is exposed, but also to the duration of the stressful situation. It has been noticed that prolonged and severe stressful situations lead to a significant increase in blood norepinephrine levels, which manifests as insomnia, anxiety, irritability, and other emotional disturbances. These conditions are accompanied (followed) by symptoms such as low energy, apathy, problems with concentration, memory, and learning, as well as depression (Yamamoto et al., 2014)

Symptoms of reduced norepinephrine levels are generally associated with attention and concentration disorders, the development of diabetes, Parkinson's disease, depression, myalgia, migraine, restless legs syndrome, and sleep disturbances. Some studies which were conducted on patients with reduced norepinephrine secretion have discovered the frequent fatigue. This can be explained as follows. Specifically, a deficiency of norepinephrine leads to hypotension, reducing the brain's ability to receive a sufficient amount of blood. Brain cells require large amounts of oxygen for normal functioning. However, if this cannot be ensured due to hypotension and bradycardia, cerebral functions slow down, and the individual experiences fatigue. Moreover, hypotension disables the delivery of sufficient blood to the muscles, leading to a deficiency of oxygen and nutrients in this tissue and consequently reduces activity. In practice, certain medications used to treat various medical conditions, such as beta-blockers and alpha-blockers, can also lower norepinephrine levels. On the other hand, there are drugs that increase blood norepinephrine levels, including tricyclic antidepressants, amphetamines, carnitine, phenylalanine, and nicotine (Zhou, 2004).

GABA – gamma-aminobutyric acid

GABA is considered as a natural anxiolytic, it participates in body relaxation, modulation of the immune system, and regulation of intestinal motility, and its function in the growth of embryos and neural stem cells was also observed. GABA has different effects on the brain at various stages of life. During the period of brain and neuronal development, GABA acts as an excitatory neurotransmitter, whereas in later stages of life, typically after the age of 25, its role changes and it becomes the main inhibitory neurotransmitter. Decreased GABA levels result from a lack of glutamate, hypovitaminosis (particularly deficiency of vitamin B6 which is essential in the process of converting substances into GABA), nutritional GABA deficiency (a diet which is low in milk and dairy products, meat, nuts, and fish), thyroid disorders, intestinal diseases, or other organ system dysfunctions that lead to stress and/or impaired GABA utilization. The intake of supplements and certain medications (such as benzodiazepines, gabapentin, and hypnotics) can influence an increase in GABA levels (Taylor et al., 2005).

Glutamate

Glutamate is one of the so-called 'get up and go' neurotransmitters — those which provide the body with energy. Its role is to form synapses in the brain during learning, and it serves as the main precursor for the synthesis of GABA. The changes in the concentration of glutamate manifest in such a way that too little glutamate leads to decreased concentration and mental exhaustion, while too much glutamate causes cytotoxicity and neuronal damage. It has been proven that certain supplements increase dopamine levels, which, in excessive amounts, manifests toxic effects on cells. To reduce glutamate levels, glutamate antagonists are used and the most common glutamate antagonists include barbiturates, dextromethorphan, alcohol, ketamine, and phencyclidine (Krystal et al., 2002). In the normalization of glutamate levels, these factors can be of great help: Vitamin B3, or niacin, which acts as a coenzyme in glutamate synthesis, and carnitine, which plays a protective role toward glutamate receptors and protects them in cases of excessive glutamate levels. Certain neuromodulators, such as Ginkgo biloba and Rhodiola rosea, as well as magnesium, vitamin D, and taurine, play a significant role in reducing glutamate levels.

CONCLUSION

Conducted studies show the importance of each neurotransmitter individually, their interactions, as well as the arrangements and density of their receptors. A disorder in only one of these factors leads to cognitive deficits. Each neurotransmitter has its function, and depends on whether its binding to receptors causes inhibition or excitation, it contributes to the realization of its role in cognition. The role of acetylcholine has been examined through numerous studies, revealing that this neurotransmitter is involved in the regulation of cognitive function whether it is observed independently or through interactions with other neurotransmitters. In studies which were conducted on rodents, damage to cholinergic input in the cortex led to deficits of attention. By observing the effects of the stimulation of acetylcholine receptor, it was concluded that activation of $\alpha 4\beta 2$ nicotinic receptors in the medial prefrontal cortex enhances performance in tasks related to visual attention, while deletion of these receptors in the medial prefrontal cortex impairs such performance (Picciotto et al., 2012). Acetylcholine expresses its effects depending on whether its levels are elevated or reduced. When acetylcholine levels are high in the body, there are symptoms such as depression, nightmares, and anxiety. On the contrary, reduced acetylcholine levels have been connected to Alzheimer's and Parkinson's diseases. Several other neurotransmitters are also connected to memory and concentration, and dopamine, serotonin, and norepinephrine are the most significant. The distribution of serotonergic receptors plays an important role in the processes of memory and learning. Specifically, the presence of serotonergic receptors in the prefrontal cortex enables rapid processing and memorization of received information, which is similar to the action of dopaminergic receptors, particularly 'D1-like' receptors. This is the group of receptors that includes D1 and D5 receptors, whose activation enhances memory and learning ability (Bhatia, 2021). In the formation of cognitive functions related to memory and recall, norepinephrine has also been shown as a very important. Research has shown, that participants who were with reduced memory and recall abilities, lower levels of norepinephrine were found. In the brain, norepinephrine is synthesized mostly in the neurons of the locus coeruleus and in the lateral tegmental area to less extent. Conducted studies have proved that the application of norepinephrine to specific brain regions immediately after cognitive training results in significantly better results in remembering the performed tasks (exercises) (Tully & Bolshakov, 2010).

Another study demonstrated a connection between agonists and antagonists of GABA_A receptors and norepinephrine levels. Specifically, the usage of the GABA_A receptor antagonist picrotoxin, in doses that enhance memory, the significantly increase norepinephrine concentrations has been proven. However, by using the GABA_A receptor agonist muscimol resulted in a decrease of norepinephrine levels (Tully & Bolshakov, 2010). It is considered that norepinephrine and dopamine are also important in memory processes, as they are among basic / main neurotransmitters responsible for motivation. Physiologists Arif Hamid and Joshua Berke came to the conclusion in their research that dopamine is the neurotransmitter the most responsible for moving a person, providing motivation, and acquiring knowledge. When a person does an activity that brings feelings of happiness and satisfaction, the concentrations of norepinephrine—and especially dopamine—become elevated. These studies have shown that individuals who are satisfied with their work or the subject they are studying demonstrate greater motivation for further learning and progress, while at the same time their dopamine and norepinephrine levels are higher (Hamid et al., 2016). It is also important to mention that changes in serotonin concentration play an important role in the maintenance of cognitive functions. Depending on its concentration, the activation of receptors as well as the distribution of receptors, serotonin significantly influences individuals by modulating their behaviour. Since serotonin

is a neurotransmitter involved in maintaining attention, concentration, sleep, and the regulation of appetite and pain, due to high density of 5-HT receptors in the hippocampus and prefrontal cortex, its role in cognition is also evident. In the hippocampus, the serotonergic system is involved in memory processes, spatial orientation, social relations and decision-making, while its presence in the prefrontal cortex plays a significant role in working memory, learning, decision-making, and attention. After longer period of monitoring levels of serotonin, it was determined that the primary cognitive impairment in individuals with reduced serotonin is, in fact, impaired memory and decreased memory (memorizing) ability (Cowen & Sherwood, 2013). Additionally, these neurotransmitters play a crucial role in maintaining wakefulness and the regulation of sleep, which is directly connected to the ability of attention, concentration, and learning.

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