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HUMANITIES & SOCIAL SCIENCES

Topic: Enhancing Communicative Language Learning through Digital Tools and Generative AI

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Abstract

This article explores the transformative impact of generative AI and digital tools on communicative language learning, with a focus on encouraging learner autonomy, critical engagement, and developing higher-order thinking skills. Drawing on classroom experience and interdisciplinary research, it examines both the promise and the pitfalls of integrating AI into educational practice, especially among Gen Z learners. The discussion highlights risks, such as the ELIZA effect and AI-driven misinformation, while also emphasizing AI's potential as an adaptive digital language assistant capable of offering personalized feedback and interactive dialogue. Through practical examples and linguistic activities, this article illustrates how tasks like image generation, role-play, and prompt engineering can enhance linguistic competence and intellectual agility. Ultimately, it advocates for responsible integration, encouraging educators to harness AI tools to complement human instruction, uphold

academic integrity, and promote reflective, learner-centred methodologies.

Keywords: *Generative AI, Communicative Language Learning, Learner Autonomy, Prompt Engineering*

Introduction

In recent times, the emergence and widespread adoption of Artificial Intelligence (AI) – particularly generative AI – across – nearly every facet of human activity, including education, has sparked a familiar blend of wonder, enthusiasm, and apprehension. Within the realm of language instruction, AI holds enormous promise to reshape learning through tailored, dynamic, and immersive experiences.

Generative AI encompasses a range of techniques that enable machines to create new content – such

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as text, images, audio, or video – by recognizing and replicating patterns from the data they have been trained on. However, this powerful capability also fuels concerns around authenticity and accuracy. Without careful oversight, generative AI could produce misleading or even harmful outputs that are difficult to distinguish from human-generated content.

AI chatbots are not designed to retrieve and report facts, as are the search engines that preceded them; their aim is “merely” to replicate natural language. They have a tendency to try to please the human interlocutor and to give him or her authoritative answers even if they, the chatbot, does not have the correct information to hand. Incorrect chatbot responses therefore frequently occur even in everyday situations. As Kasner and Dusek (2024) note, “80% of the outputs of Open LLM contain a semantic error” – that is to say, the content of their responses may be inaccurate, unverifiable, misleading, or problematic in some way. Cases, where an AI system generates information that is factually incorrect, invented, or inexistent are known technically as “hallucination”.¹ Studies like that of Xu et al. (2024) suggest these so-called hallucinations are a built-in limitation of large language models (LLMs) and cannot be fully eliminated. Chatbot reliability tends to improve when responding to routine or widely understood queries but decreases significantly with less typical or nuanced tasks (McCoy et al. 2023): the kinds of activities that constitute language learning especially at higher levels. The main problem with the phenomenon of hallucination is that chatbots are not trained to express uncertainty in any of their replies – users are typically displeased when they do – and instead articulate all their replies to enquiries in the same authoritative and self-assured manner that often is unquestioned by overly deferential or uncritical human interlocutors.

¹ See, for example, <https://www.datacamp.com/blog/ai-hallucination>

² For example, the AI developer Anthropic has introduced Constitutional AI, a framework that aligns the system’s behaviour with a set of human-centric principles, such as minimizing harm, respecting individual preferences, and promoting truthfulness. Rather than relying solely on human feedback, it leverages self-supervision and adversarial training to internalize its “constitution” autonomously. Through

As AI gets more complex and sophisticated human supervision may become impossible, and AI tools may have to be developed specifically to monitor other AI tools leading ultimately to the age-old dilemma of “QUIS CUSTODIET IPSOS CUSTODES”.²

Such concerns leave students and educators alike navigating uncharted territory – questioning not only AI’s effectiveness and ethical implications but also its short- and long-term impact on language learning environments. Doubts persist around whether these tools genuinely improve educational outcomes or risk eroding the human-centred foundation of learning. Many educators stress the importance of ensuring AI functions as a supportive resource, rather than as a substitute for human expertise and interpersonal exchange, especially with children and young adults who are being increasingly isolated in bubbles created by digital technology and social media.

Still, despite these dilemmas, it is clear that generative AI offers remarkable opportunities for language teaching. Used carefully and with consideration, AI-enabled tools empower educators to design engaging and personalized learning experiences that meet the diverse needs of individual learners. Whether through adaptive tutoring systems, language learning apps, virtual assistants, or innovations yet to come, AI opens new doors to real-time feedback and sophisticated scaffolding designed for every single learner that were once unimaginable.

This article highlights a selection of language learning scenarios that incorporate digital tools and AI to promote communicative competence. Drawing from years of classroom experience and practical insights, we examine how educators can leverage AI to cultivate meaningful dialogue and enhance linguistic skills. Our exploration includes a range of pedagogical strategies, technological advances, and examples of best practices that reflect

constrained optimization, the model is guided to remain helpful while operating strictly within its constitutional boundaries, steering clear of ambiguous or open-ended objectives. Additionally, its training data and architecture are carefully curated to embed pro-social behaviours and guard against unsafe or deceptive outputs. See: constitutional.ai

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both the potential and the challenges of AI-enabled language education.

As one traverses this evolving educational landscape, it is vital to approach AI integration with thoughtful reflection, ethical awareness, and a strong commitment to student agency and a learner-centred approach. By acknowledging both the transformative power and the limitations of AI, educators can unlock new ways to empower learners and equip them with future-ready skills.

Ultimately, our goal is to present inspiring and innovative approaches to engaging students through digital tools and AI – both inside and beyond the classroom – while reinforcing autonomy and motivation. We aim to demonstrate how AI-powered platforms and chatbots can become useful digital assistants to teachers and learners, helping to craft accessible, adaptive, and personalized learning environments tailor-made for today's learners.

Gen Z and AI

The majority of those currently engaged in education and formal language learning come from Gen Z (Generation Z). Like their immediate predecessors in Gen Y, they have often been referred to as “digital natives” (Prensky, 2001). Technology has permeated their lives from the beginning, and for many, imagining a world without it is simply inconceivable. Yet, this deep-rooted familiarity does not preclude a sense of unease. Increasing media coverage surrounding advanced AI – particularly generative models – has sparked anxiety among students about the future relevance of the professions they are training for. Language-related careers such as translation and interpreting, traditionally popular among language graduates, are already feeling the impact of AI disruption, fuelling demotivation and uncertainty.

Such fears can be misplaced because AI should not be seen as a substitute for human intelligence. De Cremer and Kasparov (2021) caution against equating the capacities of human and artificial intelligence. While AI systems are fast, precise, and consistently logical, they lack traits such as emotional intelligence, cultural sensitivity, and intuition – all of which are distinctly human, and priceless.

Recognizing the evolving nature of the workplace and the complementary strengths of humans and AI is essential for equipping young people with the tools to thrive professionally once they leave formal education. Educators now face the responsibility of preparing students not only to navigate AI-enhanced environments, but also to engage with its complexities – ethically and critically. This entails not only exploring AI's potential, but rigorously examining its limitations and risks.

Unsurprisingly, the younger generations have embraced AI tools enthusiastically. Their early adoption has been so pronounced that many educators are concerned about the possible misuse of these technologies to gain unfair academic advantages – often through methods that more technologically challenged teachers struggle to detect. Widespread use of generative AI for assessments has raised profound questions around academic integrity. If such tools are used to produce work that is passed off as original, the principle of merit-based advancement itself may be compromised.

In response to these challenges, many education institutions are seeking ways to balance AI's educational potential with the requirement to safeguard academic standards. Rather than prohibiting tools like ChatGPT or DeepSeek, conventional wisdom recommends educating students on responsible use. It emphasizes the importance of understanding risks related to plagiarism, bias, and misinformation, and anticipates a transformation in assessment methods to mitigate the risk of AI-enabled cheating.

The risks of having young people interacting with generative AI and chatbots

Before exploring practical strategies to empower learners to engage productively with AI, it is necessary to first address some of the real risks involved. While the advantages are many, the potential for harm is significant when AI is misused, particularly by students hoping to avoid effort. Without thoughtful oversight and expert moderation by educators, AI's presence in the classroom could be counterproductive, and this offers reassurance to those educators concerned about being replaced by technology.

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One especially troubling phenomenon outlined is the “ELIZA Effect.” Named after a pioneering 1966 chatbot developed by MIT computer scientist Joseph Weizenbaum, ELIZA gained notoriety for its DOCTOR script, which mimicked a Rogerian therapist by turning users’ inputs into probing questions. Despite its limited capabilities, many users attributed human-like understanding to ELIZA and even shared deeply personal thoughts with it. The ELIZA Effect refers to our tendency to anthropomorphize non-human entities – whether pets, toys, or even vehicles such as ships or cars. When it comes to chatbots, the risk increases exponentially: unlike passive objects, they respond, and this interactivity can intensify users’ projections, blurring the line between reality and illusion, especially in the case of children, who are particularly susceptible to this effect, used as they are to make-believe and interacting with dolls or cuddly toys as if they were alive. A deeply troubling recent example of the ELIZA effect occurred in February 2024, involving a 14-year-old boy named Sewell Setzer III from Orlando, Florida. According to lawsuit filed by his mother, he tragically died by suicide after forming a profound emotional attachment to a chatbot developed by Character.AI, despite knowing it was not a real person.¹

Children and young adults like Sewell, are clearly vulnerable. Raised in a digital age where social media often replaces traditional relationships, they may be especially prone to treating chatbots as real companions. As influencer culture expands, this phenomenon will likely intensify. Some online personalities are already launching personalized chatbots that mimic interactions with their followers – an innovation driven, one may fear, not by educational or philanthropic goals but by commercial gain.

Reputable AI developers and providers are aware of this danger. Most chatbots have procedures in place to stop them from doing harm to or encouraging humans to harm themselves or others. There is however a clear and present risk that less reputable actors, unscrupulous and greedy influencers, rogue states, or nefarious forces on the dark web,

may develop AI systems that do not espouse such a philosophy and purposely do not incorporate such safeguards. This is a risk that cannot be mitigated in the classroom, but it makes it even more important that students, as responsible citizens, are familiar with AI and the dangers that it can pose.

Learning to harness AI

AI is not infallible nor all-powerful, which should come as reassurance to those worried about it taking their jobs. The limitations of AI not only underscore the genuine concerns students may have about being side-lined in the job market by faster, cheaper, and seemingly more reliable alternatives, but also illuminate a clear path forward. Preparing for any 21st-century career will likely involve mastering the art of communicating and collaborating with AI tools and chatbots – skills that may become as critical as engaging with human colleagues.

Historically, every major technological breakthrough has disrupted existing job roles but also sparked the rise of entirely new profession. Today, one such role rapidly emerging is the “prompt engineer” – a specialist who crafts precise input to guide AI systems in performing specific tasks.

Language students, equipped with advanced communication abilities and a strong grasp of context, inference, and pragmatics, are uniquely suited for this evolving field. Chatbots are built to simulate human interaction, yet they are merely participants in Turing’s famed “Imitation Game” (1954). These systems lack true cultural understanding or lived human experience. Interacting with a chatbot can feel like conversing with someone fluent in your language but unfamiliar with its societal norms, unspoken cues, and conversational subtleties (see Grice, 1974).

Just as one would adapt communication when speaking with someone from a different cultural background, engaging effectively with AI requires accommodation strategies and an awareness of where misunderstandings can arise. Students

¹ See <https://www.nytimes.com/2024/10/23/technology/characterai-lawsuit-teen-suicide.html>

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trained in mediation and intercultural communication already possess the sensitivity and foundational knowledge needed to navigate these challenges. Their ability to bridge gaps between human nuance and machine logic positions them well for this emerging human-digital dialogue.

Practical ways for empowering learners with AI tools

Despite the serious challenges AI presents, it is not something we can simply ignore. Alongside its limitations, it offers numerous benefits. There is a growing imperative to encourage students to engage with AI in positive and constructive ways. Language students, in particular, are well positioned to serve as intermediaries between humans and machines – making them ideal candidates to become prompt engineers. With this in mind, the following section proposes a set of practical activities designed to give learners hands-on experience with AI tools, enhancing both their confidence and motivation.

As previously noted, effective use of chatbots depends on learning how to compose prompts that guide AI toward increasingly complex and satisfactory outcomes. This is more nuanced than it may initially seem. While chatbots often communicate in a naturalistic manner, they are still prone to misinterpretation, especially when it comes to pragmatic understanding. For example, when one person asks another, “Can you tell me the way to the station?” the expected response is directions to the station in question – not confirmation of whether one is aware of the relevant station’s location without actually giving directions. Although advancements in Natural Language Processing (NLP) and its branch, Natural Language Inference (NLI), have significantly mitigated these alignment issues (see Khurana et al., 2023), limitations persist. Although advances are being made all the time, chatbots can still struggle to reliably interpret every indirect speech act (Searle, 1975), and lack a consistent grasp of conversational implicature (Grice, 1974) or relevance (Sperber & Wilson, 1986).

Prompt writing is a skill best acquired through iterative practice – trial and error being intrinsic to the learning process. To practice, learners can be

given specific tasks to complete using chatbots. Picture generation is one of the many concrete tasks where chatbots can provide valuable practice for learners, written or spoken (usually by means of a microphone and speech-to-text software). The utility of such activities stems from the fact that they constitute specific tasks which have a product or output that the learner themselves can use as a gauge for how successful their own input has been: if the picture or graphic generated matches more or less what they are describing then they can see for themselves that they have completed the task successfully. Asking learners to describe specific pictures or images is a good first stage (and a simple picture description is part of the Cambridge B1 Preliminary speaking test), later on, as a more creative activity, learners could generate original images out of their imagination.

Below in Figure 1, we give an example of a description of a picture with an AI-generated picture (using Microsoft Co-pilot) as output for the prompt describing the original picture:

As can be seen, in this example, the output is largely, but not completely satisfactory: the old lady is pictured with two walking sticks, for example, although the prompt specifies “*a walking stick*”. The AI has also put the two people in the middle of the road. This not specified in the prompt, because it is something that a human, with real world knowledge and experience, would neglect to specify assuming that it was implied or self-evident. Such a breakdown in communication between human and AI is useful because it shows the learner that AI does not always process input in the same way as a human would, necessitating that the human prompter is prepared to render some details specific that, with a human interlocutor, they would assume were given. The real value of this exercise comes in trying to mediate further with the AI and making any necessary moderations by editing the prompt slightly and regenerating the picture (Figure 9):

Although this picture is not quite perfect – the old lady is perilously close to the kerb, for instance – there is a tangible improvement and shows the basic principles behind prompting (in essence interacting with the chatbot to perform a specific task).

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Such an activity can also be modified to allow learners to describe graphs (an important academic skill, especially in scientific or technical subjects, and part of such tests as IELTS Academic) – as illustrated in Figure 3 using an example from a practice test:

Again, the output is good but not perfect, and the point of the exercise is to encourage learners to learn how to give the AI further prompts in order to fine-tune the output.

Using AI to increase learner autonomy

The principle of learner autonomy is a cornerstone of the communicative approach to language acquisition.¹ It emphasizes the importance of learners taking charge of their own educational journey – developing independence, self-management, and sustained motivation. When learners take responsibility for their progress, they become more involved in setting personal goals, choosing relevant materials, and monitoring their own development. This active participation contributes significantly to their linguistic competence.

However, there is one glaring concern, namely that the rise of AI may encourage passivity among students, potentially diminishing their drive to engage with learning tasks. Some argue that generative AI could even render language learning obsolete – an idea touched on by Ostler (2010: 261), well before today's more advanced and widespread AI technologies emerged.

In brief, if electronics can remove the requirement for a human intermediary to interpret or translate, the frustrations of the language barrier may be overcome without any universal shared medium beyond compatible software. Recorded speeches and printed texts will become virtual media, accessible through whatever language the listener or speaker prefers.

Contrary to the perspective implied by Ostler here, we contend that AI is unlikely to eliminate the need for language learning. On the contrary, it has the potential to significantly empower learners – perhaps even contributing to a wider enthusiasm

for learning languages. Perhaps the three most obvious are the following.

Firstly, as illustrated by our examples with picture/graph prompts in §7, while AI often produces a larger share of the linguistic output during interactions, this does not relegate the learner to a passive role. AI systems are designed to respond to user input and direction. When learners recognize this dynamic, they can fully harness AI's capabilities as an adaptive and responsive learning partner.

Secondly, unlike traditional digital media such as search engines, AI-powered chatbots allow users to interact via natural language. Learners can go beyond simple queries and engage in meaningful dialogue – requesting clarification, elaboration, and context, in ways previously unavailable.

Last but not least, although AI may generate extensive reading and listening material, this content is tailored to the learner's own requests. This personal relevance can enhance engagement, driving learners to process the material and respond in an authentically communicative manner.

Using AI for correction and immediate feedback

The ability of AI and chatbots to correct input is a valuable tool for learners, and their teachers who might otherwise be forced to spend hours and hours correcting student work and assignments, often outside normal working hours. This does not mean that teachers may now delegate all their marking to AI. Rather, they may now assign more written work to their learners because AI may take up the extra load. Indeed, such is the nature of marking that teachers, especially those in the state sector, cannot typically assign as quite as much written work as their students may need, simply because they do not have the time to correct and give feedback on it all. A devious teacher might use AI in any case, and pretend to their students that they were still marking by hand, but this would be unethical. Instead, if AI is to be used for at least some marking, with the justification that it provides the

¹ See, for example, Holec (1981), Benson (2011)

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learner with more practice and immediate feedback (as opposed to waiting a few days before the teacher can hand it back, at which point the learner may have lost all interest in the task), then it makes perfect sense to empower students by letting them learn to work autonomously with the AI and to treat it as a digital language assistant.

Clearly, when it comes to testing or to work that will be assessed by the teacher then it is important that this be done without the assistance of AI, or if it is, that the degree of assistance is clearly apparent to the teacher or assessor. In order to do this, some code of practice has to be negotiated and drawn up and communicated clearly to students. Identifying student malpractice by means of AI is becoming a pressing issue and, although tools have been developed to identify or to block AI (in both written and spoken tests), the technology is moving so fast that a kind of arms race is well underway. Consequently, at least as such time that attitudes to and means of testing and assessment undergo radical change, the problem seems to be here to stay.

This worrying trend should not blind educators to the fact that chatbots do prove effective at identifying and listing linguistic inaccuracies in the input of users, if prompted to do so, and can thus play a valuable role in learners' language acquisition as shown in Figure 4:

As can be seen, the chatbot will provide a lot of feedback almost instantaneously with only a simple, non-technical prompt: "Correct my English. List any corrections and provide feedback on how I may improve the text". It does not even need to know what the question the student is attempting is.¹ A more sophisticated prompt, one provided by a teacher for example, might include more detailed instructions and consist of something like:

"Correct the English in this text. List the errors and give me some advice on how to improve my answer. The question I was asked to answer was "[Insert question / task here]". Here is

the answer that I want you to correct: "[insert your answer]".

The drawback with such a system lies in the quality of the feedback. General chatbots², at least, are not very consistent in terms of format and will not always produce feedback in the way illustrated above, which may confuse learners. As can also be seen in Figure 4 (last section "How You Can Improve") the chatbot can give feedback which is very general and prone to bland platitudes (e.g. "make sure verb forms match the tense.").

Chatbots can be useful to learners in responding to queries about language, where otherwise they might ask the teacher or assistant (in most cases, only possible during lessons) or try to find the answer to their question (often easier said than done) in a reference book or via a web search:

As can be seen, the chatbot gives a comprehensive and clear answer, with illustrative examples of use. Even though, as with all information given by chatbots, the learner should be aware of the fact that chatbots can "hallucinate" (see §1). Setting aside the frustrating issue of output reliability, one clear advantage chatbots hold over traditional reference materials is their interactivity. Learners can engage with them directly – requesting clarification or additional details whenever something is unclear, confusing, or even seems implausible. They can thus ask follow up questions, much like they might do with a teacher or language assistant, if they find the information incomplete or unsatisfactory, or something has sparked their curiosity.

Initially in Figure 6, the chatbot gives the standard reply that almost any pedagogical grammar would provide. Interestingly, in the final section, it goes beyond this and touches briefly upon some matters related to non-standard usage and language change. Notwithstanding this, it avoids discussing any wider theoretical issues, seeking refuge instead in the platitude "language loves exceptions". The advantage of the chatbot over a conventional reference work, apart from obvious concerns of

¹ In this case: "An English-speaking friend of yours who is still at school does not know whether to study at a university near their hometown or in another city far way. Write an email in reply. Briefly describe how and why you chose the university where you are studying. Discuss the advantages and disadvantages of studying where you do and whether you wish

that you had gone somewhere else. Write 150-200 words. (30 MARKS). Maximum time = 30 mins.

² Special AI tools, which come at a financial cost, provide more sophisticated feedback, which teachers can modify and adapt to their learners' needs.

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cost, time and availability, is precisely that it can be questioned if anything is unclear or seems wrong (i.e. "hallucinations"). If in the exchange reported as Figure 6, the learner is unhappy with the recourse to the concept of exception, then they are free to press the chatbot further, and get an immediate reply as shown in Figure 7:

The chatbot, tireless and as ready to help as ever, starts out by praising the student for their curiosity ("Brilliant observation"), thus reinforcing such behaviour. It then goes on to give another well-reasoned and well-organised reply that this time discusses the issues of non-standardness and ever shifting linguistic norms in a way that a non-expert can follow. The information that it gives is largely accurate, but regarding concerns of hallucination (see §1), learners would be advised to check anything that they learn in this way either with their teacher or a reference book, or if time does not allow, even another chatbot.

Using AI as to stimulate learner curiosity and to develop Higher Order Thinking Skills.

Developing higher-order thinking skills (HOTS) – such as analysis, evaluation, and synthesis – is vital to enriching language learning beyond lower order thinking skills (LOTSs), such as memorization.¹ HOTS nurture deeper engagement with texts, help learners form nuanced arguments, and empower them to interpret meaning across diverse contexts. When students use target language to evaluate ideas, draw comparisons, or reflect critically, they activate metacognitive strategies that enhance retention and communicative confidence (Anderson / Krathwohl, 2001). Moreover, tasks like summarizing complex information, and responding to open-ended prompts have been shown to boost linguistic and cognitive flexibility (Cummins, 2000). By integrating Bloom's taxonomy into curriculum design, educators can scaffold language tasks that not only build proficiency but also stimulate intellectual growth. AI systems can be useful tools in this process.

¹ See Blooms Taxonomy (1956), revised by Anderson and Krathwohl (2001).

² Content Language and Integrated Learning – see, for example, Coyle et al. (2010).

The activities outlined in Table 1 offer a structured and varied foundation for further development and variation. For instance, a role-play interview could be transformed into an integrated skills task, where learners use the dialogue they generate as the source material for writing a newspaper or magazine article. Learners might also conduct parallel interviews using different chatbots – such as Chat GPT and Deep Seek – prompted to impersonate the same celebrity. By comparing the responses, they can identify inconsistencies and be reminded that chatbots are not infallible nor objective, underscoring the importance of fact-checking and not treating them as authorities on any particular matter.

Another approach could involve using chatbot roleplay to explore the biography of a historical figure. For example, a learner studying science might ask a chatbot roleplaying as Maria (Marie) Salomea Skłodowska-Curie something like: "Given your love of your homeland Poland, how did you feel when you left Warsaw to study in Paris?"

Such imaginative lines of enquiry naturally spark curiosity and can be followed up with independent research to assess the plausibility of the chatbot's responses. This again plays the vital role of instilling the awareness that, while engaging, chatbot outputs may not always be factually accurate and are prone to hallucination.

For more advanced students, this activity can be adapted to cover "What if?" scenarios, encouraging them to explore issues for themselves and indulge in informed speculation, which may then be discussed with educators or peers. For example, a chatbot pretending to be Marie Curie, could be asked how she thinks her life would have turned out if had stayed in Warsaw instead of going to France. Alternatively, students of science, in particular physics, especially those on CLIL courses², might like to ask more technical questions such as "Madame Curie, how did you isolate pure radium chloride from pitchblende, and what challenges did you face during the fractional crystallization process?"

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The kinds of activities listed in Table 1, promote active investigation rather than passive information consumption. They encourage learners to be inquisitive, seek out additional sources, and critically engage with the material. In doing so, learners experience a dynamic form of learning that traditional reference works struggle to match. Unlike a static written text, which is limited to the author's choices and assumptions about reader interest, a chatbot can adapt in real-time to the learner's curiosity: much like being having a personal tutor, who never tires of answering questions, at one's disposal "24/7" so-to-speak.

Conclusions

The integration of generative AI into communicative language learning offers both myriad interesting opportunities and considerable challenges. As this article demonstrates, these tools, when applied ethically and thoughtfully, can enhance learner autonomy, stimulate higher-order thinking, and tailor instruction to individual needs. Yet, their effectiveness hinges on educators' ability to scaffold meaningful interactions, guide prompt writing, and promote critical engagement with AI-generated output.

AI is not a replacement for human teaching but a valuable tool in the evolving educational landscape. Its limitations (such as lack of real-world experience and unreliability as regards content – see hallucinations §1) underscore the continued importance of human mediation, especially as regards intercultural awareness, contextual sensitivity, and emotional intelligence.

Gen Z learners' affinity for digital technology positions them uniquely to benefit from AI-rich environments. With proper guidance, they can learn to navigate AI's complexities while developing skills relevant to future linguistic, academic, and professional contexts.

Ultimately, rather than diminishing the role of language education, generative AI can invigorate it – empowering learners to explore language dynamically and creatively. Educators should embrace this shift by cultivating responsible use, reinforcing

academic integrity, and leveraging AI to invigorate – not stifle – students' cognitive and communicative growth.

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The Influence of Gender Role Distribution within the Family on Relationship Satisfaction

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Abstract

The present study examines the relationship between gender role distribution within the family and satisfaction in romantic relationships among young adults in Shkodra, Albania. Particular attention is given to the association between egalitarian attitudes toward family roles and perceived relationship satisfaction. The study also explores possible gender differences in attitudes toward gender roles and relationship satisfaction.

A quantitative research design was employed. The sample consisted of 100 participants, equally divided between women and men, with a mean age of 22.05 years ($SD = 2.79$). Data were collected using two self-report instruments: the Gender-Equitable Men Scale (GEMS), used to assess attitudes toward gender roles and family responsibilities, and the Couples Satisfaction Index (CSI), used to measure satisfaction in romantic relationships.

The findings indicate a statistically significant positive relationship between egalitarian attitudes and relationship satisfaction. Participants who

reported more egalitarian views regarding the distribution of family roles also tended to report higher levels of satisfaction in their romantic relationships. In contrast, traditional gender role attitudes showed no statistically significant relationship with relationship satisfaction. The results further indicated that no significant gender differences were found either in egalitarian attitudes or in levels of relationship satisfaction.

This study contributes to the existing literature on gender roles and the dynamics of relationships by providing data from the Albanian context, where traditional family norms continue to coexist with evolving social attitudes toward gender equality. The findings suggest that perceptions of fairness and shared responsibility within romantic relationships may positively influence the quality of relationships among young adults.

Keywords: Gender roles, egalitarian attitudes, relationship satisfaction, romantic relationships, family role distribution, young adults, Albania.

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Introduction

Gender roles represent an important component of family and relationship dynamics, influencing how responsibilities, expectations, and social roles are distributed among partners. Traditionally, family structures in many societies have been characterized by a division of labor in which women were primarily assigned domestic responsibilities and the care of the family, while men were expected to serve as the head of the household and an authority figure within the family unit. These patterns have historically been reinforced by cultural norms, social expectations, and broader social institutions.

In recent decades, however, significant social and cultural changes have contributed to the transformation of traditional gender expectations. Increased access to education, women's participation in the labor market, and shifting social attitudes toward equality have influenced the organization of family life and intimate relationships. Consequently, many couples have adopted more egalitarian approaches to the distribution of domestic responsibilities, decision-making, and emotional support.

The relationship between the distribution of gender roles and satisfaction in romantic relationships has become an important topic in psychological and sociological research. Previous studies have suggested that perceptions of fairness and equality within relationships can positively influence relationship quality, emotional intimacy, and overall satisfaction among partners. Conversely, rigid adherence to traditional gender expectations can contribute to tension, dissatisfaction, and inequality within romantic relationships.

Despite the growing body of international literature on gender roles and relationship satisfaction, few studies have examined these issues in the Albanian context, particularly among young adults. The social transformations that have taken place in Albanian society over the past few decades have influenced family structures and interpersonal relationships, while traditional attitudes toward gender continue to exert a strong influence in many contexts.

For this reason, the present study aims to examine the relationship between the distribution of gender roles within the family and relationship satisfaction among young adults in Shkoder, Albania. More specifically, the study investigates whether egalitarian attitudes toward family roles are associated with higher levels of relationship satisfaction and whether there are significant gender differences in attitudes toward gender roles and satisfaction in romantic relationships.

The Construction of Gender Roles in Family Dynamics and Their Influence on Relationship Satisfaction

Personal relationships are an important part of human life and have a considerable influence on the way individuals experience themselves, others, and the social world around them (Guerrero, Anderson, & Afifi, 2011). Although interest in interpersonal relationships has existed for a long time, their systematic study has become increasingly relevant in contemporary psychological and family research. Positive and supportive relationships have been associated with better mental and physical well-being, which makes relationship quality an important area of academic investigation (Mertika, Mitskidou, & Stalikas, 2020; Guerrero, Anderson, & Afifi, 2011).

Among the different forms of personal relationships, romantic relationships are especially significant because they involve emotional intimacy, commitment, communication, and shared life expectations. Relationship satisfaction is therefore commonly examined as an indicator of the quality of romantic and marital relationships. In the literature, marital satisfaction has been one of the most frequently studied topics in marriage and family research, particularly in relation to the factors that help maintain stability and happiness between partners (Khezri et al., 2020).

Relationship satisfaction can also be influenced by how family roles are distributed between partners. In many societies, family life has traditionally been organized around clearly differentiated responsibilities between men and women. Women were commonly associated with childcare, domestic responsibilities, and emotional care within the family, whereas men were generally expected to assume the role of economic provider (Bosson et

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al., 2005). During recent decades, however, social and cultural changes have contributed to a gradual shift in these traditional expectations, leading to more flexible attitudes toward gender roles and family responsibilities (Bartley, Blanton, & Gilliard, 2005).

Changes in gender roles have influenced the organization of work, family life, and childcare responsibilities. Previous studies suggest that these changes may affect relationship quality differently among men and women (Jackson et al., 2014; Kurdek, 2005). Despite a gradual increase in men's involvement in domestic work, women continue to perform a greater proportion of household responsibilities in many families (Bianchi, Milkie, Sayer, & Robinson, 2000). Differences in the distribution of these responsibilities may influence perceptions of equality and satisfaction within romantic relationships.

Several studies have suggested that egalitarian attitudes are associated with better relationship outcomes. Men with more egalitarian views have been found to report higher marital satisfaction and lower likelihood of divorce (Kaufman & Taniguchi, 2006; Amato & Booth, 1995). Similar findings have also been observed among both younger and older couples, indicating that egalitarian attitudes may be linked to greater satisfaction across different age groups (Amato & Booth, 1995; Kaufman & Taniguchi, 2006).

Earlier research suggested that men tended to benefit more from marriage than women (Bernard, 1982; Fowers, 1991). More recent studies, however, indicate that gender differences in marital satisfaction may be changing as family structures and expectations become more flexible (Beam et al., 2018; Abreu-Afonso et al., 2022). These findings suggest that relationship satisfaction should be understood as a dynamic phenomenon shaped by social change, gender expectations, and the organization of family life.

The way household responsibilities are divided between partners may affect satisfaction within the relationship. Amato et al. (2003), in a comparison of national samples from 1980 and 2000, observed that women generally reported higher marital satisfaction when men participated more in domestic tasks. Similar findings were reported by

Stevens, Kiger, and Riley (2001), who found that women's satisfaction was positively associated with their partner's involvement in household responsibilities. These studies suggest that the perception of a more balanced division of domestic work may contribute to more positive relationship experiences.

Gender expectations may also influence emotional expression and communication within romantic relationships. Rochlen and Mahalik (2004) suggest that restrictive male gender roles may negatively affect both men and their female partners. When individuals feel pressured to conform to narrow gender expectations, they may limit the expression of emotions, needs, or vulnerabilities, which can affect intimacy and relationship quality.

The broader social context is also important. Hopcroft and McLaughlin (2012) showed that the relationship between gender equality, family life, and psychological well-being may vary across societies. This suggests that gender roles cannot be understood only at the individual or couple level, but must also be interpreted within cultural, economic, and social conditions.

Overall, the literature emphasizes that equality within romantic and marital relationships is closely connected to intimacy, fairness, and satisfaction. Traditional gender stereotypes may create difficulties for relationship quality, while more egalitarian attitudes can support healthier and more balanced partnerships. Johnson (2003) also highlights the importance of addressing traditional gender role stereotypes in the context of couples' therapy and relationship functioning.

Study questions and Hypothesis:

1. Do individuals with egalitarian attitudes toward family life report higher levels of satisfaction in their romantic relationships compared to those with traditional attitudes?

Hypothesis 1: Individuals with egalitarian attitudes toward family life experience higher satisfaction in romantic relationships. (Are there significant gender differences in egalitarian attitudes toward family life and gender role distribution?)

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Hypothesis 2: There are significant differences between women and men in terms of egalitarian attitudes. *(Do women report higher levels of satisfaction in romantic relationships compared to men?)*

Hypothesis 3: Women experience higher satisfaction in romantic relationships compared to men.

Conceptualization

The present study focuses on two main concepts: relationship satisfaction and gender role attitudes within family life. These variables were selected because previous literature has identified them as important factors in the functioning and quality of romantic relationships.

Relationship satisfaction refers to an individual's subjective evaluation of the quality and stability of a romantic relationship. It includes emotional closeness, communication, trust, commitment, and the extent to which personal expectations and needs are fulfilled within the relationship (Hendrick, 1988). Relationship satisfaction is also associated with psychological well-being and emotional adjustment, making it an important concept within studies of interpersonal relationships and family dynamics.

Gender role attitudes refer to beliefs and expectations regarding the roles and responsibilities of men and women within the family and society. These attitudes are shaped by cultural norms, socialization processes, education, and personal experiences. Within the context of family life, gender role attitudes influence how individuals perceive the distribution of domestic responsibilities, child-care, decision-making, and emotional support between partners.

In this study, egalitarian attitudes are understood as support for a more equal distribution of responsibilities and decision-making between men and women. Traditional attitudes, in contrast, reflect more rigid role divisions in which domestic and caregiving responsibilities are primarily associated with women, while authority and financial responsibilities are more closely associated with men.

The conceptual relationship between these variables is based on the assumption that perceptions

of equality and fairness within romantic relationships may influence relationship satisfaction. Couples who share responsibilities and decision-making more equally may experience greater emotional support, mutual respect, and relationship stability.

Operationalization

In this research, a quantitative design was employed, where 100 participants were surveyed, consisting of 50 women and 50 men. The average age of the respondents ranged from 18 to 30 years ($SD = 2.79$). Data for the subjects were collected through surveys, using two self-report questionnaires.

Methodology

Sample

The study involved 100 participants, 50 females (50%) and 50 males (50%). The age of the participants ranged from 18 to 30 years, with the average age being 22.05 years ($SD = 2.79$). The majority of the participants (61%) were in relationships or had been in relationships at the time of completing the questionnaire, 7% were married, 20% were engaged, and 12% were single. Regarding their place of residence, most participants lived in urban areas (53%), while the remaining 47% lived in rural areas. The educational levels of the participants varied: 13% were in their first year (Bachelor), 13% in their second year (Bachelor), 52% were in their third year (Bachelor), and 17% were pursuing a Master's degree. The remaining participants did not respond to the question regarding their educational level.

Procedure

Participants were initially informed about the research via social media, and those interested in participating were identified. A total of three meetings were held with participants. In the first meeting, they were provided detailed information about the research and the subsequent procedures. They were then given the questionnaires to fill out in the following days. In the second meeting, the completed questionnaires were collected

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for analysis. The third meeting took place with participants who were interested in learning about the results of the research.

It was clearly communicated to the participants that their participation in this study was completely voluntary, and they could withdraw at any time without any consequences. Their personal information was kept confidential, and privacy was ensured throughout the study. The data and findings from the study would be shared with the participants and used exclusively for academic purposes.

Instruments

The study used a survey method, utilizing two main questionnaires as the primary instruments. In addition to these questionnaires, demographic information such as gender, age, ethnicity, marital status, and education level was also collected. The Gender-Equitable Men Scale (GEMS, 2011) was used to measure attitudes towards the division of gender roles in the family. The questionnaire consists of 24 statements, but the number of statements may vary depending on the cultural context in which it is administered. For this study, 17 statements were used. Twelve of these statements represent "unequal" gender norms, such as: "Changing diapers, washing, and feeding the children is the mother's responsibility," "A woman's most important role is to take care of the house and cook for the family," and "The husband should have the final word in family decisions." The remaining five statements represent "equal" gender norms, including: "A couple should decide together if they want children," "If a man gets a woman pregnant, the child is the responsibility of both," and "It is important for a father to be present in the lives of his children even if he does not live with their mother."

The second questionnaire is The Couples Satisfaction Index (CSI) which measures couples' satisfaction in romantic relationships. The questionnaire consists of 32 statements in different formats, where the higher the score on a given item, the greater the satisfaction in the relationship.

Data Analysis

After administering the questionnaires, the data analysis was conducted using the statistical package SPSS (Statistical Package for Social Sciences). The study used a quantitative design for data collection, and after entering the data into SPSS, the questions were recoded. To analyze the first hypothesis, descriptive statistics were initially calculated for egalitarian roles, traditional roles, and then for the couples' satisfaction index in romantic relationships. To analyze the correlation between egalitarian attitudes and the level of couples' satisfaction in romantic relationships, Spearman's correlation was used. Additionally, a t-test was conducted to measure gender differences in the egalitarian attitudes variable. Finally, the mean scores of males and females on the couples' satisfaction index were calculated, along with the minimum, maximum, and standard deviation..

Results of the Study

This section presents the results related to egalitarian attitudes and their impact on romantic relationships, gender differences in egalitarian attitudes, and gender differences in romantic relationship satisfaction.

In Table 1, the descriptive data for egalitarian roles and traditional roles are presented

Table 1: Descriptive Statistics for Egalitarian Roles and Traditional Roles

	N	Min.	Max.	Mean	SD
Egalitarian roles	100	17.00	25.00	22.9700	2.04720
Traditional roles	100	12.00	56.00	24.9100	8.74336
Valid N (listwise)	100				

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In Table 2, the descriptive data for the romantic relationship satisfaction index are provided.

Table 2: Descriptive Statistics for the Couples' Satisfaction Index

	N	Min.	Max.	Mean	SD
Couple's satisfaction Index	100	76.00	150.00	126.6100	18.22303
Valid N (listwise)	100				

In Table 3, the correlation between egalitarian roles and couple's satisfaction index is provided.

Table 3: Correlation between Egalitarian Roles and Couples' Satisfaction Index

		Egalitarian roles	Couple's Satisfaction Index
Spearman's rho Egalitarian roles	Correlation Coefficient	1.000	0.217*
	Sig. (2-tailed)		0.030
Couple's Satisfaction index	Correlation Coefficient	0.217*	1.000
	Sig. (2-tailed)	0.030	
	N	100	100

The results indicate that egalitarian attitudes are moderately positively correlated with relationship satisfaction, with a correlation coefficient of $r = 0.217^*$. The significance level is $p = 0.030$, which suggests that the correlation is statistically significant. This means that individuals with more egalitarian views tend to report higher satisfaction in their romantic relationships.

Given that the correlation is positive and statistically significant, we can conclude that the first hypothesis (which posits that individuals with egalitarian attitudes in family roles experience higher satisfaction in romantic relationships) is supported by the data.

The findings support the first hypothesis, suggesting a moderate but statistically significant association between egalitarian attitudes and relationship satisfaction within the studied sample.

In Table 4, the correlation between traditional roles and the Couples' Satisfaction Index is presented.

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Table 4: Correlation between Traditional Roles and Couples' Satisfaction Index

			Traditional role	Couple's Satisfaction index
Spearman's rho	Traditional roles	Correlation Coefficient	1.000	-0.134
		Sig. (2-tailed)		0.184
	Couple's Satisfaction index	Correlation Coefficient	-0.134	1.000
		Sig. (2-tailed)	0.184	
		N	100	100

The results show a negative correlation of -0.134 between traditional roles and the Couples' Satisfaction Index. This negative correlation is weak and not statistically significant ($p = 0.184$). This suggests that as traditional roles increase, satisfaction in romantic relationships slightly decreases, but the relationship is not strong or statistically meaningful.

These results indirectly reinforce the positive correlation found between egalitarian attitudes and couples' satisfaction (as shown earlier in the data). However, traditional roles seem to have a negligible and non-significant effect on relationship satisfaction.

Table 5: Resonances to the Statement "The most important role of a woman is to take care of the house and cook for the family"

	Completely disagree	Disagree	Neutral	Agree	Completely agree
The most important role of a woman is to take care of the house and cook for the family (%)	48	16	17	7	12

Table 6: Responses to the Statement "A couple should decide together if they want children"

	Completely disagree	Disagree	Neutral	Agree	Completely agree
A couple should decide together if they want children (%)	0	0	0	4	96

A large majority of participants (96%) completely agreed with the statement, indicating strong support for shared decision-making regarding children. This finding is consistent with the idea of

shared responsibility and joint decision-making between partners.

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Table 7: Results of the t-Test Analysis, Gender Differences in Egalitarian Attitudes

	Gender	N	Mean	SD	SE Mean	t	df	p
Egalitarian roles	Male	50	23.08	2.23	0.32	0.535	98	0.594
	Female	50	22.86	1.86	0.26			

Since the p-value is greater than 0.05, we reject the hypothesis that there are significant gender differences in egalitarian attitudes. Thus, the data suggest there are no significant differences between men and women in terms of their views on gender

roles within romantic relationships. The standard deviations for both genders are quite similar, further confirming the lack of significant difference.

Table 8: Differences between Males and Females on the Relationship Satisfaction Index

Gender	M	N	SD	Min.	Max.
Male	123.4400	50	18.44148	79.00	150.00
Female	129.7800	50	17.61642	76.00	150.00
Total	126.6100	100	18.22303	76.00	150.00

Discussion

The present study examined the relationship between gender role distribution within the family and satisfaction in romantic relationships among young adults in Shkodra. The findings indicate that individuals with more egalitarian attitudes toward family roles tend to report higher levels of satisfaction in their romantic relationships. The correlational analysis showed a positive relationship between egalitarian attitudes and relationship satisfaction ($r = .217^*$), supporting the first hypothesis of the study. These findings are generally consistent with previous literature suggesting that equality and fairness within relationships are associated with healthier relationship dynamics and greater emotional satisfaction (Glenwright & Fowler, 2013).

Previous studies have emphasized that the division of domestic responsibilities may significantly

influence relationship quality, particularly in relation to perceptions of fairness and mutual support. Glenwright and Fowler (2013) found that egalitarian attitudes were positively associated with relationship satisfaction for both men and women. Similarly, research examining household labor has shown that greater male participation in domestic responsibilities may positively affect women's relationship satisfaction (Stevens, Kiger, & Riley, 2001). In this regard, the findings of the present study further support the idea that shared responsibilities and balanced family roles may contribute to more positive relationship experiences.

The study's findings also indicated that there were no statistically significant differences between women and men regarding egalitarian attitudes. This finding contrasts with earlier theoretical perspectives suggesting that women tend to express more egalitarian attitudes than men (Wood, 2008). According to Wood (2008), traditional gender stereotypes have historically associated men

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with hierarchy, authority, and competition, while women have been more closely associated with cooperation and egalitarian values. However, the absence of significant gender differences in the present study may reflect changing social attitudes among younger generations, particularly among individuals with higher levels of education.

No statistically significant gender differences were found in relationship satisfaction levels, although women reported slightly higher average scores than men. Earlier studies often suggested that men benefited more from marriage and reported higher levels of satisfaction than women (Nordenmark, 2017). More recent research, however, has shown that relationship satisfaction is shaped by multiple interpersonal and social factors, including communication, emotional intimacy, trust, and perceptions of equality within the relationship (Gottman et al., 2017).

When interpreting the results, it is also important to consider the social and cultural context in which the study was conducted. Albanian society has historically been characterized by relatively traditional family structures and gender expectations. However, social and cultural changes in recent decades, including increased educational opportunities and evolving perceptions of gender equality, may influence young adults' attitudes toward romantic relationships and family roles.

Conclusions and Limitations

This study examined the relationship between the distribution of gender roles within the family and relationship satisfaction among young adults in Shkoder. The results indicate that egalitarian attitudes toward family roles are positively associated with relationship satisfaction. Participants who expressed more favorable views toward shared responsibilities and equality within relationships tended to report higher levels of satisfaction in their romantic relationships.

The study did not identify statistically significant gender differences either in egalitarian attitudes or in levels of relationship satisfaction. Both women and men expressed relatively similar views regarding family roles and the dynamics of romantic relationships. These findings may reflect

a shift in the social attitudes of younger generations toward gender equality and roles within couples.

The findings contribute to the existing literature analyzing the relationship between gender roles and the dynamics of relationships, particularly in the Albanian social context, where traditional family norms continue to coexist with broader social and cultural changes. The findings suggest that perceptions of fairness, mutual support, and shared responsibilities can positively influence the quality of relationships among young adults.

It is important to highlight some limitations of this study. The research was conducted on a relatively small sample, consisting mainly of college students and young adults, which limits the extent to which the findings may be generalized beyond the studied group. In addition, the data were collected through self-report instruments, a method that may be influenced by participants' personal interpretation of the questions and their tendency to provide socially acceptable responses. Further research conducted on broader and more heterogeneous samples could contribute to a more comprehensive understanding of the relationship between gender role attitudes and relationship satisfaction across different social and demographic contexts.

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Research

The Medieval English Glossary as Vehicle of Cultural Adaptation: The Case of *Ælfric's Vocabulary*

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Abstract

When historical linguists examine medieval glossaries, they commonly do so with a view to studying phoneme changes, morpheme changes, or sememe changes. Along the lines of the last type here, this study analyzes *Ælfric's Vocabulary* (Wright 1884), a Latin-Old English glossary compiled by Abbot *Ælfric* of Eynsham for pedagogical purposes in 11th century England. The discussion focuses on selected items in the glossary that were used to render semantic loans (e.g. E. *gerefa* 'reeve' for L. *consul* 'Roman magistrate', E. *scruud* 'shroud' for L. *tunica* 'tunic'), with special attention to native lexemes (e.g. E. *wesend* 'bison' for L. *urus* 'aurochs') which, due to contact with Latin, acquired new senses but ultimately went obsolete in favor of the Latin terms. Adducing such borrowings, the paper maintains that because *Ælfric's* glossary

was used as a teaching tool for Anglo-Saxon scholars, and contained to a great extent everyday words for people, animals, plants, clothes, weapons, and so on, it fostered polysemy, expansions of basic semantic fields, and the adoption of numerous loanwards from Latin, and as a result, the glossary served distinctly as 'a vehicle of cultural adaptation' (cf. Ashrafova 2024; ahin 2009).

Keywords: *glossary, polysemy, semantic loan, lexical loan, sememe*

Introduction

The cultural context of language

If our main objective is to analyze instances of semantic borrowing and lexical loss as well as loan-

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word adoption in an attempt to establish that Ælfric's pedagogical glossary was explicitly 'a vehicle of cultural adaptation', perhaps it is best to begin with an orienting definition of culture. The most relevant definition of culture in the OED is under sense III.7.a. It reads thus:

"The distinctive ideas, customs, social behaviour, products, or way of life of a particular nation, society, people, or period." (Oxford English Dictionary <https://www.oed.com/>)

Obviously, this is common ground. However, before proceeding further, we may highlight a few terms for clarity in the context of language and borrowing processes. We will be considering the 'ideas' as the concepts signified by loan words and loan senses, the 'social behaviour' as what we might call lettered interlocution, the 'products' as, in our case, Latin loan nouns as well as native Old English equivalents, and 'people' as the speech communities of medieval Latin and English, particularly Ælfric and his fellow scholars in England.

A current reanalysis of cultural phenomena is Barth (2020: 35): "[Cultural] ideas are made manifest to other persons [...] only in a necessary conjunction with other aspects or dimensions of existence which together compose social action: aspects such as social relationships, will and purpose, and material context." Here we find an emphasis on sharing culture and social interaction with purpose. Evidence of such will be found in Ælfric's compilation and dissemination of his glossary, which was designed with didactic aspirations.

Methods

Linguistic borrowing as cultural adaptation

In a discussion of German loanwords in English, Ashrafova (2024: 44, 49) generalizes on the matters of linguistic adaptation and cultural influence: "The assimilation of loanwords reflects English's historical openness to linguistic influences, showcasing a linguistic flexibility driven

by social and communicative needs [...] This process of adaptation highlights how loanwords serve as conduits for cultural exchange [...]"

Of course, that openness, that conceptual accommodation, dates back to medieval times, when King Alfred was translating the *Historiarum* of Paulus Orosius and our Abbot Ælfric was compiling his *Vocabulary*, both men addressing what they deemed social and communicative needs among their people in their day (i.e. the 9th century for Alfred and the 10th for Ælfric).

As regards borrowing and consequent developments in the English lexicon, Kizi and Zafarovna (2025: 389) assert: "loanword absorption drives English vocabulary development by creating new patterns through [...] semantic change processes [..., and] adjustments stem from social and cultural contexts".

In Old English, loans from Latin, Old Norse, and so on, often augmented the existing inventory of lexemes, but sense borrowing and consequent polysemy were also commonplace.

Functions and types of loans

With respect to the reasons for lexical and semantic borrowing, we may begin with Jespersen's statement about the borrowing impulse. On this matter, he notes: "When a nation produces something that its neighbors think worthy of imitation, these will take over not only the thing but also the name. This will be the general rule, though exceptions may occur, especially when a language possesses a native word that will lend itself without any special effort to the new thing" (1955: 30).

In a more detailed manner, Gortlach (1997: 149-151) outlines several reasons for adopting loans. The most pertinent among them are: gaps in the native lexicon; failed loan translations (calques); and association with previous loans of the same semantic field.

This discussion will highlight semantic borrowing along with lexical obsolescence and loss, and we will find that one or more of those reasons was causal. Gortlach (1997: 145-147) gives the main types of loans as: loanwords, calques, semantic loans, syntactical loans. Below, we will be

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considering Latin semantic loans (which initially caused polysemy in native words), calques (which failed to survive), and Latin loanwords (which displaced native words in Old English times or later).

Background

Aspects of Medieval English glossaries

Wright and Wulcker (1884) is the largest collection of medieval English glossaries. It contains 19, largely anonymous, glossaries, dated from the 8th to 15th centuries, mostly representing the southern dialects of Old and Middle English, and it includes Ælfric's Vocabulary (glossary). Most of the early glossaries are non-alphabetical, and a few glossaries include illustrations of items. In the main, they were intended to serve didactic purposes. (e.g. the oldest one, of the 8th century, was compiled for the school of Canterbury, which was under Archbishop Parker)

Examples of native English words used to translate multiple Latin words: *æcer* 'field', *bed* 'bed', *boc* 'book', *cræft* 'craft', *flod* 'flood'. Such instances reflect semantic borrowing which resulted in polysemy by the addition of new senses. Later, as certain of the Latin equivalents were adopted into the English lexicon as loanwords, some of the new senses were naturally vulnerable to loss, and narrowing made possible in these lexemes. At the same time, the lexicon itself expanded.

Ælfric as teacher and facilitator of linguistic and cultural adaptation

As regards Ælfric the man, the monk, and the teacher, Newman (2010: 166) notes that:

"Ælfric was born in the English kingdom of Wessex around the year 955. He entered the monastery at Winchester as a teen and lived there, as a postulant and eventually as a monk and mass priest, until 987. In that year, Bishop Alphege sent him to the recently founded Abbey of Cernel. Ælfric remained at Cernel until 1005, when he was invited by Æthelmær to be the first abbot of Eynsham Abbey [...] Ælfric would also be known

as a figure significant to the monastic temperament of the late 10th and early 11th centuries, not only for his roles as monk and abbot, but for his dedication to religious and linguistic learning, and, perhaps most of all, for his liturgical homilies, which he composed in the vernacular tongue of English, and cast in an easy, rhythmical, alliterating, and semi-poetical style [...] Ælfric's vigor as a teacher further resulted in the composition of the Grammar and Glossary. Translated from Priscian Major and Minor c. 995, the Grammar outlines the sounds, inflections, and syntax of Latin for Anglo-Saxon pupils. This work is accompanied by the Latin-English Glossary, which contains not only technical terms but also many common words for occupations, plants, and animals. The Glossary is arranged in categories, the first of which relates to the occupation of agriculture, whose subservient but earnest activities were esteemed by the Anglo-Saxon clergy."

On the purposes of Ælfric's glossary, Wright (1884: 105) observes that: "The object of these vocabularies [this glossary] was chiefly twofold; first to interpret Latin words to the Anglo-Saxon scholar, and secondly, to furnish him with the Latin words for the common objects of life. The vocabulary of Alfric would seem to have been originally arranged with a view to the latter object".

Thus, in compiling his glossary, Ælfric wished to introduce his fellows not only to some Latin terms requisite for Christian monks, but also very much to expose them to Latinate culture via basic everyday vocabulary.

Results

Ælfric's Vocabulary (Glossary)

Ælfric's Vocabulary contains approximately 3000 items on 86 pages. This non-alphabetical glossary is divided into 15 sections, and it includes a few unmarked subsections. It is followed by a supplement (the last 21 pages).

It is the longest, early, originally compiled Latin-English glossary. One in the Wright and Wulcker collection is longer (at 136 pages in length), but

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it differs in being derived from the glosses annotated onto a number of texts written in Latin, and perhaps also from previously compiled glosses, like that of Ælfric, which is dated earlier. Similar renderings of native 'lichama' for corpus, 'gerefa' for consul, and so on may indicate as much. By more or less modern categorization (disregarding the inclusion of particular reptiles (e.g. lizards) under 'Insects'), the sections may be given thus:

Members of society *Insects*

Social roles
Nautical terms
Religion
Colors
Body parts
Clothing
Animals

Birds
Plants
Trees
Crops
Agricultural tools
Miscellaneous objects

Ælfric's Glossary: Sample lexical borrowings in the wake of lexical losses

reticulum [borrowed 17c.]	'fishing net, hairnet'	cicada [borrowed 15c.]	'homopterous insect, cicada'
feaxnet [feax obsolete 17c.]	'hairnet'	hilhama [obsolete OE]	'cricket'
elephans [borrowed 14c.]	'elephant'	lancea [borrowed 13c.]	'light spear, lance'
ylp [obsolete 13c.]	'elephant'	wigar [obsolete OE]	'war-spear'
camelus [borrowed 10c.]	'dromedary'	sulphur [borrowed 14c.]	'brimstone, sulphur'
olfend [obsolete 13c.]	'dromedary'	swefel [obsolete OE]	'brimstone, sulphur'
flasco [borrowed 7c.]	'wooden vessel for wine, flask'	color [borrowed 14c.]	'color, pigment, complexion'
buteruc [obsolete OE]	'leather bag for butter, vessel'	bleoh [archaic 19c.]	'color, hue, complexion'
altar [borrowed 9c.]	'altar for burnt offerings'	corpus [borrowed 15c.]	'body, abode of the soul'
weofod [obsolete 15c.]	'idol, holy nourishment (table)'	lichama [obsolete 18c.]	'living, non-spiritual body'

The dates and definitions listed above are given in the *Oxford English Dictionary*, the *Oxford Latin Dictionary*, or the *Anglo-Saxon Dictionary*.

Ælfric's Glossary: Sample calques

gnomon [borrowed 16c.]	'pointer of a sundial, gnomon'
dægmaetspilu [calque (hapax?)]	'day divider declarer' ('teller of the divisions of day')
armonia [borrowed 14c.]	'conjunction melody, harmony'
geþwære sang [calque]	'agreeing song'
libatio [borrowed in 14c.]	'a sacrificial offering, libation'
wintifer [calque (hapax?)]	'windy carrier'
fungus [borrowed 16c.]	'mushroom, fungus'
metteswam [calque (hapax?)]	'meat-mushroom ('food-fungus)'

Similarly, the dates and definitions listed here are given in the *Oxford English Dictionary*, the *Oxford Latin Dictionary*, or the *Anglo-Saxon Dictionary*.

Additional medieval English calques are listed in Mac Gillivray (1902) and Newman (2006).

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Discussion and conclusions

This discussion has examined the contents and purposes of Ælfric's Vocabulary, and it has contended that the glossary functioned as a 'vehicle of cultural adaptation'.

Borrowings for social roles, animal species, weapons, and items of clothing and furniture have been analyzed. Semantic loans such as 'consul' (signified by gerefa 'reeve'), 'tunic' (signified by scrud 'shroud'), 'cicada' (signified by hilmama 'cricket'), 'corpus as abode of the soul' (signified by lichama 'living physical body'), 'gnomon' (signified by dægmaelspilu a calque meaning 'teller of the divisions of day'), and others have been adduced. These loans, causing polysemy, evidently filled perceived lexical gaps in Old English times, and later as such native words were supplanted by their Latin equivalents, those loanwords functioned to represent sememes which would otherwise have been lost as their host calques (e.g. metteswam 'meat-mushroom') went obsolete.

Within its socio-cultural context (cf. Kizi and Zafarovna 2025: 389) and to satisfy "communicative needs" (Ashrafova 2024: 44), the design of the glossary served the purpose of edification via the social actions (cf. Barth 2020:35) of the teacher and the learner as well as the purpose of cultural accommodation. The transfer of these ideas by means of such words required linguistico-cultural adaptation; it required accommodations to Latinize cultural concepts which were "worthy of imitation" (cf. Jespersen 1955: 30) as the English lexemes underwent polysemy, expanding semantic fields by adding sememes to the mental lexicons of Anglo-Saxon scholars and later to those of other speakers of English.

Ultimately, English has adapted linguistico-culturally in a variety of ways over the centuries. Neologisms from native material have been formed and have spread only to go obsolete some generations afterward. Loanwords from dozens of languages have gained currency and later fallen out of use. Senses have been borrowed and then lost. No doubt the net result of those thousands upon

thousands of adaptations, that is, the lexis of Present-Day English, would, were they alive today, captivate the teachers of old, Iareowas like Ælfric.

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Original research

Human Translation and AI: Reimagining EAP/EFL Pedagogy in the Language of Emotions. The Cases of *The Diary of Anaïs Nin* and *Gratitude* by Oliver Sacks

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Abstract

As English for Academic Purposes (EAP) and English as a Foreign Language (EFL) classrooms evolve with technology, this research aims to argue that integrating the practice of AI-powered literary translation not only modernizes pedagogy but also fundamentally enhances EAP/EFL learners' linguistic, cultural, and critical capabilities.

In classroom interventions across a Master's in Psychology, a University Language Centre and a Secondary School, 106 students translated 18 extracts from two literary Diaries (by Anaïs Nin and Oliver Sacks). They compared their Italian translations with those from ChatGPT, DeepL, or Google Translate to determine human-AI translation differences and assess which better conveys the source author's emotions. Textual similarity was calculated using the TF-IDF (Term

Frequency-Inverse Document Frequency) method, a vector-representation technique that assigns a weight to terms based on their frequency in a text and their distribution across the entire corpus. In addition, an Emotional Detection (ED) analysis was conducted on the human translations and on those generated by the artificial intelligence systems, in order to explore how the affective content of texts is reworked in the transition from the original to the translation. Results show that human translations present significantly greater variability and emotional sensitivity than AI, particularly in metaphorical and affectively charged texts.

Keywords: *English for Academic Purposes (EAP), English as a Foreign Language (EFL), Translation studies, Intercultural Competence, Artificial Intelligence (AI).*

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Introduction

The objective of this research is to present an authentic project accomplished in the academic year 2024/2025, focusing on creative writing as a psychotherapy (Mastela 2020), followed by diary translation (as an affective, emotional practice).

Through a series of classroom-based interventions with students belonging to three different contexts (a Master's degree programme in Psychology, a University Language Centre and a Secondary School - all based in Catania, Italy), this research focuses on the translation of emotions as a pedagogical tool in English language teaching and on the comparison between human translation and AI translation.

The importance of creating an authentic learning environment and engaging students in translation projects has been recognized in recent years by several translation teachers and scholars.

In addition, following Yu (2022), a standard method to assess Machine Translation (and the latest developments, such as AI) success is to compare it to human translation. Although this field has begun to be explored, research remains limited. Thus, this study addresses the gap by asking: Do human translations of emotionally charged literary texts exhibit greater variability than AI-generated translations?

Methods

Measuring translation divergence

A corpus of 18 extracts from two literary Diaries (Gratitude by Oliver Sacks and The Diary of Anais Nin), was administered to a total sample of 106 students (enrolled in B2/C1 English language courses, aged between 16 and 60, with different levels of education—from high school to PhD—and of different genders) who were requested to translate them into Italian and to compare their translations to the ones produced by a chosen AI tool among ChatGPT, DeepL, and Google Translate in order to determine how much human translation differs from AI translation and to assess which one conveys the source texts author's emotions.

The data were collected in a structured file in which human translations and those produced by AI were separated and organized by quotation,

while keeping information about the translation tool used.

Starting from this corpus, the analysis was developed in several phases.

In the first phase, for each quotation, the human translations were isolated from the translations generated by the three AI systems. This made it possible to perform a controlled comparison on the same source text and among different engines. Distinguishing between the three tools allowed for the evaluation not only of the distance between human and machine translation, but also the degree of convergence or divergence among the solutions provided by the systems themselves.

Textual similarity was calculated using the TF-IDF (Term Frequency-Inverse Document Frequency) method, a vector-representation technique that assigns a weight to terms based on their frequency in a text and their distribution across the entire corpus, reducing the impact of words that are too common and not very informative. TF-IDF transforms each translation into a weighted vector, where rare but informative terms are emphasized, and frequent, low-information words are downweighed. Cosine similarity was then applied to these vectors, a measure that quantifies the degree of similarity between two texts on a continuous scale from 0, indicating no similarity, to 1, indicating almost complete overlap. This metric reflects the angle between two vectors: values close to 0 mean the vectors are dissimilar (orthogonal), while values close to 1 indicate nearly identical direction and high textual overlap (Vanmassenhove et al., 2019).

Subsequently, internal variability was operationalized as the standard deviation of the similarities calculated between all possible pairs of translations referring to the same quotation. For each quotation, all pairwise similarities were computed either among human translations or among machine-generated translations. The standard deviation of these values was then calculated to quantify internal coherence: a low standard deviation indicates high consistency, whereas a high one reveals divergence in translational choices. This made it possible to measure, on the one hand, how much human translations differ from one another and, on the other, how much the translations produced by the three AI tools differ from one another. Introducing the

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variable “translation tool”, therefore, it was possible to assess whether systematic differences exist among ChatGPT, DeepL, and Google Translate in terms of internal consistency and distance from human translational choices (Freitag et al., 2021). The results were then visualized using boxplots and heatmaps, tools that highlighted respectively the distribution of similarities and the patterns of convergence and divergence between human and AI translations, respectively, both at the level of individual quotations and in comparison, among the various translation tools.

Emotional detection analysis

Alongside the analysis of similarity and translational variability, an Emotional Detection (ED) analysis was conducted on the human translations and on those generated by the artificial intelligence systems, in order to explore how the affective content of texts is reworked in the transition from the original to the translation. The analysis was performed using an emotion-detection model specific to the Italian language, based on the MilaNLProc/feel-it-italian-emotion neural network, capable of classifying each text according to four basic emotions: joy, sadness, fear, and anger.

Each translation, human or automatic, was first analyzed individually by the model, which provided a dominant emotional label and a confidence score. This phase was essential to assess not only linguistic similarity but also whether the emotional impact of the source text was preserved or altered in the translated versions, by humans or AI tools (Bek, 2023; Qian et al., 2023; Liu et al., 2025).

Questionnaire

Finally, a questionnaire was administered to our student sample (70,5% men and 29,5% women). Among them, 55 of the participants use AI tools occasionally for translation, 38 to use it often, and 9 affirmed to never use it with this purpose. Only 4 affirmed to always use it.

The questionnaire included questions about the use of artificial intelligence in translating literature (diaries, in particular) from English into Italian.

Results

Quantitative results: measuring translation divergence

In the analyzed corpus—consisting of translations produced by 106 students from quotations taken from *Gratitude* by Oliver Sacks and *The Diary of Anaïs Nin*, compared with translations generated by three AI tools (ChatGPT, DeepL, and Google Translate)—the quantitative analysis of the data reveals a complex picture that makes it possible to meaningfully address the issue of human translational variability versus artificial translation.

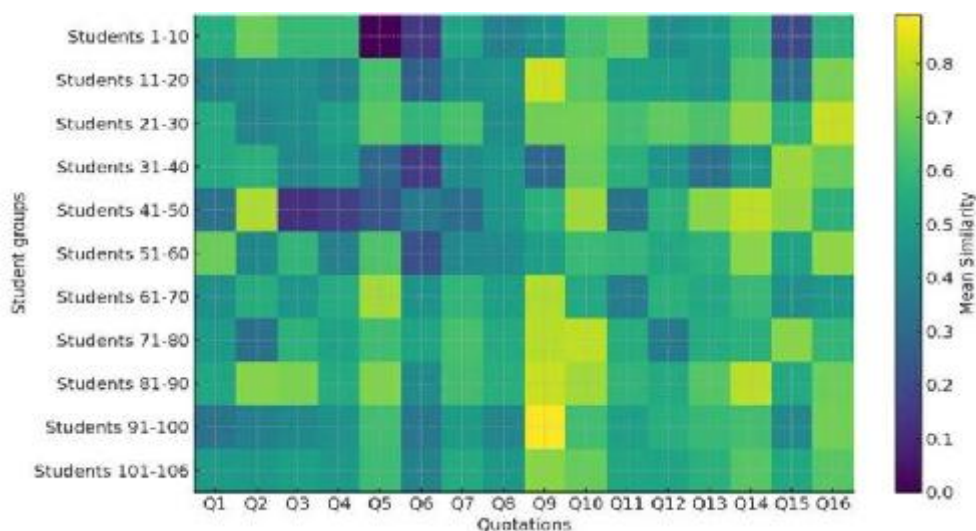
The initial measure used was the semantic-lexical similarity between personal translations and AI translations, calculated through cosine similarity applied to TF-IDF vectors. The resulting values, displayed in a heatmap reorganized by blocks of students (groups of ten) and by quotations, show a clearly heterogeneous distribution. Alongside quotations characterized by a high average alignment with the AI output—where values approach 1—there are systematically darker areas corresponding to lower similarity scores, sometimes close to zero.

Reorganizing the data into groups makes collective tendencies more visible and highlights how the distance from AI translations is neither uniform nor random; rather, it varies consistently both across different quotations and among different segments of the student sample.

This indicates that in many cases the students did not simply echo or slightly rephrase the AI’s output, but instead produced significantly divergent solutions, often restructuring the metaphorical image or altering the semantic orientation of the translation.

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Figure 1 - Heatmap of mean similarity across student groups



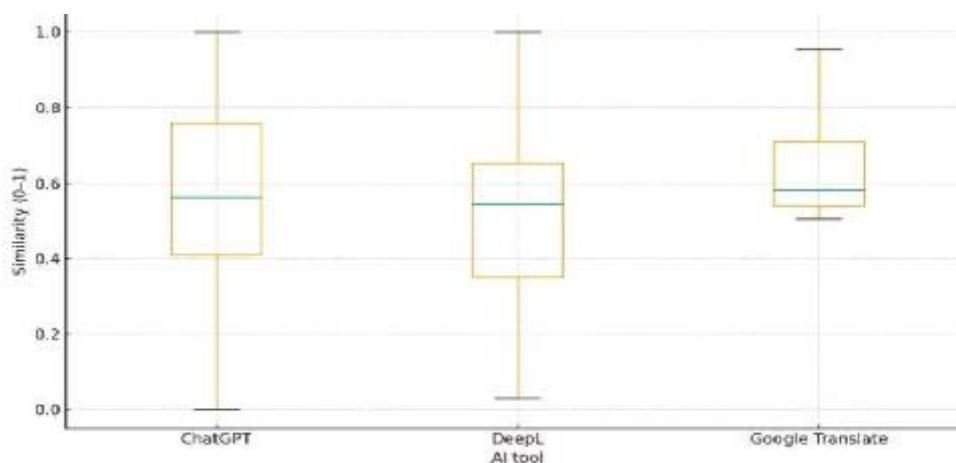
The heatmap (Fig. 1), taken as a whole, visually conveys strong inter-individual variability, with students oscillating between high proximity to the AI and highly divergent choices, and with certain quotations proving more “sensitive” than others to this kind of divergence—especially when the original text contains metaphors or complex emotional concepts such as “bugger off,” “arrow,” “irreversible loss,” “rehearsal for separation,” or “we are still like animals.” This already suggests that interaction with AI does not produce a uniform standardizing effect, but rather a spectrum of responses that depends both on the individual translator and on the complexity of the source text.

It is clear that the tool used by the students influenced the results. Indeed, the analysis by AI

translation tools shows an average similarity that is fairly homogeneous across the different systems: ChatGPT is at 0.5886, while DeepL and Google Translate fall within comparable ranges (0.5936 and 0.5621, respectively), indicating a general tendency toward relatively stable and consistent translations. In terms of frequency within the corpus, ChatGPT is the most widely used tool, with 73 cases, followed by Google Translate with 22 cases and DeepL with 11. This numerical imbalance means that the statistics related to ChatGPT rest on a broader empirical base compared to the other two engines, while the results for DeepL, given the smaller sample size, must be interpreted more cautiously

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Figure 2 - Boxplot of similarity values by AI tool



The graphical representation (Figure 2) of the similarity between human and AI translations for the 106 cases analyzed clearly shows that Google Translate displays a more compact distribution, with generally more stable similarity values, while ChatGPT and DeepL show a much wider dispersion, indicating greater fluctuation in the relationship between automatic output and human reformulation. In particular, ChatGPT shows the widest range, with cases of strong convergence and cases of strong divergence, suggesting that its output is sometimes adopted as a model, but other times deeply reworked or rejected by the students.

Regarding the central research question of the study—whether human translations show greater or lesser variability compared to those produced by AI—it is essential to distinguish human-AI similarity from internal variability. Similarity values measure how closely each individual translation aligns with or diverges from the AI output, but they do not directly measure how much students differ from one another, nor how much the automatic systems differ among themselves.

Nevertheless, based on the data obtained, it emerges that the human translations lie along a very wide continuum, with solutions that are very close to AI output and solutions that are

profoundly independent. By contrast, AI translations—even when produced by different systems such as ChatGPT, DeepL, or Google Translate—tend to move within a narrower range of variation.

In particular, where the original texts present complex or culturally marked imagery, such as “bugger off” or “rehearsal for separation by death”, human translations show a much broader range of solutions, ranging from semantic softening to radical re-semanticization, while AI tends to converge on more literal formulations with less creative variation. This phenomenon further supports the hypothesis that human translation is not only more variable but also qualitatively more sensitive to the metaphorical, pragmatic, and emotional levels of the source text.

The calculation of internal variability conducted at the level of each individual quotation quantitatively confirms the hypothesis of greater dispersion in human translations compared to those produced by AI systems. The average standard deviation of the students’ translations is 0.2142, while that of the translations generated by ChatGPT, DeepL, and Google Translate is significantly lower, at 0.1178. This indicates that, given the same source text, human solutions show a broader range of variation, reflecting

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interpretative differences, individual stylistic choices, and a greater degree of freedom in reformulation. AI translations, although produced by different models, show a tendency toward convergence, with a higher average similarity (0.7012 compared to 0.3608 for human translations) and lower internal variability, suggesting a greater standardization

of automatic translation strategies. These results underline that human translation, within the analyzed corpus, is characterized not only by greater distance from artificial output but also by a more pronounced plurality of solutions, especially in metaphorical and semantically complex passages.

Table 1 - Human vs. AI Translation Variability and Similarity

Metric	Value	Description
Human standard deviation	0.21	Average variability in human translations
AI standard deviation	0.12	Average variability in AI-generated translations
AI internal similarity	0.70	Consistency across ChatGPT, DeepL, and Google Translate
Human internal similarity	0.36	Consistency across student translations

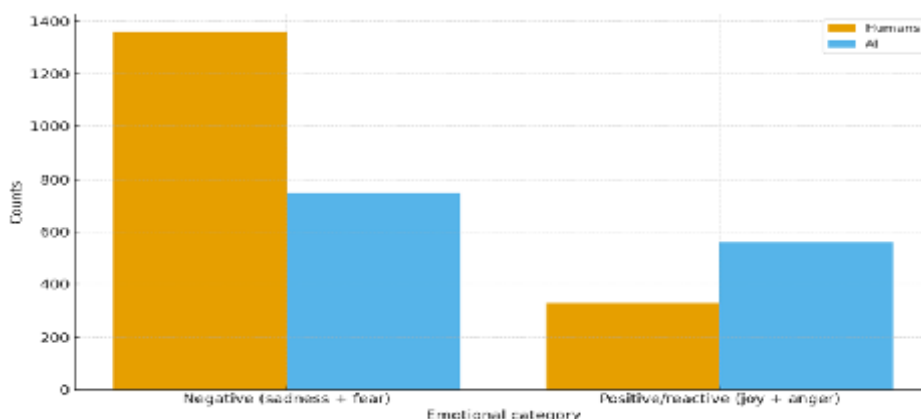
Quantitative results: Emotional detection analysis

Regarding the analysis of emotions, since the corpus examined consists of literary texts that are strongly marked on the existential and thematic level—centering on experiences of loss, death, separation, and memory—the four categories returned by the model were subsequently reorganized into two broader interpretative areas consistent with the nature of the material. On the one hand, there is a pole of

deep negativity, comprising the emotions of sadness and fear (linked to grief, vulnerability, and anguish). On the other hand, there is a pole of positive/reactive re-elaboration, comprising joy and anger (interpretable respectively as signals of vital affirmation and of emotional distancing).

This reorganization made it possible to avoid a mechanical reading of the automatic categories, reintegrating the analysis within an interpretative framework more appropriate to the type of texts under examination.

Figure 3 - Emotional polarity distribution



The results (Fig. 3) show a clear divergence between human translations and AI translations.

Human translations are strongly concentrated in the deep negativity pole, with 1,367 occurrences

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(out of 1,696 total translations) falling into this macro-category, compared to only 329 in the positive/reactive pole. This suggests that students tend to preserve, and in some cases intensify, the emotional weight related to loss, pain, and vulnerability present in the original texts. AI-generated translations, on the other hand, show an overall more balanced emotional profile compared to human translations, with 750 occurrences in the deep negativity pole and 554 in the positive/reactive pole. Notably, within this latter category, there is a relatively high presence of the emotion of joy, interpreted not as

simple happiness but as a signal of a distanced or rebalancing reformulation of the traumatic and memorial content of the source texts. The remaining 392 AI translations, characterized by marked emotional neutrality or scores too low for reliable classification, were not included in the graphical representation in order to preserve readability and interpretive coherence. This gap should not be interpreted as an “emotional deficiency” of AI, but rather as the result of its text generation strategies, which favor more balanced and less affectively polarized linguistic solutions.

Table 2 - Emotional Distribution in AI and Human Translations

Emotion	AI Translations	Human Translations
Anger	130	73
Fear	122	1117
Joy	424	256
Sadness	628	250
Neutral	392	-
Total classified	1304	1696

As detailed in Tab. 2, human translations show a strongly skewed concentration on the emotion of fear (1,117 occurrences out of 1,696), which can be interpreted as a greater emotional involvement with themes of loss, vulnerability, and existential anguish present in the texts. The fear detected by the model should not be understood strictly in psychological terms but as a linguistic index of a strong proximity to pain and the experience of grief, while sadness is less represented (250 occurrences), suggesting that students are less likely to “cool down” the emotional content into a form of detached sadness and more likely to maintain it in a dimension of immediate affective exposure.

In AI translations, instead, a more nuanced emotional distribution is observed: the categories of sadness (628 occurrences) and fear (122 occurrences) are both present but less dominant than in human translations, with the prevalence of sadness indicating a tendency to

redistribute the tragic content of the text between processing and attenuation of emotional tension. The relatively high presence of joy in AI translations (424 occurrences out of the 1,304 classified) does not indicate a naive distortion of the original content but rather a systematic tendency to rebalance negative emotional load through less dramatically connoted linguistic formulations aimed at semantic reworking. In this sense, the “joy” detected by the model should not be interpreted in hedonic or consolatory terms but as a marker of a process of attenuating the tragic intensity present in the sources.

It is also important to emphasize that all 1,696 human translations were classified by the model into one of the four emotional categories, whereas 392 AI translations were excluded from the analysis due to emotional neutrality or classification scores too low to be considered reliable. This asymmetry seems to indicate that

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automatic translations tend toward reorganizing and partially neutralizing emotional load rather than erasing it, while human translations are overall more sensitive to the affective and symbolic layering of the original texts, maintaining a closer adherence to their emotional complexity.

Qualitative results

From a qualitative point of view, it is noteworthy how human and AI translations diverge, not only in lexical choice but, more importantly, in their handling of tone, register, and cultural resonance. By examining a colloquial, irreverent sentence: "He thought he would live to eighty and then bugger off" from Oliver Sacks, alongside a metaphorically charged expression "pierced by an arrow" from Anaïs Nin, the analyses bring to the fore the different pressures exerted by style-sensitive prose. Together, they serve to illustrate that AI systems tend toward safe, literal, semantically stable solutions, whereas human translator, through creativity, intuition, and subjective interpretation, produce a far wider spectrum of possibilities, running the range from highly effective recreations of the original voice to unintended tonal shifts. In both examples, the contrast brings to light the core dilemma at the heart of translation, balancing accuracy with expressiveness, and fidelity of meaning with fidelity of effect.

The different human translations of the sentence "He thought he would live to eighty and then bugger off" show a whole gamut of strategies, which indicate how differently translators interpret tone, register, and cultural nuance. On one extreme, very neutral interpretations such as "Lui pensava che avrebbe vissuto fino agli ottant'anni e che poi ne sarebbe andato", retain the literal meaning but flatten Sacks's playful irreverence into something bland and almost bureaucratic type of language. This is a tendency that is often seen in AI output. More expressive ones, such as "Egli pensava che non avrebbe vissuto più di 80 anni e che dopo si sarebbe levato dai piedi" or "poi si sarebbe levato di

torno", get much closer to "bugger off", by adopting colloquial Italian idioms; despite small semantic shifts, they reproduce more effectively Sacks's light-hearted and self-mocking tone. Others fall into tonal mismatches: "passato a miglior vita", "si sarebbe spento", or "andarsene in pace" are correct, yet they introduce solemnity or tenderness absent from the original, while "tirato le corde" tries creativity but uses a non-standard idiom which may raise readers' eyebrows. Taken altogether, the comparison shows, in a nutshell, the dilemma between semantic accuracy, tonal fidelity, and cultural equivalence faced by any translation. Neutral, safe translations—the ones typically produced by AI—retain meaning but lose voice, while human translators, through colloquial choices, euphemisms, or experimental idioms, can either succeed in recreating the author's irreverence or, at times, inadvertently distort it. All in all, the versions using "levarsi di torno" or "levarsi dai piedi" turn out to be the closest reproductions to Sacks's intended tone, with the best balance of clarity, informality, and humor.

The AIs' translations of the expression "pierced by an arrow" from *The Diary of Anaïs Nin*, compared with human renderings, show clear differences in strategy, nuance, and stylistic sensitivity. In this case, DeepL and ChatGPT converged on "trafitto da una freccia", a solution that is lexically precise, slightly poetic, and fully appropriate to Nin's literary tone. But here, too, this choice reflects limits that are proper to AI systems, which always head for the most conventional dictionary equivalent, avoiding risks in style and failing to capture possible emotional, symbolic, or sensuous nuances proper to Nin's writing. Quite another story, however, is told by human translators, who offer a much broader and more heterogeneous range of possibilities. Some alternatives, like "trafitto da una freccia", or the more dramatic "trapassato da una freccia", stay faithful to the original while modulating intensity and register, whereas others deviate decidedly in tone: "perforato da una freccia" introduces an overly clinical

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precision; "infilzato da una freccia" risks sounding crude, or grotesque; and "bucato da una freccia" trivializes the metaphor through colloquial language. Further illustrative of how human creativity may also result in distortion or typographical mistakes is the error "pugnalato da una feccia". Overall, while AI offers a safe, neutral, and stylistically consistent option, human translations exhibit both greater expressive potential and greater variability, oscillating between poetic refinement, dramatic intensity, and mismatched or inappropriate choices. The best-balanced, faithful rendering, shared by both AI and one human version, remains "trafitto da una freccia", which maintains Nin's literary tone without excess or distortion.

Discussion

A discussion on the role of AI in text translation, with advantages and disadvantages, is now in order.

The research conducted revealed a fairly clear and shared perception by the students of the role of artificial intelligence in translation work. Students acknowledged that AI represents a useful tool, capable of speeding up the process and providing generally correct translations, often offering synonyms, alternative phrasing, and explanations of the meaning or origin of certain expressions. Many highlighted how AI can help enrich one's vocabulary and quickly provide a general understanding of a text.

However, almost all respondents emphasized the limitations of AI compared to a human translator. In particular, automatic translation often appears too literal, mechanical, and lacking in sensitivity. AI struggles to capture emotions, cultural nuances, irony, and metaphors—elements that are essential when producing a natural translation faithful to the spirit of the original text. Although AI may be more precise grammatically, it cannot reproduce interpretative richness or human "feeling."

Another recurring point concerns the importance of human oversight: AI can suggest good solutions, but its translations always need

to be checked, corrected, and adapted. Revision is considered essential, as is the ability to compare different versions and critically reflect on linguistic choices. Some students even noted that this process helped them improve their own linguistic awareness.

In conclusion, students agreed that AI is an effective support tool, provided it is used with moderation and critical judgment. It can facilitate, complement, and enrich translation work, but it cannot replace the sensitivity, deep contextual understanding, and creativity typical of a human translator.

As for advantages, the responses clearly indicate that the primary advantage of using artificial intelligence in translation is speed. Students repeatedly emphasize that AI allows them to obtain a translation in a matter of seconds, drastically reducing the time required compared to manual translation. This speed is seen as particularly useful not only in academic study but also in professional contexts, where large volumes of text must be managed, or quick responses to messages and communications are needed.

In addition to speed, many appreciate the convenience and accessibility of the tool: AI is always available, easy to use, and allows users to quickly generate a first version of a text or gain a general understanding of its content. In several cases, it is also considered an effective tool for checking the accuracy of one's own translation or for comparing alternative ways of expressing the same idea.

Another highlighted advantage concerns AI's lexical knowledge, which allows users to quickly learn new words, synonyms, stylistic variations, and correct grammatical constructions. AI also offers alternative translations depending on the context, helping users choose the most suitable formulation. For those who struggle to understand individual terms or expressions, AI provides immediate and reliable support to clarify meanings and linguistic structures.

Finally, many students recognize that AI is useful for producing a first draft of a text to be further refined: a base that is accurate, fluent, and often

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well-structured, which can then be adapted to stylistic or communicative needs.

In summary, the use of AI in translation is perceived as fast, practical, efficient, and educational, capable of facilitating comprehension and offering multiple linguistic suggestions. Despite its limitations, it represents a valuable support tool for anyone wishing to translate quickly and more easily access the meaning of words and texts.

As for drawbacks, the responses reveal a strong awareness of the risks associated with using artificial intelligence for translation. The first limitation highlighted concerns the possibility of errors: AI can translate too literally, misinterpret the meaning of words, or completely miss cultural nuances, metaphors, idioms, and emotions. This can result in translations that are grammatically correct but unnatural, nonsensical, or unable to convey the tone and depth of the original text.

A second recurring risk is dependency. Many students worry that frequent use of AI could reduce motivation to fully engage in language learning, weaken critical thinking, and diminish the ability to translate independently. There is concern about a gradual "mental laziness," leading to underuse of memory, creativity, and interpretative skills, ultimately compromising personal linguistic development.

Many responses also emphasize the danger of losing originality: AI-generated translations tend to standardize style, erase the author's personality, and neutralize emotions. Some note that, if not carefully reviewed, a text produced by AI can feel cold, artificial, or stylistically anonymous.

Finally, broader risks were noted, such as the potential replacement of human professionals, with resulting employment consequences, and even indirect effects related to the environmental impact of large computational systems.

Conclusion

In conclusion, students recognize that AI can be a useful support tool, but they stress that excessive or uncritical use can lead to errors,

misunderstandings, loss of skills, and diminished quality of the translated text. Human intervention remains essential to verify, interpret, and preserve meaning, creativity, and emotion.

In addition, in a world where English for Academic Purposes/English as a Foreign Language classrooms evolve with technology, integrating the practice of AI-powered literary translation not only modernizes pedagogy but also fundamentally enhances EAP/EFL learners' linguistic, cultural, and critical capabilities.

Human translations show significantly greater variability and emotional sensitivity than AI, particularly in metaphorical and affectively charged texts. The future lies not in replacing human translators but in harnessing AI's strengths while safeguarding human creativity, judgment, and the irreplaceable capacity to translate the language of emotions.

As a follow-up, this research will further compare the aforementioned results to the literary translation from Italian authors (respectively, *Diario V 1947>1955* by Delfina Vezzoli, 2016, *Gratitudine* by Isabella C. Blum, 2016), reflecting on the role of the translator's "affect" (Koskinen 2020) in language choices. This will prompt discussions among students regarding 'foreignizing' versus 'domesticating' translation choices (Venuti 1995), and will encourage them to consider how cultural nuances and affect/emotions are either preserved or erased by AI.

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Memory in Motion: AI-Mediated Storytelling Across Languages, Classrooms and Generations

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Abstract

In increasingly multilingual and culturally diverse educational environments, storytelling has emerged as a powerful pedagogical practice for fostering language development, identity expression, and cultural continuity. At the same time, advances in artificial intelligence (AI) have transformed digital storytelling by introducing new possibilities for content generation, translation, and multimodal communication. This paper explores the role of AI-mediated storytelling across languages, classrooms, and generations, examining how AI can support narrative practices while preserving human creative agency. Drawing on interdisciplinary research in language education, digital storytelling, multilingualism, heritage language learning, and intergenerational memory, the study proposes a conceptual framework that positions AI as a narrative mediator rather than an autonomous storyteller. The discussion

highlights the educational potential of AI-supported storytelling for enhancing language learning, promoting multilingual expression, strengthening cultural identity, and facilitating the transmission of intergenerational memory. At the same time, it addresses critical ethical concerns related to authorship, bias, transparency, and learner agency. The paper argues that the pedagogical value of AI-mediated storytelling depends on human-centered instructional design, critical engagement with technology, and the preservation of authentic narrative voice. Ultimately, AI-mediated storytelling is presented as a collaborative human-machine practice that reconnects language, memory, and meaning across linguistic, cultural, and generational boundaries.

Keywords: Artificial intelligence; digital storytelling; multilingual education; heritage languages

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intergenerational memory; cultural identity; language learning; narrative pedagogy; human-AI collaboration; multimodal communication.

Introduction

In contemporary educational settings, multilingual classrooms have shifted from being “exceptional cases” to a normalized reality. Learners frequently exhibit substantial differences in linguistic backgrounds, cultural experiences, and meaning-making processes. Consequently, instructional design is no longer limited to the development of language skills; rather, it has evolved into a complex practice that must simultaneously address identity expression and cultural understanding. In essence, educators must maintain a dynamic balance between fostering functional language abilities and validating individual experiential expression.

From this perspective, narrative represents a particularly promising instructional approach. As one of humanity’s most fundamental meaning-making practices, narrative not only transmits information but also shapes personal identity and sustains cultural continuity (Shahid & Khan, 2022). Moreover, the pedagogical strength of narrative lies in its accessibility and participatory nature: it engages learners by situating language learning within concrete contexts and emotional experiences, rather than confining it to abstract grammatical rules (Lucarevschi, 2016). Existing research indicates that narrative activities can simultaneously enhance listening, speaking, reading, and writing skills, while also improving memory retention and expressive motivation (Abd Rahman & Bakar, 2020; Sabari & Hashim, 2023).

With the advancement of digital technologies, narrative forms have undergone a modern transformation. Traditional oral and text-based storytelling has evolved into multimodal forms that integrate text, images, audio, and other media. This transformation expands expressive resources

and reshapes how learners participate in narrative practices (Sabari & Hashim, 2023). Digital storytelling effectively integrates language learning, creative expression, and digital literacy, thereby fostering more learner-centered and interactive classroom environments (Shahid & Khan, 2022).

At the same time, artificial intelligence (AI) has become increasingly embedded in language education and content creation. From automated writing and translation to multimodal generation, AI offers clear advantages in efficiency and personalized learning support (Son et al., 2023). However, this technological integration raises significant ethical and practical concerns, including ambiguous authorship, stylistic homogenization, algorithmic bias, and the potential erosion of human emotional expression (Bibi, 2024; Adel et al., 2024). Although AI expands the technical boundaries of storytelling, debate persists regarding its potential to diminish human narrative agency.

Existing research often conceptualizes AI as a functional tool for language support, whereas digital storytelling scholarship emphasizes individual experience, identity, and narrative perspective. The intersection between these domains remains underexplored, particularly in relation to human-centered narrative practices. Evidence suggests that, despite AI’s capacity to enhance multimedia presentation and creative efficiency, narratives perceived as meaningful and valuable continue to depend on human leadership in meaning-making and emotional expression (Chen, 2024; Trichopoulos et al., 2023).

Accordingly, a critical research question emerges: To what extent can AI expand narrative expression without compromising human creative agency? This question is particularly urgent in heritage language and cultural education, where learning involves not only linguistic acquisition but also the transmission of intergenerational memory and cultural identity (Montrul, 2022; Vassiliadis, 2026).

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In response, this study integrates educational, cultural, and technological perspectives to construct a conceptual framework for AI-mediated storytelling and to identify evidence-based classroom practices. By focusing on cross-linguistic, cross-classroom, and intergenerational learning contexts, this paper aims to address gaps in current multilingual and intergenerational narrative research and to inform future scholarship and pedagogical practice.

Digital Narrative as a Practice of Meaning-Making

Digital narrative is defined as a meaning-making practice centered on storytelling and enhanced by multimedia resources. It is not merely a form of technical production or digital artifact creation; rather, its core value lies in learners' ability to express personal experiences, perspectives, and understandings through narrative structures (Abd Rahman & Bakar, 2020). From this standpoint, the significance of digital storytelling resides not in the final product, but in the learner's process of organizing meaning and constructing self-expression.

In English language teaching, digital storytelling provides a contextualized and purposeful platform for language use. Compared to traditional grammar-focused and pattern-drilling methods, it prioritizes language use in authentic or simulated real-life situations. This enables learners to develop linguistic competence while expressing personal stories and ideas. Research demonstrates that project-based digital storytelling enhances both writing and oral skills while increasing learner engagement (Sabari & Hashim, 2023). In this context, language learning becomes a purposeful act of expression rather than a mechanical exercise.

Multimodality is a defining characteristic of digital storytelling. Learners communicate not only through text but also through images, sound, video, and other semiotic systems, thereby reducing the limitations imposed by single-language expression. For learners who experience

difficulty with text-based communication, multimodal resources provide essential support, enabling them to convey ideas more effectively through visual and auditory means (Shahid & Khan, 2022). This inclusivity is particularly valuable in linguistically diverse classrooms, as it creates accessible expressive spaces for learners at varying levels of proficiency (Abd Rahman & Bakar, 2020).

Importantly, the educational benefits of digital storytelling do not emerge automatically; they depend on clearly defined instructional goals and structured scaffolding. Without guided support, activities may remain superficial creative exercises and fail to promote deep language development or reflective expression (Shahid & Khan, 2022). Therefore, educators must intentionally align digital storytelling with curricular objectives, guiding learners from casual storytelling toward purposeful meaning-making and rhetorical communication.

In summary, digital storytelling is a pedagogical practice grounded in meaning, voice, and multimodal integration. It expands expressive possibilities in language learning while strengthening learners' roles as narrative agents. On this foundation, digital storytelling provides a coherent, human-centered framework for examining AI-mediated storytelling.

Artificial Intelligence as an Intermediary in Learning

In contemporary educational research, AI is generally conceptualized not as an autonomous instructional agent, but as a supportive intermediary within the learning process. It functions as a tool or collaborative partner rather than a replacement for teachers or learners. Research in Computer-Assisted Language Learning (CALL) confirms that AI can support drafting, revision, translation, and real-time feedback; however, learning objectives and pedagogical decisions remain under human control (Son et al., 2023).

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Within the learning process, AI tools reduce cognitive load by assisting with ideation, error correction, and expression refinement. These functions allow learners to focus more on content, meaning, and structure rather than on repetitive linguistic adjustments (Yang & Jun, 2022). However, research cautions that, without structured pedagogical guidance, learners may develop an overreliance on AI, potentially weakening independent reflection and deep cognitive processing (Heung & Su, 2024).

AI integration also reshapes classroom role dynamics. Teachers transition from knowledge transmitters to designers of learning experiences, responsible for selecting appropriate AI tools and aligning them with instructional goals (Lim et al., 2021). Learners, in turn, must develop new competencies, including the ability to evaluate, filter, and revise AI-generated outputs rather than passively accepting them (Jolly & Memon, 2022). This shift reframes learning as a process of critical judgment and negotiation rather than simple answer acquisition.

In practice, effective AI integration faces persistent challenges, including unequal access to technology (the digital divide), limited teacher training, and unclear implementation pathways (V et al., 2022). These limitations underscore that the educational value of AI is not self-generating; it requires coordinated institutional support, technological infrastructure, and sustained professional development for educators (Siregar, 2024).

AI-Mediated Digital Narratives and Human-Machine Collaborative Creation

In computational narrative research, AI is positioned as a creative collaborator rather than an independent storyteller. AI systems can generate plot segments, suggest narrative trajectories, and adapt storylines based on user input; however, the overall meaning and direction of a narrative emerge from the interaction between human intention and machine generative capacity (Alhussain & Azmi, 2021).

From a collaborative perspective, responsibilities are clearly differentiated. AI supports plot generation, linguistic variation, and the provision of creative options, whereas humans oversee content selection, meaning interpretation, and final creative authority. This division preserves human narrative agency and positions AI as an enhancer of creative possibilities rather than a substitute for human creators.

Scholarly evidence indicates that, even with AI's multimedia and linguistic support, the core qualities of narrative—coherence, cultural relevance, and emotional resonance—continue to depend on human judgment (Chen, 2024; Trichopoulos et al., 2023). During student–AI collaboration, learners actively evaluate, revise, and reconstruct generated content to align with their personal intentions; this process itself constitutes a form of critical technological engagement.

In cultural heritage contexts, this collaborative model remains applicable. AI facilitates archival organization, historical reconstruction, and multimodal presentation, thereby expanding access to cultural narratives; however, it functions as an enabling tool rather than a producer of cultural meaning (Trichopoulos et al., 2023). Thus, AI-mediated storytelling is best understood as a form of human–machine co-creation in which humans retain responsibility for meaning, direction, and ethical considerations.

Multilingualism and Heritage Language Contexts

Multilingual and heritage language education pursue interconnected objectives, including linguistic development, identity construction, emotional belonging, and cultural continuity. As such, they extend beyond narrowly defined language instruction and constitute complex socio-educational practices (Montrul, 2022).

Research consistently demonstrates that recognizing and supporting learners' home and heritage languages within school settings contributes positively to identity formation and a sense of belonging (Wang, 2025; Qin & Zou, 2025). Heritage

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language education also functions as a critical bridge for cultural knowledge and intergenerational memory. However, practical implementation is often constrained by limited resources, insufficiently prepared educators, and rigid curricula; consequently, successful initiatives frequently rely on individual teacher effort rather than systemic support (Alejan et al., 2021; Singh, 2025).

Pedagogically, cross-linguistic strategies, collaborative learning, and culturally integrated tasks effectively leverage learners' linguistic repertoires as assets rather than obstacles (Siregar, 2024). Digital technologies, including AI, can further support multilingual expression and access to resources; however, their effectiveness depends on strong alignment with instructional design (Li et al., 2026).

Within this context, AI-mediated storytelling offers distinct advantages. It facilitates multilingual expression and translation, centers diverse cultural voices, and provides safe spaces for identity and experiential sharing. Ideally, it links language development with cultural identity; however, this potential can only be realized through intentional, learner-centered pedagogical design.

Intergenerational Memory and Cultural Transmission

Intergenerational learning is a bidirectional and interactive process in which narrative plays a central role. Cultural studies consistently emphasize that storytelling about personal experiences, family histories, and community heritage enables the transmission of knowledge, values, and collective memory across generations (Vassiliadis, 2026).

Cultural memory is not static; rather, it is continuously constructed and renegotiated through everyday narratives and social interactions. Stories both document and reinterpret the past, shaping present identities and cultural understandings. Narrative thus functions as a key

mechanism linking individual experience to collective memory (Horvat et al., 2025; Trichopoulos et al., 2023).

In educational contexts, incorporating intergenerational narratives enhances learners' sense of belonging and deepens cultural understanding. Such practices also foster dialogue, empathy, and mutual respect across generations (Batista et al., 2024; Stewart et al., 2025), transforming classrooms from spaces of knowledge transmission into communities of shared experience.

AI-mediated digital storytelling expands these possibilities by enabling multimodal recording and preservation. It transforms orally transmitted memories into durable and shareable digital resources, thereby creating more accessible and interactive pathways for cultural continuity.

Pedagogical Anchors: TPACK and TAM

The effectiveness of AI-supported storytelling depends on the coherent integration of technology and pedagogy, for which the TPACK and TAM frameworks provide valuable analytical perspectives.

The TPACK framework (Technological Pedagogical Content Knowledge) emphasizes that effective technology integration requires the intersection of subject knowledge, pedagogical knowledge, and technological knowledge, rather than superficial tool adoption (Lim et al., 2021). In language education, this implies that AI must be intentionally aligned with narrative and language-learning objectives, rather than used as a generic instructional aid.

The TAM framework (Technology Acceptance Model) focuses on user adoption, suggesting that technology is more likely to be embraced when it is perceived as both useful and easy to use. When teachers and learners recognize AI tools as educationally beneficial and operationally accessible, their willingness to adopt such tools increases significantly (Li et al., 2024; Han & Sa, 2021).

Together, these frameworks highlight that sustainable AI-mediated storytelling depends not

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solely on technological capability, but on effective instructional design, teacher competence, and positive user experience.

Ethical and Design Considerations for AI-Mediated Narratives

Ethical considerations are integral to the use of AI in narrative practices. Key concerns include ambiguous authorship, algorithmic bias, data privacy risks, and the marginalization of minoritized linguistic and cultural voices (Bibi, 2024; Adel et al., 2024; Zhu et al., 2025).

For example, excessive reliance on AI-generated content without transparency may undermine learners' creative agency. Pedagogical design must therefore prioritize the visibility and recognition of human contribution. Furthermore, because AI systems reflect the biases of their training data, outputs may privilege dominant cultural perspectives, potentially marginalizing minority languages and cultures (Zhu et al., 2025).

To address these issues, classrooms should establish clear ethical guidelines. Educators should provide developmentally appropriate explanations of how AI systems function (Gusetti et al., 2024), enabling students to understand these tools rather than treating them as opaque "black boxes." Learning environments should also encourage learners to critically evaluate, revise, and refine AI-generated outputs in order to maintain personal voice and intentionality. Additionally, institutions should define explicit usage policies that clarify expectations regarding AI collaboration, attribution, and academic integrity.

Issues of technological equity must also be considered, as unequal access to AI tools may exacerbate existing educational disparities (Berson et al., 2025). Ethical AI integration therefore requires safeguarding human creative agency while promoting fairness, inclusivity, and cultural respect.

Conclusion

This study proposes a conceptual framework that positions AI as a narrative mediator. Within this model, AI supports translation, content generation, and multimodal enhancement, while humans retain ultimate authority over meaning-making, interpretation, and creative decision-making.

In practice, AI-mediated storytelling demonstrates considerable potential in multilingual education, intergenerational memory transmission, and cultural heritage preservation. It can enhance linguistic proficiency, increase learner motivation, and strengthen cultural belonging. However, these outcomes are not automatic; they require human-centered pedagogy and explicit ethical guidance.

For classroom implementation, three key principles are recommended. First, educators should employ AI transparently and judiciously to maintain learner trust and uphold academic integrity. Second, instruction should intentionally support multilingual and multicultural expression, thereby centering diverse linguistic and cultural identities. Third, teachers should provide learners with sustained opportunities to engage in authentic narrative practices and community-based learning.

Future research should examine how teachers and learners negotiate creative ownership in AI-supported contexts and how collaborative systems influence identity formation and belonging. These questions warrant longitudinal and empirical investigation.

Ultimately, AI-mediated storytelling is not merely a technological intervention; it represents a humanistic pedagogical approach that reconnects language, meaning, and memory across linguistic, cultural, and generational boundaries.

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Review

From Tool to Co-Author: A Review of Artificial Intelligence and Human Expression

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Abstract

The growing combination of generative AI systems in creative and communicative processes has challenged the traditional lines between human and machine voices. This review paper examines how AI-based NLP (natural language processing) and text generation technologies are changing authorship, creativity and linguistic identity. The study focuses on three major research questions: (1) How do current AI tools reshape human linguistic and artistic expression? (2) What ethical and epistemological challenges emerge from AI-assisted creativity? (3) In what ways do human-machine collaborations redefine concepts of authorship and authenticity?. This paper uses a systematic literature review approach, combining findings from recent researchers in linguistics, digital humanities and media studies. The review of these studies

showed three major trends: the increasing acceptance of AI as a creative partner rather than a tool; growing ethical concerns over authorship, bias, and intellectual ownership; and the emergence of hybrid genres combining human and algorithmic voices. The paper concludes that AI-generated words need a redefinition of creativity as a distributed and co-constructed process, where agency and authorship are negotiated across humans and machine boundaries. The implications for the paper include the need for updated ethical guidelines that should clarify authorship, responsibility, and transparency in AI-assisted creativity. It also put an emphasis on the importance of AI literacy across disciplines, as human-machine collaboration is re-defining creativity into a shared and distributed process.

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Keywords: Generative AI, Natural Language Processing, Authorship, Linguistic Identity, Human-Machine Collaboration, Digital Humanities

Introduction

The advancements in the field of Artificial Intelligence have introduced the innovative ways in which language is produced, interpreted and circulated. Recent developments in NLP (Natural Language Processing), specifically large language models, capable of generating sleek and smooth contextual appropriate and diverse linguistic tests have expanded the role of AI. These roles are developing beyond computational assistance into areas and domains that were at one time regarded as pure humanistic like creative writing, artistic expression and communication. (Floridi and Chiriatti, 2020; Holzner et al., 2025). Consequently, AI systems are not just supporting human expressions but are participating increasingly in meaning making.

Previously, writing tools and communication were seen as extensions of human intention that provided expressions without challenging the notion of human authorship. AI generative systems are trained on a large scale of textual data that shows a qualitative shift rather than simplifying the linguistic production. These AI systems are generating content, imitating literary styles and are combining linguistic patterns. (Bender et al., 2021). It is often argued by the scholars that this shift marks a transition from AI as a neutral instrument to AI as a creative collaborator, that prompts the reassessment of how agency and intention are distributed within the creative processes (Shneiderman, 2020; Linares-Pellicer et al., 2025).

These given transformations and shifts have increased the debates about authorship, creativeness and linguistic identity. Traditional models of creativity often emphasize originality, intentionality and individual genius and authorship has

long been rooted in human mind and accountability. As a result, creative processes are appearing not only as a singular human act but also as a co-constructed process that emerges from human-machine interaction (Devis et al., 2015).

In this light, this review papers aims to examine the evolving relationship between AI and human intelligence regarding creativity and use of language styles. The research is systematic review in nature and the study blends research from linguistics, digital humanities, media studies, and AI ethics to answer research questions: (1) How do current AI tools reshape human linguistic and artistic expression? (2) What ethical and epistemological challenges emerge from AI-assisted creativity? (3) In what ways do human-machine collaborations redefine concepts of authorship and authenticity?

After observing main trends and analytical frameworks, this paper argues that generative AI reflects a transition from tool based assistance to more collaborated and co-authored expression. It argues that in the era of AI creativity should be seen as a collaborative process and it calls for stronger ethical frameworks across different disciplines (Holzner et al., 2025; Linares-Pellicer et al., 2025).

Methodology

This research article uses literature review methods that are systematic in nature and answers how generative artificial intelligence recreates human authority, style of language and creativeness. In order to provide clear, rigorous and reproducible research from multiple disciplines, a systematic review approach is used. Given the conceptual and ethical nature of research questions, this review focuses on qualitative and theoretical patterns rather than statistical meta-analysis. The review integrates research from linguistics, digital humanities, and media studies, and AI ethics, that reflects the interdisciplinary nature of AI-mediated creative processes.

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Results and Discussion

The analysis revealed major trends that collectively address the study's research questions and demonstrate a shift toward understanding AI-mediated expression as a distributed and co-constructed process.

From Tool to Creative Partner: Redefining Creativity

Among the reviewed studies, a consistent finding is the re-conceptualization of AI from a functional tool to a creative partner. AI systems not only assist with linguistic tasks but actively contribute to ideation, stylistic variation, and narrative development. Research in the computational department and human interaction with computers has created outcomes emerging from interaction of humans with AI systems. (Devis et al., 2017) These findings suggest a theoretical shift away from human-centric models of creativity to collaborative frameworks in which work is shared. These systematic reviews indicate that AI-enhanced is most effective when humans retain control, which reinforces the view that AI extends human creativity rather than AI replaces human creativity. (Holzner et al., 2025). This challenges the traditional assumption that creativity is only a human trait.

Empirical studies further demonstrate that generative AI can support early-stage creative processes by offering alternative perspectives and expanding the space of possible ideas. For example, Chen et al. (2025) show that generative models play a significant role in conceptual design by assisting humans in redesigning problems and generating new directions in designs. Similarly, Rafner et al. (2023) argued that creativity in the era of AI is best understood as a hybrid cognitive process, where human judgement and machine-generated suggestions interact dynamically. These perspectives support a deconstruction of creativity as a distributed process and rather than attributing creative agency solely to either

humans and machines, the work shows the interaction, iteration and co-construction.

The literature demonstrates that generative AI has a vital impact on linguistics and artistic expression. Studies report that AI-generated text can replicate various range of genres, registers and stylistic conventions, and it often archives the levels of fluency that can be compared to human-authored texts (Floridi and Chiriatti, 2020) This capacity has seen increased integration of AI into creative writing, journalism, academic communication, and digital media.

However, the findings also highlight tensions between innovative methods and how to standardize them. Various studies warn that AI-generated language tends to reproduce dominant linguistic patterns that are embedded in training data, which can lead to stylistic homogenization and reduction in linguistic diversity. (Bender et al., 2021).

Ethical Concerns: Authorship, Bias, and Responsibility

Along with the growing acceptance of AI as a creative collaborator, ethical concerns emerge as a dominant theme in the literature. One of the most important challenges is authorship and responsibility in creative work that is assisted by AI. The literature examining perceptions of AI-generated writing revealed significant uncertainty regarding the issue whether AI can or should be considered an author, and how the responsibility for content should be assigned (Formosa et al., 2025)

Systematic reviews further highlight the ethical risks associated with bias and representational harm in generative AI systems. Afreen et al. (2025) demonstrate that generative models often reproduce social, cultural, and linguistic biases that are embedded in their training data, raising concerns about fairness in the outputs produced by AI.

In educational and creative contexts, transparency has emerged as a key principle. A hybrid systematic review by Arar et al. (2025) emphasizes

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the need for clear exposure of the AI environment in research and writing to maintain trust, accountability and research integrity.

Emergence of Hybrid Genres and Co-Constructed Expression

A third most significant trend observed in the review is the development of hybrid creative forms that blend human and AI voices. Research in creative and professional work shows that AI is now a regular part of files like literature, design, and the arts. The new generated genres are difficult to distinguish as human authored or machine authored (Tsao et al., 2025)

These hybrid forms after development questions the standards of originality and authenticity. As the line between human and machine voicing has become unclear and blurred, creativity is now seen as a mixture of technology, culture, and institutional contexts rather than an individual act.

Synthesis: Creativity as a Distributed and Co-Constructed Process

The review studies, when blended together, show that algorithmic expression requires the basic re-considering of creativity, authorship, and agency. AI does not replace human mind and creativity; instead it has given us the collaboration between humans and machines. This point of view is supported by the range of empirical studies, systematic reviews, and conceptual analysis. These studies in the collection highlight collaboration, negotiation, and shared responsibility.

The significance of this interpretation is both practical and theoretical. Practically ethical approaches and institutional policies are required on urgent bases. These policies clarify authorship, responsibility, and transparency in a work created by AI. From a theoretic perspective, the creative process should be considered a shared process among humans and machines.

Conclusion

This review which is systematic in nature observes the role of generative AI in creative and

linguistic practices. It also considers the aspect of human-machine co-working. It considers how this collaboration redefines creativity, authorship, and ethical responsibility. The findings clearly show a change in scholar's perception of creativity. Creativity is now seen as a shared process rather than as human capability and it is molded by the interaction of humans with machines.

At the same time, the review also demonstrates continuous ethical and epistemological issues. In the legal and in

stitutional frameworks, the questions of authorship, intellectual ownership, and accountability are still unsolved. The major significance of human-AI cooperation is represented by the development of hybrid creative genres. As the collaboration between human and machine are intertwining frequently, the traditional distinctions like author and tool, originality and derivation no longer fully hold up. This shift highlights the need for updated views about creativity as thoughtful, rational, process-oriented and shaped by wider socio-technical systems.

On the whole, the review article suggests that gen AI does not reduce human creativity but it reshapes it into something more collaborative and negotiated. Future research should focus more on empirical studies. These studies should include the creative process, how the audience reacts to it and how various cultures engage with these changes in order to understand how human intelligence and creativity are evolving in this increasingly algorithmic world.

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Conceptual Paper

In the Footsteps of a Renaissance Figure

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Abstract

Luigj Gurakuqi is one of the most distinguished personalities of our national, educational, and cultural movement at the end of the National Renaissance and the beginnings of Independence. A major polyhedral figure: politician and diplomat, distinguished statesman, linguist, poet and prose writer, aesthetician and literary critic, pedagogue and textologist, economist and financier, orator, man of culture and science, of word and action, of the pen and the rifle. Above all, he was a great patriot, ardent lover of the homeland, co-founder of the Albanian state of the modern era. Luigj Gurakuqi published many poems distinguished for their patriotic content, lyricism, and technique of versification. Through his articles he also made an important contribution to Albanian aesthetic thought and literary criticism. In the personality of Luigj Gurakuqi stands out a broad and encyclopedic culture. He was a profound connoisseur of the cultural heritage of his own people and of classical Roman and Latin culture.

The history of the country and world history were a permanent object of his studies. He knew archaeology and the economic and financial sciences, the national and European educational-pedagogical heritage. Gurakuqi was a polyglot. Besides Albanian, he mastered Latin, Italian, Turkish, and French; he knew Greek, German, and English. He has the merit of being among the principal drafters of the educational and cultural program of our national movement for autonomy, freedom, and independence. By fervently propagating the traditions of our people, he had a clear aim: that Albanians should know their own values, should know and appreciate the values of their own blood. He condemned blood feuds as a harmful act and as a means incited by foreigners in order to divide the Albanian people.

Keywords: Personality, patriot, culture, poetry, Albanian, people, national, renaissance, literature.

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Introduction

The biography of Luigj Gurakuqi is simple, painful, even tragic. He was born in Shkodër, where he was also educated. He completed his higher studies in Italy, initially in medicine and later he would dedicate himself to the natural sciences. But the desire to deal with society and its problems caused him not to practice the profession he chose.

Although his life was unjustly taken at the age of 45 after an assassination attempt, he left deep traces in the culture of the Albanian people.

Together with Ismail Qemali he participated in the raising of the flag in Vlora in 1912. He took part in several of the governments that were often formed from the day of Independence until 1924.

He continuously stood out as one of the embodiments of the democratic spirit, at a time when democracy among us was endangered both internally and externally. He often unmasked the exploitative aims of the feudal lords and rulers of the time in his speeches and articles.

He also unmasked the predatory aims of world imperialism in the Albania of that time. But Luigj Gurakuqi was also one of the fighters of our National Renaissance who began his political and patriotic activity also as a poet and publicist, spreading the voice of the call to war against the age-old occupiers and standing in the front lines of the struggle.

Nevertheless, Luigj Gurakuqi is more a fighter-tribune than a poet, more a politician and publicist than an artist. Like many writers of that time, he devoted all his creative inclination to the issue of bringing the country out of its long enslavement; he did not have enough time to engage in literary creativity, although he began his life path, not so long, with such ambitions.

The great problems of the time accompanied him from a young age. While he completed the lycée in Calabria and later the university in Naples, he understood that those were years of struggle

with pen and rifle for the liberation of the enslaved homeland, therefore the awakening of the oppressed and culturally poor compatriots had to be carried out.

The great battle for the rebirth of the homeland had to begin. Meanwhile, the maturity of age showed him the difficult road of spiritual and sometimes even physical battles for the liberation of the country. At the same time, he would fight against the Ottoman occupiers and against the internal enemies: against the rulers and feudal lords who placed individual interest above the interest of the country, and against pseudo-patriots who pretended to be patriots and against pseudo-intellectuals who pretended to be intellectuals.

From early on he became involved in political life, which gradually distanced him from poetic creativity and brought him closer to journalism. Something similar did not happen only to Luigj Gurakuqi; other writers of the last years of the National Renaissance and of the period between the two world wars also embraced journalism for the more direct treatment of the issues of the day.

A Poet Who Precedes Journalism

Luigj Gurakuqi, still young, before reaching 20 years of age, wrote his first poems, which he began to publish in 1898 in *Albania* of Faik Konica¹, which at that time was published in Brussels and more rarely in the *National Calendar* in Sofia.

Among his verses are woven motives similar to those of our National Renaissance: first of all love toward the homeland, the hymnization of the best-known figures such as Skanderbeg, Pyrrhus, Gjin Bua Shpata as great heroes of the past and the patriots who were engaged in spreading education and culture as educators of the nation; these are the portraits of his patriotic poetry.

With the good desire to awaken the Albanians dulled in slavery and to return their pride and touch their dignity, he writes:

¹Luigj Gurakuqi, *Vepra të zgjedhura (Selected Works)* with a preface by Mark Gurakuqi, Naim Frashëri, Tirana, 1961, p. 6.

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*"I wished, poor as I am, to be able to sing
 In a lofty manner, to kindle the brothers;
 To strengthen them in love of the
 homeland,
 Especially the younger generation."
 (To Mr. Gegë Postrippa)¹*

Likewise, as with many other writers of our Renaissance, Luigj Gurakuqi was destined by ill fate to live outside the homeland, with or without his desire. Longing for parents, sisters and brothers, friends, and loved ones overwhelms him deeply. Just like Ndre Mjeda and Filip Shiroka, with warmth and exhausting longing he describes his birthplace, Shkodra.

Although he studied in Italy, Luigj Gurakuqi never forgot that besides education, he had to work for the good of the homeland and together with other patriots seek jointly the paths and possibilities for the salvation of the country from the centuries-old yoke.

Two problems troubled him, against which he would raise his voice later as well: fratricide and the indifference of a part of the Albanians devoted to personal interests:

*"They think only of gaining,
 And of killing one another."
 (To Mr. Gegë Postrippa)²*

He understood very well the mission of the spoken and written word and did everything possible so that the Albanian language would remain preserved and untouched as the principal means for an untouched identity, that it should be an unconquerable pen before which all the assimilating waves of sultans and pashas had broken.

In emigration, Gurakuqi began to engage in poetic creativity not so much driven by inclination as by the demands of the time, when versification had become a way of expressing patriotic and freedom-loving feelings and influencing the feelings of others.

Besides other things, all the magazines and newspapers of that time are full of various poems written about everything: national and religious celebrations, schools, letters, good mothers, teachers, historical exemplars, courageous boys. Among the verses of Luigj Gurakuqi we often find swallows that fly and tell the emigrants the condition of the homeland, what is happening in Albania, what appearance the city of Shkodra had taken, what people think, etc. His swallows cannot fly from Albania without returning to Fusha e Rrmajit to see the graves of our ancestors, suffering but proud in their endurance.

The epistolary character of his poetry shows that it was both his pain and his remedy. A sincere versifier, burning from longing for his birthplace. Here is how he expresses himself in the poem *Desire*:

"To embrace my kin and friends."³

Also in the other poem *To My House*:

"In foreign lands, suffering and languishing."⁴

This longing toward the birthplace and close people, which in some of our Romantic poets was expressed with more manly and optimistic colors, in Luigj Gurakuqi has turned into a softened feeling, lowered to the level of sentimentalism.

We must emphasize that Luigj Gurakuqi did not criticize only his political opponents, but also Albanian poets with whose poetics he did not agree. He was convinced that the heroism of Skanderbeg and Pyrrhus, or the love and longing toward the homeland, could be treated and expressed properly only as they had been sung in ancient Greco-Roman poetry.

Therefore, with the exception of Jeronim de Rada, Zef Skiroi, and Gjergj Fishta, of whom he speaks only well, for the others he claims that they have voices like crows, ravens, owls:

¹Luigj Gurakuqi, *Vepra të zgjedhura* (Selected Works), Naim Frashëri, Tirana, 1961, p. 122.

² Ibid, p.122.

³ Ibid, p. 131.

⁴ Ibid, p. 159.

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“Do you hear, friends, how they sing like
 crows,
 Today’s Albanians, see how they rage,
 Like sparrows when they have fallen into
 carrion.
 But can it be that thus, as these are doing,
 there will be sung
 The heroisms of Gjergj worthy of a Tyrtæus
 For whom Aeneas and Achilles could be
 praised?”¹

To Gurakuqi, the level of Albanian poetry appeared low; therefore he reproached the poets by comparing it with ancient poetry or European Romanticism. Enchanted by the verses of Homer, Pindar, Sappho, Anacreon, Virgil, Catullus, Tibullus, Propertius, his understanding of contemporary poetry was not the proper one. He knew classical grandeur and mixed it with Johann Wolfgang von Goethe, Friedrich Schiller, and Lord Byron. He saw Albanian poets as possessing truncated culture. Equipped with solid knowledge of classical literature, he did not refrain from showing off his own culture somewhat.

But beyond these reproaches, his great desire was that his people should have poets of the caliber of the poets of antiquity. *The Pledge of Honor* he dedicated to the poet who seemed to him that he would become an Albanian Tyrtæus.

Luigj Gurakuqi, the First Codifier of Albanian Metrics

He published the well-known work *Versification in the Albanian Language* in Naples in 1906. The viewpoints artistically expressed in the poem *The Fairies’ Decade*, he attempted to express artistically in this work, which he published continuously in the magazine *Albania*. Benlœw’s book on rhythm and rhyme in Albanian folk epic poetry was not some support that gave very great

encouragement either from the viewpoint of the issues raised or the final solutions.²

“ Nevertheless, today Luigj Gurakuqi is rightly regarded as the first Albanian who attempted to codify Albanian metrics.”³

The taste of this late poet had advanced after the theoretical and aesthetic achievements of his time.

Although more by nature a critic than a poet, he had not formed proper viewpoints on poetry as a form of artistic expression, also because literature had not directed his interest toward it. He thought that Albanian poetry was in the phase of its qualitative beginnings or as he said “*still in swaddling clothes.*”⁴

Luigj Gurakuqi divides poets as they had been divided in idealist and Romantic theory since Plato onward: into versifiers, poets, or poets and rhymers. He also gave interesting thoughts on the genesis of poetry. He asserts, like all Romantics, that poetry and song are the result of man’s need to express himself.

With his theoretical work Luigj Gurakuqi attempted to canonize the development of our poetry, which would expand with different currents especially during the time between 1912 and 1940. One of these currents would be the non-principled classicism of the priest-poets of Shkodra, among them Gjergj Fishta and Ndre Mjeda.

Gurakuqi as a Publicist

In the verses of Gurakuqi’s poems, the problems he grasps, their ideological content, factual character, and patriotic inclination have fused Gurakuqi the poet with Gurakuqi the publicist. We cannot overlook the fact that in short literary-artistic prose appears Gurakuqi the publicist, in the sketches

¹ Luigj Gurakuqi, *Vepra të zgjedhura (Selected Works)*, Naim Frashëri, Tirana, 1961, p. 152-153.

² Louis Benlœw, *Du rythme et de la rime dans la poesie epique des Albanais*, Bucharest, 1898.

³ *Historia e letërsisë shqipe II (History of Albanian Literature II)*, Tirana, 1959, p. 388.

⁴ Luigj Gurakuqi, *Vepra të zgjedhura*, Naim Frashëri, Tirana, 1961, p. 250.

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"In the National Garden", "Longing for the Homeland", and "Late Repentance". The prose "In the National Garden"

is written in an elegant style, which influences the awakening of consciousness through the creation of an emotional state in the reader.

The author evokes the past, historical reality, with the aim of serving his compatriots as an example of the resistance and struggle of Albanians for freedom and national rights.

At 16 years of age, encouraged and inspired by his teacher of the Albanian language, Jeronim de Rada, alongside poetic and literary prose creations, he also wrote articles that were welcomed by the Arbëresh and Italian intellectual circles. He began his journalistic activity with Konica's *Albania*. The scholar Vili Kamsi, who compiled the complete bibliography of Konica's magazine, catalogued 58 titles of writings under the pseudonyms of Luigj Gurakuqi: Jakin Shkodra, Lekë Gruda, and Peter and Paul.¹ The fund of Gurakuqi's journalism is rich and with healthy national content.

Gurakuqi also wrote in the Italian language under the pseudonym G. Vico in the magazine *"La nazione albanese"* during 1897-1924, which was published by the Arbëresh Anselmo Lorecchio, in the Italian periodical *"L'Espansionata"*, but also in the magazine *"Albania"* the review *Cenni sul costume di Scutari d'Albania, Proverbi e Favole*.²

Anselmo Lorecchio welcomed Gurakuqi's writings, but Gurakuqi's presence in the magazine *"Albania"* worried him; he even accused him as a collaborator of the magazine *"Albania"*, which was in the service of Faik Konica and playing Austria's game.

To this absurdity Gurakuqi responds in the article *"Albania"* and *"The Bashkimi Society"*³, where he argued that *"Albania"* was an entirely national newspaper and gave valuable

contribution also for the treatment of issues of language, literature, and national culture, and that Lekë Gruda felt honored to express his thoughts in the columns of that Albanian periodical and in the Albanian language.

He continued to publish articles, journalistic prose, pamphlets, and essays in various newspapers.

The Oratory of Luigj Gurakuqi

Master of the pen, well-prepared and spontaneous, Luigj Gurakuqi knew how to intertwine the written word with that expressed in gatherings not only in order to penetrate the minds and hearts of people, but also to propagate and defend his ideas before the opponents of the nation and Albania.

Academician Rexhep Qosja states that:

*"Luigj Gurakuqi is one of the fighters of our National Renaissance who began his political and patriotic activity also as a poet and publicist, spreading the voice of the call to struggle against the centuries-old occupiers and himself standing in the front lines of that struggle. Luigj Gurakuqi is much more a fighter-tribune than a poet, much more a politician and publicist than an artist."*⁴

His lectures paid deep attention to the problems he would raise; he discussed them adapted to the cultural level of the environment and its interests.

Anti-conformist and anti-demagogic, he was often found in the sights of the many politicians of political life before the last war. As a defender of free and just speech, he was surrounded by many enemies who hated him because he did not think like them.

They hated him precisely for his oratory. His intellectual superiority and progressive ideas brought him many admirers and equally many opponents. Continuously he was the polemicist

¹ Villy Kamsi, *Bibliografi kronologjike (Chronological bibliography)*, ALBANIA, 1897-1909, Shkodra, 2008, p. 122.

² Revista "Albania" (Journal "Albania"), Brussels, 1900, no. 4, p. 94-95.

³ Revista "Albania" (Journal "Albania"), Brussels, 1905, no. 2, p. 47.

⁴ Luigj Gurakuqi, *Vepra të zgjedhura (Selected Works)*, Prishtina, Rilindja, 1969, p. 9.

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with prime ministers, ministers, deputies, journalists, beys and little beys as Fan Noli called them, with true and false intellectuals, newspaper directors and finance directors. His whole life passed with sword in hand.

Quite well known already are a series of speeches of Luigj Gurakuqi such as the one held on the opening day of the Normal School of Elbasan; the speech before the national gathering in Korçë on March 14, 1914, the day of the liberation of that city; the debates and replies in the National Assembly during the years 1921–1924, where his talent, ability to convince the audience, strength of rhetorically argued speech, and eloquence shone. Full of figures, tonalities, and reticences, Gurakuqi's oratory stood out above others.

The inauguration of the first Albanian Normal School in Albania and Elbasan, a marked event of the year 1909, was and remains one of the most notable events of the school and the history of our nation.

With a solemn, calm, and enchanting tone he presents the aim of the Normal School, emphasizing:

*"..From this school will come forth those philanthropic men who, like Orpheus and Amphion, with the wisdom and sweetness of their words and counsels, will tame the wild beasts, will move the rocks and cliffs, will civilize and bring people closer together."*¹

After mentioning the history of Albania, he conveys the ideas and ideals of the Renaissance figures, seeing the Normal School and the future teachers as national missionaries: *"Here the Tosks and the Ghegs will merge, will mingle... will become one; ...here the Albanian language... will take one form, one common face."*²

Impressive is the rhetoric delivered in Vlora in the days of the declaration of Independence.

Through episodic descriptions of the path traversed, the heroic struggle of our people, Luigj Gurakuqi invites Albanians: *"...to unite, to come together, to become one..."*³

Among the most powerful speeches in parliament by Luigj Gurakuqi are those for the defense of the Albanian population of Kosovo, where he spoke with full anger and indignation about the Serbian massacre against our brothers. As representative of the opposition in parliament and member of the Liberal Party, he promised and remained faithful to the voters of Shkodra in the National Council:

*"The homeland is the most precious thing we have in life; it is the blessed land where our nation lives, where the bones of our grandfathers rest, where we were born and raised, where we shall be repeated with our sons and grandsons, bound also like us by language and brotherhood."*⁴

Conclusion

An orator in life, an orator also in poetic creativity. A good connoisseur of ancient Greek and Roman literatures, even more of them than of contemporary national literature, Luigj Gurakuqi became a slave of the classicist ideal of poetry. The chains that Apollo placed upon him, he did not tire of removing; indeed he wished to justify them even in the 20th century.

The identification of the Romantics with the "universe," this beloved mother from Jean-Jacques Rousseau, Lord Byron, Percy Bysshe Shelley, Alphonse de Lamartine, Alessandro Manzoni and Giacomo Leopardi, De Rada and Naim Frashëri onward, was also carried out by Gurakuqi, fascinated after the bosom of the universe.

But the adoration of the Fairies of Parnassus he would pour into verses for two of them: Euterpe and Polyhymnia. In love with them, he would

¹ Gazeta "Dielli", (Newspaper "The Sun"), no. 40, 31.12.1909, p. 3.

² Ibid, p. 3.

³ Gazeta "Përlindj'e Shqipëniës", (Newspaper "The rebirth of Albania"), no. 26, 1913, p. 2-3.

⁴ Gazeta "Besa shqiptare", (Newspaper "Albanian Besa"), Shkodra, March 24, 1921, p. 3.

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pour out his adoration in *The Fairies 'Decade* and *The Pledge of Honor* with names from mythology. The value of his own poems he based mainly on the artistic displacement of words and on diction. Under the influence of the Romantics, he expresses himself with their means and feelings; under the influence of the Roman and Greek classics, he adhered to the norms of their poetry. Therefore from Parnassus, at times a Romantic breeze blows, and at times a classicist one. The language used, at times indirect and at times archaic, also has a strange punctuation which in many cases differs from the writers of that time. Luigj Gurakuqi was an activist of culture and a precious exemplar of the history of our people. He will remain as one of the most distinguished fighters for the independence and freedom of the Albanian people.

At the time when he wrote, we had greater need for people capable of comprehensive political, cultural, and patriotic activities than for people who thought only about poetry. He would stand out as one of the intellectuals most dedicated to opening the doors of modern civilization in Albanian life and culture.

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Conceptual Paper

Italophony in Albania Today: Prospects and Critical Issues

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Abstract

Italophony in Albania today is facing a new reality. On the one hand, Italian is considered a cultural bridge and a linguistic contact associated with modernity, educational quality and the possibility of professional mobility; on the other hand, the English language is taking on an increasingly dominant role as the language of the global economy and technology. The younger generations today display asymmetrical bilingualism, with a passive or limited knowledge of Italian, which is often replaced by English in academic and work contexts.

This paper aims to present and analyze the current situation of Italian-speaking people in Albania and the reasons for its transformation from a language of "affection" and closeness to a language of opportunity and European partnership.

We will focus in more detail on the issues of the sustainability of italophony, which requires a re-thinking of linguistic and cultural policies aimed at promoting Italian not only as a language of historical memory and emigration, but also as a contemporary resource for education, research and cultural tourism.

Keywords: italophony, linguistic-cultural contact, linguistic and cultural policies

Introduction

Italophony in Albania is a sociolinguistic phenomenon that must first and foremost take into account the centuries-old history of relations between Italy and Albania; a history of intense political, economic, cultural and social relations.

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Italian language and culture have penetrated Albania at various times in history.

The 1930s were a particularly significant period in which Italian and Albanian were in intense contact. During this period, Italian was taught in Albanian schools as a language of culture. In Albania's major cities, Italian was introduced as a compulsory subject in schools. Italian teachers were present in Albanian schools to teach language, culture, art and science. Students spoke Italian fluently. During this period, the Italian presence in Albania was particularly focused on economic development. Italy built roads, banks, aqueducts, government infrastructure, etc. in Albania. Many scholars, geographers, engineers and agronomists carried out missions in Albania during that period. Italian was the language of communication and dialogue. The first Italian-Albanian dictionaries, bilingual newspapers and radio broadcasts on Albania were issued.

A second historical moment concerns the period from 1945 to 1990. Albania severed all political and cultural ties with Italy and the Western world. It was a dark moment in Albanian history. In the 1980s, when I began a university course in Italian Language and Culture, Albania was politically, economically and culturally isolated. We were not allowed to travel and get to know Italy up close, we knew little about the country across the sea; however, for us young students, the interest was so great that the only educational resources were a few Italian grammar books.

For the Albanian population of large cities such as Tirana, Durrës, Vlora and Shkodra, radio, cinema and television kept alive their interest in Italian language and culture. It is well known that, in communist Albania, the regime had severed all ties with Western culture. It had banned everything. It had also attempted to interrupt the RAI television signal, but in Albania people listened to Italian radio and, for those who were more fortunate, watched Italian television. Through Italian music, the language arrived and it was possible to speak and understand basic Italian. In cinemas, Italian films were the most widely distributed, especially neorealist works, films about the Mafia or those about mythological heroes. With the few

Italian books that circulated secretly, people learned Italian. The Italian language was considered the language of expression of a great culture. In return, classical Italian literature was among the most translated in Albania at that time. Italian radio and television, the only linguistic and cultural vehicle at that time, influenced the way Albanians thought and lived.

We have now reached the third moment. In the 1990s, thousands of Albanian families embarked on a journey and, in a thousand different ways, arrived in Italy. With the little Italian they knew and the dream of building a better life, many Albanians settled there. The Italian language was primarily the means of communication that helped Albanians to be accepted into Italian life. Language mastery allowed them to integrate quickly into society. On the other hand, Italian became not only the language of the host country, but also a bridge that reconnected the two peoples in a relationship of friendship and collaboration.

Returning to my personal experience, in the 1990s I found myself teaching Italian language and culture in Albania's most "Italian" city: Vlore. The history of the city of Vlore recognises the historical fact of Italian presence since the 1920s. Fishermen from Puglia, Italian workers, technicians, engineers, military personnel, etc. lived and worked in Vlore, coming into contact with the local population. During this period, there was a spontaneous Italian-speaking community in Vlore. Then, in the 1930s, an Italian primary school was established in Vlore, which aimed to teach all subjects in Italian. All this heritage was passed on to the people of Vlora, who loved Italian and spoke it too. It is the most important city in southern Albania and the country's second largest port after Durrës. Geographically, it is the Albanian city closest to Italy. Italians feel at home in Vlore. Italian visitors never tire of talking about its natural beauty, archaeological sites and landscapes, the authenticity of its cuisine, the proud reserve of its people and the incredible linguistic skills of its young people, especially in Italian. Franco Romano At the aforementioned university, as well as at various foreign institutions, he

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has held numerous courses for teachers of Italian as a second language, professor of Italian language and culture at the University for Foreigners of Perugia, recounts his first visit to Vlora:

When I first arrived in Vlore twenty years ago, alone and disoriented, it was already evening. I wanted to let my family know I had arrived, but mobile phones were not yet commonplace—in fact, they were undoubtedly considered quite alien devices—so I wandered around the semi-deserted streets of the city centre in the hope of finding a public telephone. I hadn't been able to call from the hotel: there were no phone boxes and the reception didn't have a system for counting calls. Just as I was beginning to lose hope of getting in touch with my family, I met a group of men walking along the main street. I plucked up my courage and asked them where I could make a phone call. As if by magic, one of the group, who understood Italian even without speaking it, took a mobile phone out of his pocket, dialled the number for me, let me talk and then, with extreme naturalness, put his tiny, rounded rectangular device back into his pocket, not without revealing a hint of haughty and at the same time smug self-importance. Needless to say, the Albanian "man with the telephone" not only refused to be paid, but also declined my invitations to have a drink together. And so did his friends. Instead, he greeted me cordially, joined his companions and disappeared with them into the evening mist and the dust of the road beaten by the November wind.

Let us now turn to the present day. Italian is a daily tool of communication and work for Albanians. Italians have been among the first foreign investors in Albania. The country is open to Italians in all sectors and fields, particularly in business. It should be noted that the vast majority of businesses, shops and various establishments already trade with Italian companies, sourcing various types of products from Italy, ranging from food to household appliances, technology and industrial machinery.

In recent years, there has been a large 'migratory' flow of Italian citizens to Albania's largest cities,

such as Tirana, Durrës and Vlore. These are entrepreneurs who have chosen to relocate their companies and business models to Albania. Thirty-five years ago, no one would have imagined that Italian citizens, particularly businesspeople, would turn their attention to Albania not only to visit its cultural attractions, beaches and natural beauty, but also to live and work there. But what are the reasons for this? For those doing business, Albania offers great opportunities. Albania is one of the non-EU countries (not belonging to the European Union, although negotiations are ongoing) where it is most convenient to relocate the Italian business system. Take, for example, the call centre sector. Attracted by a favourable tax system and a workforce composed mainly of young people who speak Italian — almost always less expensive and less protected by trade unions — there are now numerous call centres run by Italians in Albania.

In Albania today, you find not only entrepreneurs, but also doctors, technicians, builders, architects, chefs, etc. I have contacted some of them who work and live in Vlore. When asked "how do you feel in Vlore", they immediately reply with a smile that they have adapted well and that "Vlore is a simple city to live in". Some feel like they are "in Italy in the 1980s" because Vlore has "an energy that is no longer found in Italy". Others say they "came for a challenge" but ended up enjoying themselves. "You really feel loved here," says another. "I have bought a flat here." 'The landscape is almost similar to Italy's.'

Italian is one of the most widely studied languages in Albanian schools. The teaching of the Italian language has been and continues to be supported by the Illiria Programme, an Italian government project that has been promoting and developing the teaching of Italian as a first foreign language in Albania since 2002. Through this programme, Albanian students have the opportunity to learn about Italian language and culture almost from the beginning of their school career. In the New Memorandum of Understanding between the Italian Ministry of Foreign Affairs and International Cooperation and the Albanian Ministry of Science and Education on the "Illiria

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Programme for the teaching of Italian in the Albanian school system" NOTA 5, it has been agreed to extend and strengthen the teaching of the language through the aforementioned programme, which 'in promoting and strengthening the teaching of the Italian language, will refer to European policies, using available tools such as the CEFR (Common European Framework of Reference for Languages), the European Language Portfolio, the PEFIL (European Portfolio for Language Teacher Education) and the Albanian Qualifications Framework'. NOTA 6

The Illiria programme has proven effective and has improved the quality of teaching. According to data from the Italian Language Portal in the World, created by the Ministry of Foreign Affairs and International Cooperation, 'Albania is the country with the highest number of Italian language students, distributed in particular in local schools thanks to the Illiria Programme, which since 2002 has led to the establishment of bilingual Italian-Albanian sections and Italian language courses in the curriculum in compulsory schools (primary and lower secondary) and upper secondary schools.'

The Italian Cultural Institute in Tirana organises Italian language and culture courses and certifications for all levels. Currently, the Institute's courses are divided into the various levels of proficiency set out in the CEFR. The number of students per class ranges from a minimum of 8 to a maximum of 18. An entrance test is required to place students; at the end of each level, students take an exam that allows them to progress to the next level. A certificate of attendance is issued upon request. In agreement with the University for Foreigners of Perugia, the Institute organises the CELI (European Certification of Italian Language) diploma exams every year. In agreement with the University for Foreigners of Siena, it organises the CILS (Certification of Italian as a Foreign Language) and DITALS (Certification of Competence in Teaching Italian) diploma exams. The challenges of contemporary Italian language use: a critical analysis

Despite its historical prestige, the Italian language in Albania is currently undergoing a rather critical structural reconfiguration dictated by globalisation. While English has established itself as a global language, Italian has not disappeared, but has undergone a paradigm shift: from an "idol language" it has become a functional and technical language. This means that many young people learn Italian purely out of necessity for work, limiting its use to an operational code confined to specific sectors such as marketing or low-cost customer care. This transition risks weakening the language, reducing it to a purely instrumental commercial or technical interface, a "fast" and "dry" Italian language devoid of its deep original cultural content or its emotional and libertarian value. It is necessary to promote Italian as a code for high value-added sectors such as industrial design, architecture, archaeology, quality tourism, culinary expression and medicine, areas in which many Italian professionals operate successfully in Albania.

Ultimately, this transformation highlights three fundamental issues. First of all, the dominance of English and the weakening of Italian, which risks becoming a "second-class" language, used only in informal contexts or in low-skilled jobs such as call centres, losing importance in universities and high-level professional sectors. Secondly, incomplete bilingualism, which allows young people to understand the spoken language well, especially through the internet and social media, but also means that they do not know how to write or use it correctly in formal contexts, in high-level professional or scientific fields. Finally, there is an instrumentalism that reduces Italian from a "language of the heart" or culture to a working tool, a simple technical code for marketing or call centres, ultimately losing all its cultural richness and soul.

Conclusion

Systemic perspectives and new language policies

The sustainability of Italophony requires a radical rethinking of cultural policies. It is no longer sufficient to rely on historical memory or ties linked

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to emigration in the 1990s. Italian must be presented as a language of opportunity and European partnership. At a time when Albania is engaged in negotiations for EU accession, proficiency in Italian becomes a strategic competitive advantage. Programmes such as the Illiria Programme are essential because they institutionalise Italian in schools, using European tools such as the CEFR to ensure certified quality. The challenge is to extend these standards to the entire education system in order to train a bilingual ruling class. Cases such as Vlore, where there has been a spontaneous Italian-speaking community since the 1920s, show that Italian is an integral part of the local identity. This natural linguistic propensity should not be seen merely as a historical curiosity, but as a contemporary resource for cultural tourism. Italians visiting Vlore feel "at home" thanks to the extraordinary linguistic skills of the locals. Exploiting this link can transform Italian into the driving force behind elite tourist hospitality, based on cultural proximity and quality of services.

Italian as a bridge to the future

To paraphrase David Benedetti, there is a silent paradox that runs through Albanian classrooms: 'English is everyone's subject, but it is no one's language'. Italian, on the other hand, has been the language of many in Albania, and for this very reason the challenge is not to prevent the advance of English in educational institutions, but to ensure that Italian maintains its share as the language of modernity and educational quality. The transition must be clear: Italian must move from being the language of the "country across the way" that was watched on television to being a strategic resource for training, research and the economy of the future. Only through strategic transformation.

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Theoretical Paper

Challenges and Perspectives of Translating Emotions into Albanian and English

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Abstract.

Translating emotions represents one of the most complex challenges faced by translators. This theoretical paper argues that emotional translation is not limited to the mere transfer of words but involves the faithful conveyance of feelings, affective connotations, and cultural meanings deeply rooted in each language. The paper highlights specific challenges posed by translation between Albanian and English – two languages that differ significantly in linguistic structure, cultural traditions, and ways of expressing emotions. Through qualitative analysis combining concrete examples from literary and narrative texts, the paper examines obstacles such as lack of direct equivalents for certain emotions, stylistic differences, and culture specific features. It emphasizes translation strategies including explanation, compensation, and linguistic creativity to preserve emotional authenticity. The conclusion underscores the need for translators to maintain

a sensitive, reflective approach to capture underlying emotional energy, thereby ensuring faithful intercultural transmission.

Keywords: translation, English as a foreign language, emotions, challenges, perspectives

Introduction

Translating emotions is an essential and complex field of translation studies. It is not simply a matter of transferring words from one language to another but of faithfully reproducing feelings and affective nuances. The emotional dimension of language is deeply rooted in culture, making the translation of emotions particularly delicate. Each language has its own cultural and historical specificities that influence how emotions are expressed and perceived.

The cases of Albanian and English illustrate these issues particularly well. Albanian, rich in unique

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traditions and expressions, contains emotional expressions that are difficult to transpose into English, an international language with a different structure and expressive palette. This mismatch poses a real challenge for translators, who must ensure they convey not only meaning but also intensity and emotional color.

The objective of this study is to understand how best to translate emotions between these two languages, considering linguistic and cultural constraints, in order to achieve as authentic a translation as possible.

Linguistic Challenges in Translating Emotions

Emotions are universal experiences but mediated by culture, expressed through affectively rich language that varies across societies. Translating emotions involves transmitting these affective experiences from one culture to another, going beyond lexical translation to include affective, contextual, and symbolic dimensions.

Albanian has a flexible syntax allowing different word orders to express nuances of emotions, while English requires a more fixed order. Examples of difficult to translate expressions include "Kam nje zemer te thyer" (I have a broken heart) and "Ma ben zemren mal" (literally "my heart becomes a mountain," equivalent to "my heart swells with pride").

Analysis of Divergent Emotional Metaphors

The images used to convey emotions vary greatly. For example, "M'u ftoh zemra" (my heart cooled) corresponds to "I have grown cold" or "I lost affection." "Kam fluturat ne stomak" has a direct equivalent in English ("I have butterflies in my stomach"). "Po me zien gjaku" (my blood is boiling) also exists in English. However, some expressions like "I'm feeling blue" have no equivalent in Albanian, where one simply says "Jam i trishtuar" (I am sad).

Importance of Cultural Context in Expressing Emotions

In Albania, emotional expression is strongly influenced by values such as family, respect for elders, and hospitality. Saying "kam mall per shtepi" (I miss home) evokes nostalgia and deep connection to the family home – a dimension less present in the English "I feel homesick," which is perceived as more individual and temporary. In Albanian poetry, grief is expressed through nature images: "lotet rrjedhin si shi" (tears flow like rain), while English prefers simpler formulations. Socially, Albanian culture requires emotional reserve in public but values emotional expression at family gatherings. "Te dua" (I love you) is usually reserved for close relations, while in English it can be used more broadly.

Creative Approaches vs. Literal Translation

Literal translation often fails to convey authentic emotional dimension. For example, translating "zemer e thyer" as "broken heart" is lexically accurate but may lose the deeper, communal grief connotation in Albanian culture. Creative approaches – paraphrasing, adaptation – better preserve emotional meaning. For instance, "kam mall per shtepi" can be adapted as "I feel a longing for my home." Translating "Hold your horses" into Albanian requires abandoning the literal calque for the pragmatic equivalent "Prit nje moment" (Wait a moment).

Interdisciplinary Method and Suggestions for Improving Emotional Fidelity

A purely linguistic approach is insufficient. Psychology provides tools to understand emotional impact on recipients; cross cultural and sociolinguistic studies help understand why certain feelings take specific forms depending on context. Suggestions include: prioritize paraphrasing when literal translation fails; integrate notes or explanations for untranslatable cultural nuances; collaborate with native speakers and experts; use authentic bilingual corpora; promote interdisciplinary training (linguistics, psychology, anthropology).

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Conclusion

This study highlights the main challenges of translating emotions between Albanian and English, which extend beyond lexical correspondence to cultural, pragmatic, and emotional dimensions. Syntactic flexibility and metaphorical richness of Albanian, combined with deep cultural differences, require translators to have keen intercultural sensitivity and creativity.

The importance of going beyond literal translation to prioritize contextual and emotional adaptation is paramount. Future research should focus on developing specialized bilingual tools and corpora, training translators in interdisciplinary skills, and integrating AI technologies to facilitate contextual analysis without replacing human judgment.

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Original Research

Translation as a Reconstruction Process of Meaning: An Interdisciplinary Approach and Conceptual Challenges

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Abstract

This theoretical paper examines translation as a dynamic process of meaning reconstruction and cultural mediation, moving beyond simple linguistic transfer. Drawing on previous theoretical studies, the central idea is that meaning is not fixed but intrinsically linked to context, cultural references, and the translator's strategic choices. The paper argues that translation requires a delicate balance between fidelity to the original text (preserving intent, tone, style, emotion) and necessary adaptation for the target audience. The translator is presented as a creative co-author. The analysis explores cognitive and semiotic approaches, the impact of cultural differences, challenges of multilingual contexts, transformations of meaning across time and space, and the relativization of equivalence and fidelity. The conclusion posits that equivalence and fidelity

are relative and contextual, depending on cultural differences, text purposes, audience, and situational constraints.

Keywords: translation, meaning, culture, choice, context, language.

Introduction

Our paper draws on previous theoretical studies that view translation as a dynamic and complex act of meaning reconstruction and cultural mediation, going beyond simple linguistic transfer. The central idea is that meaning is not fixed, but is intrinsically linked to the context, cultural references and the translator's strategic choices. Translation requires a delicate balance between fidelity to the original text – which extends to

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preserving intent, tone, style and emotion – and the adaptation necessary to ensure that the message is understandable and meaningful to the intended audience. The translator is seen as a creative co-author who must make strategic choices. This process involves a deep cultural transfer. The translator acts as a true cultural interpreter, adapting references (idioms, symbols, customs) to avoid misunderstandings and maintain the desired effect. Cultural adaptation is essential in all fields. The complexity increases in multilingual contexts, where the translator must manage the coexistence of many languages and cultural references, sometimes carrying strong political or identity connotations (for example, in Albania). Moreover, meaning evolves over time and space, requiring the translator to be particularly sensitive in adapting classical or historical texts to contemporary sensibilities.

Cognitive and Semiotic Approaches: Translation as Dynamic Meaning Reconstruction

Cultural adaptation is often essential because cultural references, idiomatic expressions, or concepts present in a text do not always have a direct equivalent in the target language. The translator faces a delicate choice: should formal fidelity to the text be given priority, even if that means losing some meaning or effect? Or should a freer adaptation be favored, avoiding misunderstandings but potentially modifying aspects of the text? This dilemma is particularly acute in sensitive fields such as literature, where style and emotional impact are essential, or in cross-cultural translations related to history and memory, where emotional and social expectations are as important as accuracy.

The debate between fidelity and adaptation reflects a broader, contemporary concept of translation as a living, dynamic process based on strategic choices and the ethical responsibility of the translator toward the two cultures in contact. The goal is to find a delicate balance that respects the original voice while making the translation accessible and meaningful to the target reader.

Discussing this tension means understanding that translation is as much an art as a science.

Examples include Victor Hugo's *Les Misérables*, where translators balance fidelity to period language with contemporary readability, and the translation of idiomatic expressions, where either literal reproduction or cultural equivalence may be chosen.

Impact of Cultural Differences on Reception and Interpretation

Translation is not limited to simple linguistic transfer; it also involves deep cultural transfer. Each language carries a system of values, references, customs, and norms specific to its society. Thus, internal cultural elements of the source text – idiomatic expressions, proverbs, cultural symbols, historical references, lifestyles – must be interpreted and adapted for the target culture. Without such adaptation, translation risks causing unintended misunderstandings (e.g., the French expression *avoir le cafard* loses emotional meaning when translated literally).

The translator must have sharp cultural sensitivity, be deeply familiar with both cultures, and make strategic choices that sometimes go beyond the original text, using explanation, annotation, replacement, or adaptation. Thus, translation becomes a cultural bridge, and its success depends as much on an insightful interpretation of the source text as on effective adaptation to the recipient's cultural context.

Translation Challenges in Multilingual Contexts

Studying translation challenges in a multilingual context – where several languages and cultural references intersect – raises complex issues related to the diversity of linguistic and cultural systems in contact. This involves not only managing linguistic diversity but also navigating different cultural matrices that affect meaning, communication, and interpretation.

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In the contemporary Albanian context, for example, Albanian, Greek, Serbian, Italian, and English coexist. A translator must not only master these languages but also understand the cultural and historical implications associated with them. Certain terms may have strong political or identity connotations in one language while being neutral or absent in another. In international organizations or diplomatic meetings, multilingual translation must ensure message clarity while respecting each speaker's cultural sensitivity, sometimes requiring cross-cultural dictionaries or language mediation strategies.

Transformations of Meaning Across Time and Geographical Space

Considering transformations of meaning across time and geographical space is essential, particularly in literary and historical translation. The meaning of a text is inseparably linked to its original historical and geographical context. Translation involves a migration of the text across different time periods and cultural spaces. For example, translating *Don Quixote* into a contemporary language requires considering not only the linguistic gap but also the evolution of cultural, historical, and social norms.

Similarly, in historical translation – e.g., diplomatic documents or war accounts – the temporal gap can transform the perception of facts. A translation of the Treaty of Versailles may be reinterpreted in light of contemporary values. Geographical spaces introduce cultural specificities that affect reception. This perspective emphasizes translation as a living process where meaning transformation across time and space requires creativity and sharp sensitivity from the translator.

Equivalence and Fidelity in the Creative Process

In the creative process of translation, questioning equivalence and fidelity is essential because

these concepts cannot be reduced to simple mechanical correspondence between source and target texts. Modern research shows that equivalence is often relative, contextual, and partial (Mounin). Fidelity is based not only on strict reproduction of literal meaning but also on preserving the purpose, tone, emotion, and style of the original work.

Examples include translations of Baudelaire's poetry into English (Benjamin, Howard), where musicality and atmosphere were prioritized over literal translation, and film or literary titles, where a new title may be invented to capture the spirit of the content. In legal or scientific translation, strict equivalence is sometimes impossible, requiring clarification or reformulation. Thus, translation is a dynamic and creative process where correspondence must be understood in terms of intercultural mediation and strategic adaptation.

Conclusion

Throughout this paper, we have found that translation is much more than a simple linguistic transfer. It constitutes a genuine process of meaning reconstruction, in which the translator plays an active role in cultural and linguistic mediation. This perspective, supported by contemporary theories such as Danica Seleskovič's Interpretive Theory, holds that meaning does not reside in fixed words or structures but results from dynamic construction dependent on context, cultural references, and communicative purposes.

In summary, the paper has: (a) explored cognitive and semiotic approaches that consider translation as a dynamic reconstruction of meaning; (b) analyzed how cultural differences affect reception and interpretation of translated texts; (c) studied translation challenges in multilingual contexts; (d) considered transformations of meaning across time and geographical space; and (e) questioned the notions of equivalence and fidelity in this creative process.

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Challenges of Cultural Heritage Tourism Sites in Albania and the Right of Tourists to Information: The Case of the City of Elbasan

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Abstract

Cultural heritage constitutes one of the most important assets for the sustainable development of tourism in Albania. Cultural heritage implies a common bond, our belonging to a community. It represents our connection with the past, present and future. In the digital age, official tourism websites and cultural portals constitute the main source of information for domestic and foreign visitors. However, a considerable number of these websites present significant shortcomings in the English language version, which directly affects the right of tourists to be informed accurately and the perception of institutional professionalism.

This study aims to analyze the quality of translations and content on websites that promote cultural heritage in Albania, with a special focus on

the city of Elbasan. The analysis includes linguistic, legal and institutional aspects that affect access to information and transparency towards the international public.

The findings show that the lack of standardization, professional translations and institutional coordination limits the promotional potential and undermines the implementation of the Law on the Right to Information. The study proposes concrete interventions to improve multilingual communication and strengthen transparency in the cultural heritage tourism sector.

Keywords: Cultural heritage, translation, right to information, transparency, cultural tourism, Elbasan.

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Introduction

Cultural heritage constitutes one of Albania's most valuable assets for the development of sustainable tourism and the promotion of national identity. Cultural heritage tourism represents one of the most promising areas of economic development and international image of Albania. Albania is a country with an ancient history in Europe, which is reflected in the rich cultural heritage with national and international values. Until now, the preservation of its values has been linked to the preservation of national identity, pride and wealth, while integration into regional and local development policies is seen as a very good opportunity not only for the preservation of cultural heritage, but also for its real contribution to their development.

The websites of public and local institutions, museums and heritage portals play a key role in the promotion of these values. For foreign tourists, these platforms are often the first point of contact with Albanian culture and history. However, many of these sites fail to meet standards of clarity, correct translation and transparency of information. This situation has twofold consequences: it damages the image of the country as a tourist destination and limits the right of tourists to receive complete, accurate and accessible information – a right guaranteed by the Constitution of Albania and by Law No. 119/2014 “On the Right to Information”.

These results show that the lack of linguistic professionalism and institutional coordination is not only an aesthetic or technical issue, but also a matter of violation of the right to information.

Foreign tourists, as users of public information, have the right to receive clear and accurate data in their own language. When this information is missing or inaccurate, transparency conflicts with the legal and ethical principles of public administration. In this sense, the quality of communication on tourist sites is an indicator of the level of respect for citizens' rights and institutional in-

tegrity. The existence of cultural heritage is a necessity, as an element of national identity, but if it is not transmitted properly, its values are lost. For this reason, an accurate perception of the material and intangible elements of cultural heritage is needed, combined with proper interpretation and communication and its presentation with professionalism, using not only the sources and knowledge of cultural heritage, but also the means of its transmission, as well as putting into use contemporary virtual technology, as a means of wide dissemination of cultural heritage and as a way of continuous protection of its values.

The importance in the national context classifies cultural heritage as one of the most precious assets of the Albanian national identity. Cities such as Elbasan, Berat, Gjirokastra and Shkodra contain a great historical, architectural and spiritual wealth that can serve as an engine for the development of cultural tourism. However, to be truly accessible and understandable to international visitors, this heritage must be communicated in a professional, accurate and multilingual manner. In Albania, most official websites presenting cultural heritage suffer from linguistic deficiencies, lack of professional translation and inaccuracy of content. These weaknesses not only negatively affect the tourist experience, but also harm the cultural image of the country. In this sense, the topic assumes strategic importance to identify and address these gaps. The dimension of the right to information and culture According to the Council of Europe (Council of Europe, 2020) and UNESCO (2019), equal access to culture and information is considered a fundamental human right. Tourists, as temporary visitors, have the right to receive accurate, translated and accessible information about the heritage of a country. In the case of Albania, shortcomings in English translations or in the multilingual content of official websites violate this right, making cultural heritage less understandable and less attractive to the international public. Therefore, addressing this topic also has ethical and legal values, in addition to the cultural and linguistic dimension.

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The impact on the development of cultural tourism, which is one of the most promising sectors for the sustainable development of the Albanian economy, makes it necessary that in order to attract visitors with long-term interest, the country must offer accurate information in international languages, rich and understandable descriptions, and a unified and qualitative digital experience. In the absence of these elements, the tourist experience fades and the economic potential of cultural heritage remains untapped. The case of Elbasan, as a city with great historical potential but limited digital presentation, best illustrates this gap between real values and their public communication. From an academic point of view, the topic contributes to several fields of study: Linguistics and translation through the analysis of the quality of translation of cultural content. The scientific and institutional importance concerns public and tourist communication, examining the way in which local institutions convey the cultural message. Cultural policy and the right to information by linking legal and cultural aspects. Regional development through the role of heritage in the economic and tourist promotion of small towns.

For public institutions (municipalities, heritage centers, tourism agencies), the results of this study can serve as a basis for designing new strategies for multilingual communication and for standardizing the presentation of heritage on official websites. In addition to the theoretical dimension, the topic has direct practical impact. Improving translation and the quality of information on cultural heritage websites increases the trust of international visitors, helps preserve cultural identity, promotes sustainable tourism development, and creates a bridge of intercultural communication between Albania and other countries. This topic is important because it goes beyond the linguistic aspect. It affects the quality of representation of Albanian culture in the international space. In an era where cultural perception is built mainly through digital media, correct, understandable and aesthetic translation is not only a technical issue, but a cultural and political

act that affects the way Albania is seen in the world. The study aims to highlight these issues, analyze the connection between the quality of digital communication and the right to information, and suggest concrete measures for improvement.

Literature review

Cultural heritage is the physical legacy of artifacts and objects (attributes) of a group or society that are inherited from past generations to the present for the purpose of care for the benefit of future generations. Cultural heritage includes cultural property also known as material culture (such as buildings, monuments, landscapes, books, works of art and various objects), spiritual culture (such as folklore, traditions, language and traditional knowledge), as well as natural heritage. "Cultural heritage is an indisputable element of national identity. It gives you the opportunity to understand the specific traditions of your ancestors, seeing them in a historical perspective to arrive at an understanding of who you are" Anders Hogberg (2016).

Heritage is a difficult concept to define, because it covers a large group of seemingly diverse objects and ideas that have a strong connection to the land through specific styles of art and manifestations of cultural distinctiveness to commercial products for the production of which traditional production processes have been used. Heritage is something that individuals emotionally claim as their own or see as someone else's, but always as something that is passed down from previous generations. A comprehensive definition of cultural heritage has been given by Japanese researcher Tolina Loulanski (Loulanski, T; 2006), according to which "Cultural heritage includes aspects of material culture – sites, buildings, landscapes, monuments and objects as well as intangible (spiritual) culture, aspects of which are embodied in social practices, community life, values, beliefs and forms of expression such as language, arts, crafts, music and dance". Accord-

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ing to Hall and McArthur (1996), "four main values of heritage are identified: economic values which are related to the generation of income that comes to a country as a result of the use of this heritage for tourism and recreation purposes; social and cultural values, which are expressed in the strong spiritual connection of man with the country and his identity at the local and national level; scientific and educational values, which are expressed in the transmission of cultural values from one generation to another, to better understand the high cultural level that characterizes the period of their construction; political value which is expressed through the use of cultural heritage and the values it contains by politicians to promote historical values and their national identity".

International studies show that multilingual communication at heritage sites (including museums, historic sites and tourist portals) is closely linked to public access to culture, visitor experience and the effectiveness of tourism marketing. "Communication for sustainable local tourism will include the preparation and dissemination of information on a wide range of local assets, natural resources, cultural landscapes, heritage traditions, crafts and skills, cultural events, as well as contemporary art and culture", UNWTO (2011). The perception of cultural heritage conditions the perception of the destination, both from the real state of the facts and the human right to cultural access. In the context of cultural heritage, the quality of information is not only a technical issue, but also a cultural one. Inaccurate or partial translation can distort historical values, create cultural misunderstandings and damage the authenticity of the message (Venuti, 2012).

Various authors and reports highlight that poor translations directly affect the perception of the destination, translations must balance factual accuracy with cultural adaptation and promotional style, and multilingual communication is part of cultural access and human rights policies in the world. "The modes of communication have changed and the digitalization of knowledge and information simplifies the acquisition of more

elaborate information and democratizes the availability of subject-specific knowledge", (Albert B. (2010). Virtual reality technology operates on the human perception system through computer and communication technologies, allowing people to fully enter and interact with the virtual world. This allows people to have the illusion of overcoming the limitations of time and space and material limitations.

According to the literature, "in this scenario, the Internet is not only a mode of interaction, but also affects the interaction of humans-computers with reality", (Pei J. & Yi L. (2022). Cultural heritage should be presented to the world, because it affirms our identity as a people and creates a comprehensive framework for its preservation. The social and economic value of this transmission of knowledge is important for both minority groups and major social groups within a country, and is also as important for developing countries as for developed ones. With the growth of machine translation tools (Google Translate, DeepL, large language models, etc.), many institutions use machine translation to quickly update bilingual content. The literature shows two clear trends "where the use of machine translation reduces the cost and time of producing multilingual content and makes pages available more quickly. Recent studies explore how machine translation can be integrated as a first draft and have value in volume of translations", (Constantin, F. (2023). This method has its limitations that automatic translations often do not cope with the "cultural terminology" or promotional tonality of tourist texts, the results are unnatural phrases, there is a loss of nuance and errors that affect understandability and credibility. Various research shows that tourist text needs specialized editing to achieve the necessary quality. Recent studies and comparative analyses (e.g. google translate vs DeepL) still highlight flaws in the semantic accuracy of cultural terms, (Liao, M.H. (2022).

So in conclusion, machine translation is a useful operational solution, but not the final solution because professional editing and terminology

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guidance are needed to avoid negative consequences.

An important aspect of the study is addressed as "cultural loss" in translation, that is, the unwritten elements, rituals, local terms, and historical nuances that are lost when translated inaccurately or removed due to the need for simplification. These losses can be: Lexical, where the translation of terms such as "konak", "oda", "tekke" simply as "house", "hall" without explanation. Narratively, where the removal of the historical context that gives meaning to the object. The tourist experience is reflected in the lack of practical instructions (such as access, timetables, tickets), which reduces the value of the visitor's experience. Specialized studies on "lost culture" in the translation of tourist content identify specific categories of losses and recommend strategies for improving the existing situation, (Chen, S., & Zhou, T. (2024), (Bu, Zheng Wang, Siyi Wang et al. (2025). Studies in the field of tourist translation emphasize that promotional content must balance accuracy, naturalness and persuasiveness; all elements have an impact on the tourist's decision-making, comparative quality studies (Hazaea 2025). Research on the linguistic interpretation of Museums and heritage sites note that a good multilingual strategy increases visitor engagement and understanding of cultural content (Constantin 2023).

The study of Albanian literature and local reports shows that the problems observed globally also exist in Albania, with local characteristics. Sectoral reports (UNDP 2022) identify challenges for the government in developing tourism, the need for professionalism and for developing cultural tourism products, where translation and international presentation appear as operational gaps. Albanian academic studies and articles (e.g. analysis of tourism on Albanian websites, studies on the use of information boards in heritage sites) highlight spelling errors, lack of translation and weaknesses in information design, all of which negatively affect the tourist experience. Local studies on Elbasan and municipal plans and analyses highlight the lack of updated multilingual

content (Elbasan Municipality 2023). In Albanian literature, the main problems identified are the lack of national standards for information tables and texts and translations where technical documentation is often missing (Hasani, M, Xhoga, D (2024). Local planning documents (e.g. analyses of Elbasan's tourist potential) emphasize the need for unification of communication and improvement of digital materials for tourists, (Elbasan Municipality 2023). From the literature review, several gaps and topics for further research clearly arise: The efficiency of editing automatic translations in the context of heritage content, which means how much "cultural losses" are reduced with professional post-editing. Comparative studies between regions, e.g. Elbasan with similar cities in the Balkans, to understand the role of institutional coordination. Assessment of the impact of poor translations on tourists' decision-making, e.g. studies and surveys with tourists to measure their perception of the destination. Development of institutionally supported terminological words (state-municipality, museum) to guarantee the follow-up, until the end of the solution of this problem. Creation and testing of a "practical guide" for heritage sites in Albania that includes formatting standards, labeling, and editing procedures. Practically International literature and institutional documents (Council of Europe, 2020), UNESCO, (2003)) defend the approach that multilingual communication is part of guaranteeing access to culture and information. Accurate translation is not a luxury but is part of respecting cultural rights. Technical studies on machine translation show that automatic tools are useful, but without professional editing they leave significant errors, especially when cultural terms are included. Albanian literature and local reports confirm the presence of similar problems such as shallow translations, unfinished information boards, and lack of a multilingual strategy. This opens a practical need for institutional intervention.

The right to information in Albania

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Cultural heritage is recognized throughout Europe as an instrument of cultural identity. Protecting our common heritage and promoting cultural diversity are also very important instruments for bringing different communities closer together and for improving dialogue between different cultures.

The right to information is enshrined in "Article 23 of the Constitution of the Republic of Albania", and regulated by "Law No. 119/2014".

This law guarantees free and unrestricted access to information held by public institutions, including entities that manage cultural heritage and tourism.

In the context of tourism, transparency of information constitutes a component of consumer protection, as visitors have the right to know in advance the services, schedules, prices and history of the facilities they visit.

"In the decades since the adoption of the World Heritage Convention, various definitional 'crises' have significantly influenced the ways in which heritage is classified, perceived and managed in contemporary global societies" (Anders Hogberg (2016), Rodney Harrison). The World Tourism Organization (UNWTO) and UNESCO emphasize the need for tourism information to be "accurate, accessible and understandable to every visitor". EU countries have developed standards for multilingual communication, linking the quality of translation to respect for the right to information and the right to culture. According to the Council of Europe, multilingual communication is an essential component of equal access to information and cultural participation. The document states that: "All citizens have the right to receive information and to participate in cultural life in a language which they understand." (Council of Europe, 2020). In this context, the quality of translation on official websites, including those of cultural heritage, is not only an aesthetic or technical issue, but a legal and ethical obligation directly related to: The right to public information, as guaranteed by Law No. 119/2014 in Albania and Article 23 of the Constitution of the Republic of Albania, and the right to cultural participation,

protected by the Convention on Human Rights (Art. 10) and the Convention for the Protection of Cultural Diversity (UNESCO, 2005).

In practice, inaccurate translations, the lack of appropriate cultural terminology, or the use of machine translations without editing violate the right of tourists to accurate information and an equal cultural experience. This means that institutions managing heritage sites should respect international standards for professional translation, ensuring terminological coherence, continuous updating of multilingual content, and the involvement of experts in intercultural communication. This approach helps to fulfill the right to information and culture and enhances the credibility of the country as a sustainable and inclusive tourist destination for the languages, history and civilizations of the Parties to the Convention. In the context of cultural heritage, the quality of information is not only a technical issue, but also a cultural one. Inaccurate or partial translation can distort historical values, create cultural misunderstandings, and damage the authenticity of the message (Venuti, 2012). International institutions and European bodies have issued guidelines linking multilingual communication with the rights of access to culture and information. The Council of Europe and its initiatives emphasize the necessity of plurilingual policies and the integration of the language dimension in public cultural communication (Council of Europe, 2020). The documents and recommendations of the Council of Europe encourage member states to promote multilingual access to cultural and digital materials. UNESCO, 2005, emphasizes the importance of multilingualism for the preservation of cultural diversity and social inclusion and as a result this gives ethical and political basis to the demand for accurate translation of online cultural content. These frameworks provide the legal argument that accurate translation and accessible information are not only good practice, but part of respecting cultural rights and informing the public.

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Methodology

The study follows a combined methodological approach, integrating qualitative and descriptive-analytical methods, with the aim of identifying and analyzing the challenges presented by cultural heritage tourism sites in Albania, as well as assessing their impact on respecting tourists' right to information. The choice of this approach is based on the interdisciplinary nature of the study, which combines studies on digital communication and translation, cultural policy analysis, and human rights principles, especially the right to information and access to culture. The case study of the city of Elbasan serves as an empirical model, allowing for an in-depth local analysis, but with transferable findings for other Albanian cities with similar cultural heritage. The study relies on the content analysis method, comparing the Albanian and English versions of 10 sites presenting Albanian cultural heritage, including the sites of the Municipality of Elbasan, the Ethnographic Museum, the Elbasan Castle, and several local tourism portals.

The analysis criteria focus on linguistic and terminological accuracy, clarity and up-to-dateness of information, compliance with transparency standards, digital accessibility. In addition to textual analysis, legal documents, institutional reports and international guidelines on the right to information in the field of cultural tourism were reviewed. The methodology used provides a clear and reproducible framework for analyzing the challenges of cultural heritage tourism sites in Albania. Focusing on the case of Elbasan, the study manages to connect digital communication, translation, and the right to information, creating a solid basis for empirical findings and policy recommendations.

Results and Discussion

The analysis of cultural heritage tourism websites in Albania, with a particular focus on the city of Elbasan, highlights a series of structural, linguistic and institutional problems that directly

affect the quality of information provided to tourists and the respect for the right to access culture. A significant part of the websites use automatic translations without professional editing, producing incorrect structures in English. Examples such as "Elbasan castle is well preserved and has a long story" appear frequently, damaging the institutional image. The English versions are often partial, without information on schedules, prices, events or practical instructions. This contradicts the principles of the Law on the Right to Information, which requires the provision of public information in a clear and equal manner to all citizens and visitors. Terms such as *tekke*, *konak*, *kulla*, or surrounding wall are translated in a general way, losing the cultural nuance. In some cases, translations distort historical reality, affecting the understanding of heritage. Different websites operate independently and with different communication styles. The municipality, the museum and local portals do not share the same visual or terminological identity. This fragments the image of the city and damages credibility. These results show that the lack of linguistic professionalism and institutional coordination is not only an aesthetic or technical issue, but also a matter of violation of the right to information. Foreign tourists, as users of public information, have the right to receive clear and accurate data in their own language. When this information is missing or inaccurate, transparency conflicts with the legal and ethical principles of public administration. In this sense, the quality of communication on tourist websites is an indicator of the level of respect for citizens' rights and institutional integrity.

The case of the city of Elbasan

Elbasan is one of the cities with a rich cultural heritage, where Ottoman, Roman and Albanian influences are intertwined. However, analyses show that the websites promoting the city's heritage have obvious problems: inconsistencies between the Albanian and English versions, automatic translations and lack of historical context,

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the online presentation remains inactive and outdated content, lack of information on physical access to monuments, schedules, prices or local guides. These shortcomings limit the city's ability to attract international tourists and damage its image as a cultural destination. The analysis is based on several official and unofficial sources that provide information about the city's heritage, such as the Elbasan Municipality website (www.elbasani.gov.al), the Elbasan Ethnographic Museum website, the Visit Elbasan portal, the "Skampa" Cultural Center website, articles and promotional pages on the Albania Tourism Portal, TripAdvisor, etc. The main issues identified are related to unprofessional translations and linguistic errors, such as, for example, in the English version of the Elbasan Municipality website, the description of the city's Castle contains incorrect expressions such as: "Elbasan castle is well preserved and has a long history."

Instead of the correct form: "The Castle of Elbasan is well preserved and has a long history." On some tourist sites, the translation is done automatically (Google Translate), without professional editing, creating unnatural texts for international visitors. There is a lack of complete content on the information on the ethnographic museum, the castle, churches, hammams or traditional streets, it is fragmented and often repeated in an incoherent manner. There is a lack of descriptions that connect the historical aspect with the visitor's experience, such as guides, timetables, tickets, contacts. Lack of institutional standardization, so there is no unified strategy for multilingual communication. The municipality, the museum and other institutions use different

styles and formats, without a common visual or terminological model. This creates the perception of a lack of institutional cooperation in cultural promotion. Technical and accessibility problems, inactive links to museum or cultural event websites, lack of optimization for mobile devices. Texts placed as images, which cannot be automatically translated by browsers, which is a very big problem for foreign visitors. Lack of visual and audio materials where the websites contain few low-quality photographs and no explanatory descriptions. No audio or video materials are provided in foreign languages for the presentation of monuments and events. Shallow translation of cultural values where descriptions in English focus only on physical elements such as walls, streets, buildings, without explaining the cultural context, rituals, historical traditions or traditional civic life. This makes the texts cold and unattractive to an international audience. The problems found show that the digital presentation of Elbasan's heritage does not meet the multilingual communication standards set by the Council of Europe (2020) and UNESCO (2019). This violates two essential dimensions of modern cultural policies: the right of tourists to accurate information and the right to access culture in a language they understand. Improvement requires the involvement of professional translators, institutional harmonization between the Municipality, the Ministry of Culture and museum centers, the creation of a common multilingual platform for Elbasan, as a good model for other cities. Specifically, the problems are in the table below:

Table 1.

	Page	Main Problem	Concrete Example
1	elbasani.gov.al	Incorrect translations	"The city is full of cultural object and good preserved walls."
2	Visit Elbasan	Outdated content	Latest events date from 2022
3	Ethnographic Museum	Lack of translation	English version is completely missing
4	"Skampa" Center	Inactive link	"Events" section does not open
5	Tripadvisor pages	pages Incorrect	information Wrong dates for museum opening hours

Theoretical Article

Conclusions and Recommendations

1. The quality of information on tourist websites is not only an indicator of the level of professionalism, but also a guarantee of the exercise of the right to information of visitors.

2. In the case of Albania and especially of Elbasan, improving translations, continuous updating of content and institutional unification are essential conditions for the development of cultural tourism and for building a credible international image.

3. Through the full implementation of the legislation on public information and multilingual communication, Albania can strengthen not only the tourist offer, but also the cultural and democratic integrity of its institutions.

4. Drafting a national guide for multilingual communication on cultural heritage tourist websites.

5. Involving professional translators and experienced editors in the tourist discourse.

6. Active implementation of Law No. 119/2014 to guarantee transparency and equal access to public information.

7. Creation of a unified national portal, with standardized and updated content in several languages.

8. Training for public administration in intercultural communication and digital management of tourist information.

9. Cooperation between public institutions and universities, to develop sustainable linguistic and terminological standards.

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Theoretical Article

Collective Memory, History, and Translation: Epistemological and Ethical Issues in Cross-Cultural Transmission

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Abstract

This theoretical article examines how collective memory and history are transmitted through the complex process of translation, focusing on epistemological questions (related to knowledge and understanding) and ethical considerations. Drawing on a framework combining cultural memory and translation theory, the article analyzes specific challenges in the Albanian context, considering interactions between Albania, its diaspora, and multilingual environments. Through detailed examination of Albanian excerpts compared with translations into French, it emphasizes how translators' choices influence collective understanding of the historical past, the legitimization or marginalization of certain memories, and the ethical dimensions of disseminating narratives. The article underscores the translator's responsibility in constructing and conveying cultural memories and concludes with concrete recommendations for practitioners and researchers

to improve translation quality and integrity while strengthening intercultural dialogue about memory and shared history.

Keywords: translation, language, culture, collective memory, history

Introduction

Collective memory, as a social and cultural construct, is a complex, dynamic process that is built, transmitted, and transformed over time. When based on texts and narratives, these convey not absolute truth but vectors of multiple interpretations. This complexity amplifies when narratives cross linguistic and cultural boundaries. The central question becomes: how is collective memory

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constructed, transmitted, and reinterpreted within intercultural exchanges?

The chosen framework is the Albanian context and its diaspora – a particularly important field for studying the circulation of memories. In post conflict or transitional societies like Albania, translation emerges as a key tool that can both activate and legitimize certain historical interpretations or, conversely, neutralize or marginalize others. This highlights the importance of considering translation not only as a linguistic act. This study aims to clarify epistemological issues related to intercultural memory transmission – i.e., how knowledge is produced, validated, or contested during translation – and to address ethical issues concerning who decides which memorial elements are transmitted and under what conditions.

Theoretical Framework: Collective Memory, History, and Translation

Collective memory (Halbwachs, 2025) refers to memories shared by a social group beyond the sum of individual memories. It shapes shared identity and relies on social practices, rituals, and “places of memory” (Nora, 1984–1992). History is not a simple factual summary but is constructed and narrated according to choices that guide perception of the past. Historical narratives serve to create collective identity, including or excluding certain events or interpretations. (Hobsbawm & Ranger, 1983).

Translation is essential in transmitting memories across cultures. Descriptive Translation Studies (Toury, 1995) show how translation is socially and historically situated. Ethical approaches (Venuti, 1995) emphasize the translator’s responsibility to respect cultural contexts and sensitivities related to memory, maintaining critical transparency.

Epistemological and ethical questions include: who has access to which memories? Which versions of the past are legitimized? How do lexical choices shape reception? And how can the translator avoid reproducing cultural power biases?

Methodology and Analytical Framework

The approach is based on in depth critical analysis of different text types: collective memories, historical manifestos, personal narratives, and contemporary media examples. The corpus includes historical texts of Albanian origin, transcribed oral testimonies, newspaper articles, and translated academic documents, with special attention to the Albanian diaspora in Europe and North America.

Analytical criteria focus on transparency of translation choices, traceability of strategies (clarification of culturally significant terms, smoothing, preservation of regionalisms). Each fragment is contextualized within its historical, social, and linguistic environment to highlight ethical tensions between faithful reproduction and cultural adaptation.

The Albanian Context: Collective Memory, Language, and Transmission

The Albanian language plays a central role in national identity. (Assmann, 2011).

It has two main dialects (Tosk and Gheg). Standardization in the 20th century strengthened unity, adopting Tosk as the standard.

Diasporas help preserve and spread the language. Transmission of collective memory in Albania rests on public institutions (museums, archives), media, literature, the education system, and community practices (especially in diaspora) (Assmann, 2011; Nora, 1984–1992).

Challenges include language policy (managing regional diversity and minority languages), controversial historical representations in textbooks, and the translation of historical texts into multiple languages (Albanian, Greek, Serbian, Turkish, English, etc.).

Epistemological and Ethical Issues in Intercultural Transmission

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Epistemology of translation: Translation cannot be reduced to simple linguistic transfer. (Toury, 1995; Venuti, 1995).

Translated historical knowledge is imbued with interpretative frameworks and ideologies. The translator is an active interpreter, incorporating cultural, political, and linguistic presuppositions. In the Albanian context, this becomes a co construction of collective memory.

Ethics of memory. Who decides which memories are transmitted? It is ethical to respect source communities' rights, including consent for dissemination, and to ensure marginalized voices are faithfully reproduced.

Power and representations. Translations are inseparable from power relations (Tymoczko, 2012). Translation can perpetuate official narratives or offer critical revision, empowering minority or alternative narratives from the diaspora or internal ethnic groups.

Translation as intercultural mediation: Explanatory elements (notes, glossaries, historical contextualizations) and involvement of local voices (joint editorial committees, community consultations) ensure ethical, transparent transmission.

Specific challenges for Albania: Dialectal diversity complicates spelling choices; tension between centralized national memory and diasporic memories; role of academic institutions as authority versus horizontal dynamics in diaspora.

Practical Implications for Researchers and Professionals

Ethical translation methodology requires: (a) actively including community consultants; (b) systematically documenting translation choices; (c) providing explanatory notes.

Transparent editorial framework: bilingual glossaries, accurate footnotes, a section on "translator's limits and choices." Training and awareness: deep intercultural competence, understanding of ethical issues, regular memory auditing practices.

Transdisciplinarity: involve historians, linguists, anthropologists, community representatives.

Resources: develop structured bilingual corpora and style guides for translating historical memories.

Conclusion and Future Directions

Collective memory transmitted through translation is much more than a linguistic passage – it becomes an ethico epistemological field. The Albanian case reveals challenges related to dialectal diversity, diaspora trajectory, and multiplicity of voices. Future directions include promoting reflective, co constructed translation practices; strengthening collaborations between academic institutions, translators, and communities; creating accessible learning resources; and developing clear translation protocols with contextual notes, bilingual glossaries, and sections dedicated to "memory change."

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Original research

POLITICAL-LEGAL AND ECONOMIC SCIENCES

Review

Recruitment of Police Candidates Through MMPI and CPI Personality Inventories: A Perspective Review for Albania

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Abstract

Psychological assessment of police candidates represents a core area of police psychology. The main focus of psychological assessment is to identify those applicants who demonstrate specific traits or attributes that are suitable for the police officer profession.

The study aims to provide insights from contemporary practices regarding the usefulness of personality tests in recruiting police candidates and their future application in Albania. The study focuses on examining two personality tests: the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI). The study was based on a systematic literature review using the ScienceDirect, PsycNet and Google Scholar databases from the period 2000 to 2024. The literature was filtered by identifying and analyzing key terms such as

"MMPI and police officer" or "CPI and police officer".

Based on the studies used and international practices, the application of psychological tests during the recruitment stages of applicants for police officers provides qualitative information on mental health and job suitability for the police organization and academic and research units.

The application of psychological tests in the selection of candidates for police officers provides important data for police and academic structures regarding the psychological state and the prediction of work performance and professional integrity in the future. A significant part of the studies emphasizes that in addition to the use of psychological tests, it is useful to include additional data such as clinical interviews and information regarding educational and demographic

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characteristics. Based on the studies used and international practices, the use of personality tests in the recruitment process would be positive for the police organization, the Security Academy and research purposes.

Keywords: Public safety officer, personality test, MMPI, CPI.

Introduction

The employment of a new candidate in the police structures is not only about fulfilling the criteria of educational, physical and theoretical training, but also about suitability in psycho-emotional terms. In the police organization, it is assumed that individuals combine several traits that form a particular "police personality". This personality is defined as a specific value orientation for police officers. Skolnick (1966) emphasizes that the work personality of a police employee consists of cynicism, suspicion, external isolation, internal solidarity, self-confidence, aggression and conservatism (Bennett & Greenstein et al., 2005). The application of psychological testing in the assessment of future performance has been documented since 1300 BC, when the Israelite army operating under Gideon used military aptitude tests to select suitable soldiers (Guion, 1976). Blau (1994) noted that psychological testing was used during World War I for the selection of military personnel. During World War II, the Army General Classification Test (AGCT) was developed and administered. During the late 1970s, the most popular personality tests in police settings were the Minnesota Multiphasic Personality Inventory (MMPI), the California Psychological Inventory (CPI), the Inwald Personality Inventory (IPI), the 16-Personality Factors (16-PF), the Edwards Personal Preference Sheet (EPPS), and the Personality Inventory (NEO) (Fabricatore et al., 1978). In recent years, another set of psycho-

logical instruments has been applied to police selection, such as the Personality Assessment Inventory (PAI), which is essentially a psychopathology test and has many similarities to the (MMPI). The (M-PULSE) test is an instrument first introduced in 2008 that assesses a range of attitudes and beliefs specifically related to police work tasks (Davis, 2008).

Methods of systematic literature review

Research aim and objectives

The study examines the usefulness of personality inventories (MMPI), (CPI) and their versions in the selection of candidates for police officers.

Literature search terms and search process

According to the focus of the study, the ScienceDirect, PsycNet and Google Scholar databases covering the period from 2000 to 2024 were used. The specific search terms are: "MMPI and police officer", or "CPI and police officer".

Study characteristics

The study includes 9 original articles, of which one is a meta-analysis, six are quantitative studies, one is an experiment and a literature review. The total sample size in the included studies is about 7096 participants and 16 studies.

Results

After the completion of the study filtering, 9 articles were considered suitable for use (Fig. 1). For scientific articles, the study followed the steps according to the guidelines of the systematic review report in the Prisma process (Prisma, 2021).

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Figure 1. Flowchart of the research strategy (PRISMA).

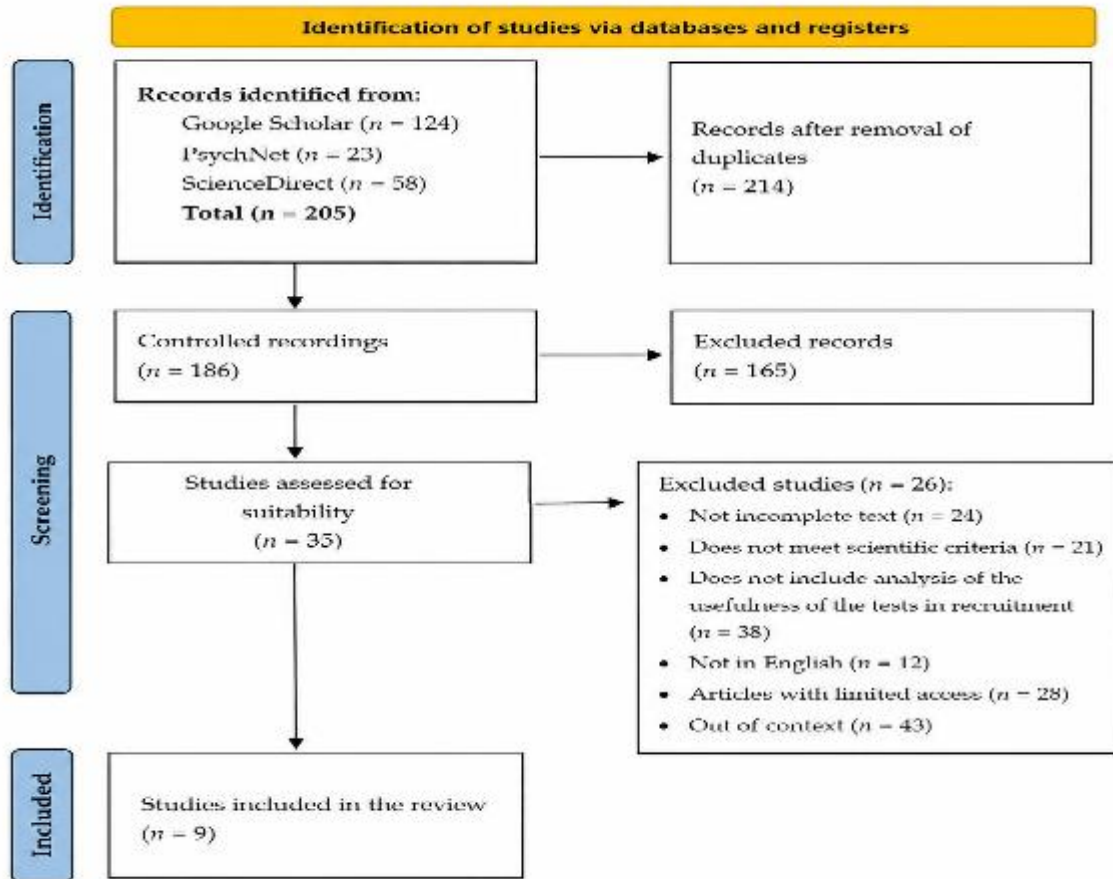


Table 1. Original research articles

Year	Author(s)	Study type	Sample size	Findings/results
2002	Daniels, S., & King, E.	Quantitative study	96	The use of (MMPI-2) in distinguishing successful from unsuccessful police officers, comparing them with superiors' assessments, presented positive data.
2007	Fischler, G.L., Ben-Porath, Y.S., & Sellbom, M.	Quantitative study	291	The (MMPI-2) indicators on the RC scales showed good predictive validity.
2008	Stewart, Casey, O.	Quantitative study	372	The test (CPI) showed significant data regarding levels of occupational risk, suitability, and the probability of involuntary dismissal.
2017	Tarescavage, A. M. Ben-Porath, Y. S., & Corey, D. M.	Literature review	320	The (MMPI) and (MMPI-2) scales showed consistent validity in predicting negative outcomes in police officer candidates.
2018	Ben-Porath, Y. S., Roberts, R. M., Tarescavage, A. M., & Roberts, M. D.	Quantitative study	143	The (CPI) and (MMPI-2-RF) data on emotional dysfunction and aspects of interpersonal functioning of police officer applicants were useful.

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2019	Curt R.B., Anne, M.B.	Experiment	120	The (MMPI) data showed positive correlations of the field performance of police officers.
2021	Detrick, P., & Roberts, R. M.	Quantitative study	5000	Several scales of the (CPI) showed modest support for construct validity.
2023	Zakaria, N. Z., Osman, I., & Noranee, S.	Meta-analysis	16 studies	The results of the (MMPI) were significant on scales related to emotional issues and performance prediction in the context of selecting competitors for police officers.
2023	<u>Holmes, K., Whitman, M.R., & Ben-Porath, Y.S.</u>	Quantitative study	754	The (MMPI-3) and (NEO PI-3) scores were positive in predicting the performance of police officer recruits.

Descriptions of personality inventories MMPI and CPI

Minnesota Multiphasic Personality Inventory (MMPI)

The Minnesota Multiphasic Personality Inventory (MMPI) is a standardized psychometric personality test for adults. The test was developed by clinical psychologist Starke Hathaway and neuropsychiatrist J.C. McKinley, faculty members at the University of Minnesota. The MMPI is designed to identify mental disorders. Mental health professionals and psychologists use several versions of the MMPI based on the purpose of their work, such as developing treatment plans, making diagnoses, or recruiting suitable candidates for employment. The basic clinical scales of the MMPI are: hypochondria, hysteria, depression, psychopathic deviation, masculinity/femininity, paranoia, psychasthenia, schizophrenia, hypomania, and social introversion. In 1959, the MMPI was first applied by King, Norrell, and Erlandson to the selection of police personnel. Under the Americans with Disabilities Act, the Inventory (MMPI) is considered a clinical test suitable for use in selecting police officers after all other factors have been considered. In 2008, a shortened version (MMPI-2-RF) was updated to include 338 questions, which also included police norms. In 2024, the (MMPI-3) was published, which focuses on assessing the pre-employment suitability and on-duty suitability of individuals in public safety occupations.

California Psychological Inventory (CPI)

The California Psychological Inventory (CPI) is a self-report test designed to assess human behavior in normal populations. The (CPI) was originally published as a 480-item test, and in subsequent revisions the number of items has changed, being reduced to several versions, 434 and 260 (Gough, 1957). The most widely used inventory is the (CPI-434) which contains 20 scales measuring individual traits and interpersonal functioning (Groth-Marna, 2009). The main scales of the (CPI) are dominance, sociability, social presence, self-acceptance, capacity for status, independence, empathy, responsibility, socialization, self-control, good impression, interaction, sense of well-being, tolerance, achievement through conformity, achievement through independence, intellectual efficacy, psychological well-being, flexibility and femininity-masculinity. The Police Personality Inventory (CPI) is a personality test that is often used in police recruitment, as it aims to assess behavioral characteristics and qualities that are associated with success in social roles. The CPI also contains subscales for specific purposes directly related to the police officer position, including managerial potential, police leadership, agreeableness, anxiety, narcissism, and police officer career orientation (Gough & Bradley, 1996). The CPI is the second most widely used pre-employment assessment test for police officers in the United States (Super, 2006).

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The role of the psychologist in the Albanian State Police

The beginnings of the psychological service in the police organization in Albania date back about 18 years. The task of the psychologist in the police structures is defined through standard work descriptions and procedures. Currently, the main focus of the psychologist in the state police is on the assessment, testing and psychological counseling of police employees within the police structure and on the recruitment of new candidates for students. Psychologists in the state police have undertaken several initiatives to reform and improve the psychological service. In 2021, the "Police Psychologist Manual" was published. In cooperation with the Human Resources Directorate and the Training Sector at the General Directorate of the State Police, in 2022, a commission was established to draft the standard procedure for psychological assessment, testing and counseling. A training course was also held with a psychologist from the Lithuanian police, where the main focus was the recruitment of police officers. Psychologists from various institutions of the State Police are part of the psychological testing in the selection of candidates for police officers at the Security Academy. Currently, the level of professional preparation of psychologists in police structures is at satisfactory levels, based on qualifications, training, licensing and engagement in scientific research. Despite institutional and individual initiatives to improve the role of psychologists in the state police, it is currently necessary to draft a work protocol according to international standards, including personality tests for recruitment purposes.

Psychometric properties of personality inventories the (MMPI), the (CPI), and their versions

Regarding the usefulness of psychological tests, two components are important; predictive validity and competitive validity. Predictive validity in

an inventory or test is the extent to which it predicts the performance that a person will have on the dimensions that the instrument is designed to assess. A test has predictive validity if it is able to identify which competitors will perform well or not in the job position for which they are applying. Competitive validity is the unit of measurement in which a test or inventory identifies a person's actual performance on the dimensions and tasks that it is supposed to assess. A large number of studies have reported positive data regarding the application of the (MMPI) in the selection of police officers. Data from a study involving 120 police officer candidates, where the (MMPI) test was administered before their employment, the results showed the effectiveness of the instrument (Bernstein et al., 1982). The Minnesota Multiphasic Personality Inventory (MMPI-3) was used by the California Peace Officer Standards and Training Commission to assess public safety police officers prior to employment. The data presented showed not only good reliability and criterion validity, but also predictive ability. One study examined the ability of pre-employment scores (MMPI) to predict future police officers with respect to serious criminal offenses and on-duty integrity. Scores on the emotional, cognitive, and behavioral domains of the scale were positively associated with excessive use of force, conflicts with superiors, poor performance, procedural violations, embezzlement/fraud, accidents, inappropriate dismissal of cases, and other off-duty offenses (Tarescavage & Ben-Porath 2016). Another study examined the validity of scores on the Restructured Clinical (RC) and Substance Abuse (MMPI-2) scales in predicting inappropriate behavior in police officer applicants. Predictive validity was moderate to strong in predicting inappropriate behavior in police officers according to a study evaluating the Restructured Clinical (RC) scales. The Victoria Police Department, Australia, has administered the Minnesota Multiphasic Personality Inventory (MMPI) and MMPI-2 to all recruits since 1985. The study included 1347 police officers, and the data showed high scores on the lying scale. Based on the results of

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the MMPI-2-RF, Sellbom et al. (2007) identified problems with integrity and misconduct in a group of 291 male police officers. The results of another study concluded that the MMPI and MMPI-2 scales showed consistent validity in predicting negative outcomes in police candidate outcomes. Although the MMPI is the most widely used test in police organizations, several studies have identified limitations in some of the scales. According to Daniels and King (2002), the (MMPI) scales were unable to make any specific distinction between successful and unsuccessful police officers, compared with performance ratings by their supervisors.

The CPI has shown utility in the psychological testing of police candidates and those in service. The test has demonstrated several advantages in terms of cross-cultural understanding of concepts and ease of interpretation (Gough, 1968). Results of one study showed that officers who had not had serious problems on the job (e.g., illegal behavior, excessive use of force, etc.) during their service showed significantly higher scores on scales measuring aspects of socialization and self-control (Hargrave & Hiatt, 1989). Another study examined the relationship between predefined profiles (CPI-434) and disciplinary behaviors of police officers. They found that officers in the control group scored higher on scales of responsibility, socialization, and self-control (Cutler & Muchinsky, 2006). A study using the (CPI) which was primarily intended to predict police performance found high correlations between good job performance, personal well-being, self-control and responsibility. Another study also examined the relationship between risk levels (e.g., aspects of integrity, illegal drug use, criminal behaviour, poor job performance, etc.) and the suitability of police officers. The test data showed high predictability for applicants with high scores on problem behaviours (Roberts and Johnson, 2001). Aamodt (2004) conducted a meta-analysis of CPI studies on the prediction of job performance variables, finding moderate correlations for levels of tolerance and intellectual efficiency. According to him, these are desirable

characteristics for police officers because they tend to show higher job results in the future. The CPI has shown positive predictive validity for both future individual and group behavior (Groth, 1997). Another study analyzed data from the CPI and the MMPI-2-RF and concluded that scales of emotional dysfunction and interpersonal functioning domains were useful for police candidates. A small number of studies have shown that the CPI has shown modest support for construct validity on some scales. The CPI is designed to assess personality across the spectrum of normal human behavior and is not focused on identifying extreme behaviors or mental health disorders. Hargrave (1985) and Sarichione et al. (1998) noted that the CPI scales were not successful in assessing aspects of police performance.

Discussion

A careful review of the cited studies shows that the main purpose of the (MMPI) is to diagnose psychological disorders and assess personality structure. The inventory is used in clinical settings, in the evaluation of police personnel, and in judicial cases. The results are interpreted by qualified professionals and usually require in-depth analysis to identify specific disorders or pathological tendencies. Despite criticisms, the (MMPI) is the instrument widely applied for police recruitment purposes in English-speaking countries. The main focus of the (CPI) is the assessment of personality traits in normal populations, which focuses on the assessment of social and interactional aspects. It finds considerable application in police structures, especially in the recruitment of employees for positions requiring interpersonal skills and leadership. The interpretation of the results is easier and provides a broad picture of social traits. The test is widely used in social sciences and academic research. The (MMPI) and (CPI) inventories are widely used in countries such as the USA, Canada, Australia, the United Kingdom, Iceland, France and Germany.

10. Conclusions

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Personality inventories (MMPI) and (CPI) are important tests that have different structures and purposes in their composition. The (MMPI) test is more focused on identifying psychological disorders, while (CPI) focuses on social traits and interpersonal skills. Based on the cited studies, the reviewed tests are the most used in police institutions. Their wide application in police organizations shows that their results represent reliability and validity. Despite the wide scope of use, some researchers have identified some limitations and shortcomings in terms of psychometric properties.

Some studies emphasize that psychopathological tests such as (MMPI) often do not reflect clinically relevant data in police structures due to the fact that applicants for police officers tend to be psychologically healthier than the general normal population. When selecting candidates for police officers, researchers suggest the need for additional data such as clinical interviews, demographic characteristics, information about education and employment experiences.

In the Albanian context, in the framework of the reform of the police organization and its approximation to contemporary standards, it is necessary to apply one of the three personality inventories analyzed in the study. Currently, police psychologists apply various psychological tests in the structures where they work, which they have translated and adapted individually. It is recommended that a working group be established with the support of the decision-making structures of the State Police to draft a psychological assessment protocol for pre-employment recruitment and treatment during employment.

Declarations

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Conflict of Interest: The authors declare no conflict of interest.

Study Limitations: This study is limited by the methodology employed, the number of references included, and its geographical scope.

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Original Research

The Role of Artificial Intelligence in Public Sector Auditing Missions: Challenges and Future Perspectives

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Abstract

Nowadays, Artificial Intelligence role is rapidly increased in various industries, even in audit.

In audit missions, machine learning, natural language processing (NLP), and data analytics, as AI technologies are becoming more efficient, accurate and comprehensive.

In external audit missions, by improving efficiency, accuracy and reliability, the integration of Artificial Intelligence is changing the audit process. As external audits play a crucial role in ensuring financial transparency, compliance, and public trust the role of AI is becoming more and more important. The role of AI in automating processes has expanded due to improvements in data processing capabilities, automating tasks, detecting fraud, and providing insights into risk management.

Through this study, we aim to show how various applications of AI technologies such as e.x machine learning (ML), natural language processing (NLP) also robotic process automation (RPA) are applied in external audit processes. The paper identifies the key areas where AI is enhancing the audit process, by examining some of the key issues addressed in an audit mission

Keywords: Artificial Intelligence, External Auditing (Public Audit), Supreme Audit Institutions (SAI)

Introduction

External public auditing plays a fundamental role to guarantee transparency in public financial management and secure the proper use of public

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funds. In this way, they strengthen citizens' trust in public institutions and add value to the auditing process.

Audit missions, traditionally, have been performed using manual procedures and standardized methodologies, that both of them are often slow and costly. As the audit environment has change, and nowadays are faced with ever-growing datasets, complex transactions, and demands for rapid reporting, the use of Artificial Intelligence has emerged as a necessity for modernizing public auditing (Kokina & Davenport, 2017). Moreover, the presence of human factor is associated with limitations like potential errors due to fatigue or overload, mental and emotional strain when processing large volumes of data, and difficulties in maintaining critical and analytical precision. In this context the use of Artificial Intelligence can reduce these limitations by supporting the auditor through enhancing the quality of analysis, the speed of processing, and the continuity of audit work.

International practices support this approach. For e.x the case of the U.S. Department of Defense (DoD) according to Kokina and Davenport (2017), AI applications can increase auditors' analytical effectiveness, make some audit stages more time-efficient, and assist in identifying unusual patterns or possible fraud at an earlier stage.

In our study of 130 albanian auditors, 60% expressed support for AI integration, 30% were skeptical, and 10% were neutral. These findings highlight a generally positive perception of AI technologies while emphasizing the need for training and capacity-building for SAI's.

International Applications of AI in Audit Process

Because of the use of Artificial Intelligence in auditing has been increased, many large institutions are exploring AI to enhance the accuracy of their audits, for the aim to analyse large datasets efficiently and detect unusual activities or risks more quickly. For instance, some government

agencies in the United States apply machine learning to process enormous amounts of transactional and contractual data, with the goal of identifying patterns that may indicate risks or irregularities.

These early applications provide valuable examples for audit institutions worldwide. Several Supreme Audit Institutions have begun experimenting with AI tools to support tasks such as risk assessment, financial data monitoring, anomaly detection, and the anticipation of possible irregularities. While full-scale AI integration across the entire audit cycle remains limited, initial projects have already shown promising gains in efficiency, reliability, and transparency.

The use of AI has expanded significantly in developed countries and within large organizations and institutions:

- Global corporations leverage machine learning, natural language processing (NLP), and robotic process automation (RPA) to enhance audit accuracy and accelerate anomaly detection (Issa et al., 2016).

- The U.S. Department of Defence utilizes machine learning algorithms to examine vast numbers of transactions and contracts, enabling the detection of anomalies and the forecasting of potential risks (U.S. Government Accountability Office, 2019).

These examples act as benchmarks for Supreme Audit Institutions around the world, many of which are now integrating AI to strengthen risk assessments, monitor data more effectively, detect anomalies, and anticipate possible financial discrepancies. Some key cases include:

- AI Canada: Use of automation and data analytics in financial and performance audits.

- UK National Audit Office (NAO): AI for risk forecasting and complex governmental data analysis.

- GAO: Use of machine learning to analyze large datasets, identify anomaly and forecast potential risks.

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- ANAO: Use of machine learning and advanced analyses to monitor specific processes and anticipate the risk.

While comprehensive AI implementation is still in its early stages, initial pilot initiatives and focused deployments are already yielding clear gains in operational efficiency, precision, and openness.

Methodology and Empirical Findings

A study involving 130 Albanian public auditors was carried out to evaluate their views on the use of AI in auditing tasks. The main findings are as follows

- 60% support AI integration
- 30% express skepticism
- 10% are neutral

The results show a positive trend for AI use, but also point out the need to improve infrastructure,

protect data, and make sure institutions are ready (Atuilik & Dhalia, 2019).

Model

A regression analysis was carried out to examine the factors affecting public albanian auditors' views on using Artificial Intelligence (AI) in auditing. The dependent variable measured whether auditors supported AI integration (1 = yes, 0 = no or neutral), and the model included the following predictors.

- Age (in years)
- Work experience: Number of years spent in auditing.
- Education level: Bachelor's, Master's, or Doctorate degree.
- Technical skills: Self-rated IT abilities and familiarity with AI.
- Data security perception: Belief that AI can be applied without risking confidentiality.

Table 1: Logistic Regression Results

Variabla e pavarura	Koeficienti (B)	Exp(B)	p-vlera
Mosha	- 0.045	0.956	0.012**
Pervoja profesionale	-0.038	0.963	0.082**
Arsimi	0.120	1.128	0.420
Njohuri teknologjike	0.510	1.665	0.000***
Besueshmeria e te dhenave	0.275	1.316	0.009**

Notes: Dependent variable = support for AI use. ***p < 0.01; **p < 0.05. (Source: Author)

Model formula:

$$\ln \left(\frac{p}{1-p} \right) = 0.85 - 0.045 * \text{Age} - 0.038 * \text{Experience} + 0.120 * \text{Education} + 0.510 * \text{Knowledge IT} + 0.2575 * \text{Trust in data security}$$

where *p* is the probability that an auditor supports the use of AI.

The main regression results showed that:

Age and professional experience had a moderate negative effect ($p < 0.05$), suggesting that younger auditors with fewer years of experience were more open to the use of AI compared to their older colleagues.

-Education level did not result in a statistically significant impact, suggesting that the tendency

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to support AI is more related to practical technological skills than to the level of formal education.

-Auditors' technical abilities were found to significantly boost their support for AI ($p < 0.01$). Those who rated their tech skills higher showed a greater likelihood of endorsing AI adoption, with each point increase in skill raising the chance of support by about 66.5%

-Auditors who were concerned about the security of AI were less willing to use it ($p < 0.05$). Lower confidence in AI's ability to protect data corresponded with reduced support for its implementation.

The adoption of AI in public auditing in Albania depends mainly on auditors' technical skills and their trust in data protection. Older or more experienced auditors tend to be cautious, which highlights the need for ongoing training and clear rules so that AI supports their work instead of being seen as a replacement.

Conclusion

Our study found that successful AI integration in Albanian public audits relies on auditors' technical skills and their confidence in data security. The caution shown by more experienced auditors underscores the importance of training and clear guidelines, ensuring AI serves as a tool to assist auditors rather than replace them. However, there remains a concern that over-reliance on AI could diminish the 'human factor,' reducing attention to the individuals being audited.

Major Areas Where AI is Applied in Public Auditing

Drawing on current practices and research, AI is primarily applied in the following areas:

- Automating routine tasks: helping to save audit time and lower costs.
- Risk evaluation and forecasting: allowing auditors to identify potential problem areas early
- Detecting fraud: identifying transactions or activities that appear unusual or inconsistent (Brown-Liburd et al., 2015).
- Monitoring compliance: applying automated tools to examine contracts, tenders, and official documents.
- Data reporting: using visual dashboards to enable faster and clearer decision-making (Yoon et al., 2015).

Challenges and limitations

While AI offers clear advantages, its use in public auditing also comes with potential risks.

-Quality and security of data: public data are often dispersed and non-standardized. -Algorithmic biases: AI models may produce biased outcomes if trained on inaccurate data (O'Neil, 2016)

-Transparency issues: Some AI systems are like "black boxes," so it is hard to see how they reach conclusions. This makes direct interaction with real audit situations harder than in traditional human-led audits.

-Ethics and law: Rules and guidelines are needed to make sure AI is used fairly and responsibly (INTOSAI, 2020).

-Human role: Even though AI can automate many tasks, it cannot fully understand context, emotions, or special circumstances. This shows the importance of combining AI with auditors' judgment to keep audits accurate, trustworthy, and detailed.

Combining AI tools with the skills and judgment of auditors is key to ensuring that public audits are both trustworthy and complete.

Future perspectives

Using artificial intelligence (AI) in public audits can help reduce mistakes, boost efficiency, and provide more detailed understanding of financial data. In the future, AI is expected to support audits in several important ways.

-Blockchain: improves tracking of transactions and transparency in financial audits, enhances transparency, supporting more accurate audits of financial statements and public funds.

-Automated audits: AI can observe fund usage in real time, detect irregularities, and strengthen fraud prevention measures, monitors fund usage in real time, detects irregularities, and supports fraud prevention.

-International standardization: aligns audit practices across SAIs for better comparability and transparency also improving comparability.

-Human-AI collaboration: AI assists auditors by combining data analysis with human judgment, through combining advanced data analytics with human insight and professional judgment, rather than replacing them (Vasarhelyi et al., 2015).

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Moreover, AI can enhance several critical aspects of external audit work, such as:

1. Financial statements: using automated tools to review balances, revenues, expenses, and asset valuations in order to detect inconsistencies with established standards.
2. Compliance: verification of adherence to laws, regulations, and accounting standards.
3. Fraud detection: identifying anomalies and indicators of suspicious activity in financial transactions and documents.
4. Risk evaluation: applying machine learning to examine operational, financial, and error-related risks to anticipate possible financial problems.

Looking ahead, the use of AI in public auditing highlights the need for a combined approach, where technology and auditors' skills work together to enhance efficiency, precision, and transparency in managing public resources.

Results

Artificial intelligence (AI) is increasingly playing a pivotal role in modernizing state-level public auditing by enhancing the speed, accuracy, and transparency of audit activities. Examples from international practice illustrate that AI facilitates the handling of large volumes of data, accelerates audit workflows, identifies anomalies, and contributes to fraud prevention.

The results from our Albanian study indicate strong auditor support for AI adoption. While there is a clear trend toward integrating AI into auditing practices, challenges remain concerning infrastructure, safeguarding data, and establishing an appropriate legal framework.

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MEDICAL AND HEALTH SCIENCES

Original research

The Impact of Rheumatoid Arthritis on Functional Ability and Health-Related Quality of Life

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Abstract

Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with pain, functional impairment, and reduced quality of life. This cross-sectional study aimed to evaluate the impact of rheumatoid arthritis on functional performance and health-related quality of life by assessing pain perception, daily functional limitations, and disease-related challenges among adults living with rheumatoid arthritis. The study included adults aged ≥ 40 years and was conducted between May and November 2025 following ethical approval obtained between May and June 2025. Data collection was performed using the Health Assessment Questionnaire-II (HAQ-II), a standardized instrument for evaluating functional ability and Health status in individuals with rheumatic diseases. The questionnaire included socio-demographic variables, functional ability measures, and Visual Analogue Scale (VAS)

assessments related to pain intensity, fatigue, sleep difficulties, and arthritis activity. A total of 290 self-reported participants participated in this study. The findings demonstrated that a considerable proportion of participants experienced moderate (42.7%) and severe (28.0%) arthritis-related pain, accompanied by limitations in mobility and activities of daily living. Greater functional difficulties were observed in activities requiring physical strength, balance, and sustained movement. The study highlights the multidimensional impact of rheumatoid arthritis on physical functioning and perceived health status, emphasizing the importance of early assessment, rehabilitation strategies, patient education, and supportive interventions aimed at improving long-term quality of life and functional independence among individuals affected by RA.

Keywords: Rheumatoid Arthritis; quality of life; functional limitations; pain perception; HAQ-II; health-related quality of life

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Introduction

Rheumatoid arthritis (RA) is a chronic, auto immune disease that mainly affects synovial joints and progressively impairs physical functioning and overall health status [1,2]. The condition is characterized by persistent inflammation, pain, joint stiffness, swelling, and structural joint damage, frequently leading to functional disability and reduced independence in daily activities [1,3]. In addition to musculoskeletal manifestations, RA may also affect different organ systems and contribute to long-term physical and psychosocial burden [4]. The course of rheumatoid arthritis is often characterized by alternating periods of remission and exacerbation, during which inflammatory activity may progressively compromise joint integrity and mobility [1,4]. Continuous disease activity can result in irreversible anatomical and functional changes, limiting the individual capacity to participate in occupational, family, and social roles [3,5]. As a consequence, many patients experience deterioration in quality of life and increased dependence on healthcare and supportive interventions [13-17]. Pain is considered one of the most dominant and disabling symptoms experienced by individuals with RA [5,6]. Beyond its physical dimension, chronic pain significantly influences emotional well-being, sleep quality, fatigue, and social functioning [7-10]. Studies have demonstrated that persistent pain in rheumatoid arthritis is frequently associated with depressive symptoms, emotional distress, reduced coping ability, and impaired daily functioning [7-9]. Furthermore, fatigue has been identified as an important component affecting patients with RA and is closely related to pain severity and psychological status [10]. Sleep disturbances and functional limitations further aggravate patients' perception of health and quality of life [11]. According to the World Health Organization (WHO), quality of life represents an individual's perception of their position in life within the cultural and value systems in which they live, and in relation to their goals, expectations, standards, and concerns [11]. In

patients with chronic rheumatoid diseases, quality of life encompasses not only physical health but also psychological condition, degree of independence, social relationships and participation in everyday activities [12,13]. Previous studies have consistently shown that individuals with rheumatoid arthritis report poorer physical functioning and lower health-related quality of life compared with the general population [13-17]. Functional limitations associated with RA frequently interfere with activities of daily living such as dressing, personal hygiene, walking, climbing stairs, lifting objects, and performing household tasks. These limitations may progressively reduce autonomy and negatively affect emotional and social well-being [16,17]. In addition, socio-demographic factors including age, gender, educational level and employment status may influence symptom perception, disease management, and access to healthcare resources [13,14]. Given the multidimensional impact of rheumatoid arthritis, there is an increasing need for evidence-based interventions that combine medical treatment, rehabilitation, health education, and psychosocial support [16]. Understanding the relationship between pain perception, functional ability, and quality of life may contribute to the development of patient-centred healthcare strategies and supportive interventions aimed at improving long-term outcomes in individuals living with RA [13,16,17]. Therefore, the aim of this study was to assess the impact of rheumatoid arthritis on quality of life by evaluating pain perception and functional limitations among adults affected by the disease, in order to support future health promotion and rehabilitation strategies.

Materials and Methods

Study Design and Setting

A cross-sectional quantitative study was conducted to evaluate the impact of rheumatoid arthritis on functional performance and health-related quality of life by assessing pain perception, daily functional limitations, and disease-related

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challenges among adults living with rheumatoid arthritis living in the city of Vlora, Albania. The study was carried out during the period May-November 2025 and focused on individuals aged 40 years and older who reported symptoms or diagnosis related to rheumatoid arthritis. This research aimed to provide an overview of the functional and health-related challenges experienced by this population group and to support the development of evidence-based healthcare interventions.

Study population and Sampling

The target population consisted of adults aged 40 years residing in the Vlora region. Participants were recruited through field-based data collection and through the Central Polyclinic where individuals with rheumatic conditions receive primary healthcare services. Participation in the study was voluntary. Individuals who agreed to participate were informed about the purpose of the study and were allowed to complete the questionnaire only once during the data collection process. A total of 290 participants were included in the final analysis. The study used a non-probability convenience sampling approach due to the accessibility of the target population and the exploratory nature of the research.

Data Collection Instrument

Data were collected using the Health Assessment Questionnaire-II (HAQ-II), a standardized self-report instrument widely applied in clinical and research settings for the assessment of functional ability and health status among individuals with chronic rheumatic diseases. The (HAQ-II) is considered a reliable and practical instrument for evaluating limitations in activities of daily living and the overall impact of musculoskeletal disorders on quality of life. The questionnaire consisted of two main sections. The first section included socio-demographic characteristics such as gender, age, marital status, educational level, employment status, and place of residence. In addition, this section contained questions related to

physical functioning and disability in daily activities. Participants were asked to evaluate their ability to perform different routine activities including dressing, personal hygiene, walking, climbing stairs, lifting objects, and performing household tasks. Responses were categorized according to the degree of difficulty experienced during activity performance. The second section assessed pain intensity and arthritis activity. Pain perception during the previous week was evaluated using Visual Analogue Scale (VAS) ranging from 0 to 10, where 0 represented "no pain" and 10 represented "severe pain". Based on the obtained scores, pain intensity was categorized as mild (1-3), moderate (4-6), or severe (7-10). Additional VAS measures were used to assess fatigue, sleep-related difficulties and arthritis activity during the last 24 hours. Questions regarding morning stiffness and perceived changes in health status compared with the previous month were also included. Prior to the implementation of the study, linguistic adaptation and pilot testing procedures were performed to ensure clarity, comprehensibility, and appropriateness of the questionnaire for the local population.

Data Collection Procedure

Data collection was conducted over a five-month period through direct administration of questionnaires in healthcare and community settings. Academic staff members and students involved in the project participated in the distribution and administration of the questionnaires. Participants completed the questionnaires individually after receiving information regarding the objectives and the confidentiality of the study. To ensure data quality and reduce duplicate participation, respondents were allowed to complete the questionnaire only once. The collected data were reviewed for completeness and consistency before statistical analysis.

Statistical Analysis

Data analysis was performed using IBM SPSS Statistics Version 23. Descriptive statistical methods

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were used to summarize socio-demographic variables and responses related to functional limitations, pain intensity, and arthritis activity. Frequencies, percentages, and distribution measures were calculated for categorical variables. Inferential statistical analyses were conducted to examine associations between socio-demographic characteristics and arthritis-related variables. Ordinal regression analysis was applied to evaluate the effect of independent variables such as gender, age, marital status, educational level, employment status, and place of residence on pain perception and arthritis activity. Model fitting procedures and parameter estimates were interpreted based on statistical significance levels. Additionally, One Way ANOVA analysis was used to explore relationships among selected variables and compare differences between participant groups. Statistical significance was considered at a p-value <0.05.

Ethical Considerations

This study was conducted within the framework of the scientific research project "The Impact of Rheumatoid Arthritis on Individuals' Ability to Have Quality Health" supported by the scientific research grant scheme of the University of Vlora "Ismail Qemali". Ethical approval for the implementation of the study was obtained from the Faculty of Health prior to data collection. All participants were informed about the purpose and procedures of the study before participation. Voluntary participation, anonymity, confidentiality of a personal information, and the right to withdraw from the study at any age were guaranteed in accordance with ethical principles and applicable data protection regulations. Informed consent was obtained from all participants before questionnaire administration.

Results

Socio-demographic characteristics

The final analysis of the study included 290 self-declared persons, of whom 180 were female with

a percentage of 62.1%, 109 were male with a percentage of 37.6% and 1 person was unidentified with 0.3%, not specifying gender. However, according to the valid percentages, 62.3% were female and 37.7% were male out of 289 persons (99.7%).

Gender: Of the total 289 participants, the majority are female, accounting for 62.3% (N=180), while males account for 37.7% (N=109). This percentage indicates a dominance of female participation, which may be related to their higher interest in the topic of the study or to the demographic structure of the target group.

Age: The most represented age group is 55 years old, with 5.4% (N=15). The age distribution shows a significant presence of middle-aged and older participants, which may have implications for the perceptions and experiences reported in the study, given the potential differences between age groups.

Marital status: The majority of participants are married (80.1%, N=230). Singles make up 4.9% (N=14), divorced 1.4% (N=4), while 13.6% (N=39) are widowed. This distribution reflects a stable family structure and may be related to social and economic factors that influence participation and engagement in study activities.

Educational level: About half of the participants have completed 8–9 years of education (49.8%, N=144), 36.7% (N=106) have secondary education, while 13.5% (N=39) have higher education. This indicates an educational profile focused mainly on primary and secondary education, which may affect the level of knowledge and perceptions of the participants regarding the topic of the study.

Employment status: The analysis of employment status shows that 49.8% (N=143) are retired, 26.8% (N=77) are employed, 19.2% (N=55) are unemployed, and 4.2% (N=12) have disability status. This distribution reflects a significant share of individuals who are not professionally active, which may affect their availability and reported personal experiences.

Place of residence: Regarding residence, 64.2% (N=183) live in their own homes, 27.7% (N=79)

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live with children, and 8.1% (N=23) live in rented accommodation. This reflects the stability of housing and may affect the social and economic conditions of the participants, which are relevant for the interpretation of the study data. These characteristics provide an important framework for interpreting the study results and

help identify demographic factors that influence the variables studied.

The socio-demographic data of the study participants are presented in the table 1:

Table 1. Socio-demographic data of the study participants, n=289

Variables	Description	Categories	Frequency (n)	Percent (%)
Gender	Gender of participants	Female	180	62.3
		Male	109	37.7
Age	Age group (most represented)	55 years old	15	5.4
Civil status	Civil status	Married	230	80.1
		Single	14	4.9
		Divorced	4	1.4
		Widow	39	13.6
Educational level	Completed education	8-9 years of education	144	49.8
		Secondary education	106	36.7
		Higher education	39	13.5
Employment status	Job status	At work	77	26.8
		Unemployed	55	19.2
		Invalid	12	4.2
		Retiree	143	49.8
Place where you live	Apartment type	In my house	183	64.2
		For rent	23	8.1
		With children	79	27.7

Table 2. Data on daily activities that indicate functional limitation

Question	No Difficulty (%)	Some Difficulties (%)	More Difficulties (%)	Impossible to do (%)	Total Valid
Can you dress yourself, including tying shoelaces and/or buttoning?	27.2	44.3	21.3	7.3	287
Can you wash your hair with shampoo?	50.0	34.3	11.5	4.2	286
Can you get up from a chair without support?	24.6	36.7	29.1	9.7	289
Do you sleep and get out of bed?	35.5	41.8	18.5	4.2	287

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Can you cut meat?	31.4	31.4	26.9	10.3	290
Can you lift a full cup or glass to your mouth?	60.8	25.3	11.5	2.4	288
Can you open a new carton of milk?	45.2	35.2	15.2	4.5	290
Do you walk outside on flat ground?	52.8	33.4	10.7	3.1	290
Can you climb five stairs?	20.0	41.4	26.2	12.4	290
Do you wash and dry the whole body?	44.5	38.6	12.1	4.8	290
Can you take a bath in the bathtub?	38.9	21.8	15.1	24.2	285
Can you get in and out of the toilet?	60.9	27.7	8.7	2.8	289
Can you reach for and pick up an object (e.g., sugar bag)?	53.4	30.7	13.1	2.8	290
Can you bend over and pick up clothes from the floor?	15.5	41.4	31.4	11.7	290
Can you open car doors?	46.9	35.1	14.2	3.8	288
Can you open previously opened jars?	48.3	34.6	10.5	6.6	286
Can you turn on and off the faucets?	69.2	19.7	8.3	2.8	289
Can you run errands and do shopping?	29.4	34.3	23.9	12.5	289
Can you get in and out of a car?	37.8	39.5	16.4	6.3	286
Can you operate tasks such as vacuuming with vacuum cleaner, or broom in the yard?	28.2	31.1	21.8	18.9	280

From graph 1 it can be seen that:

1. Dressing and personal care

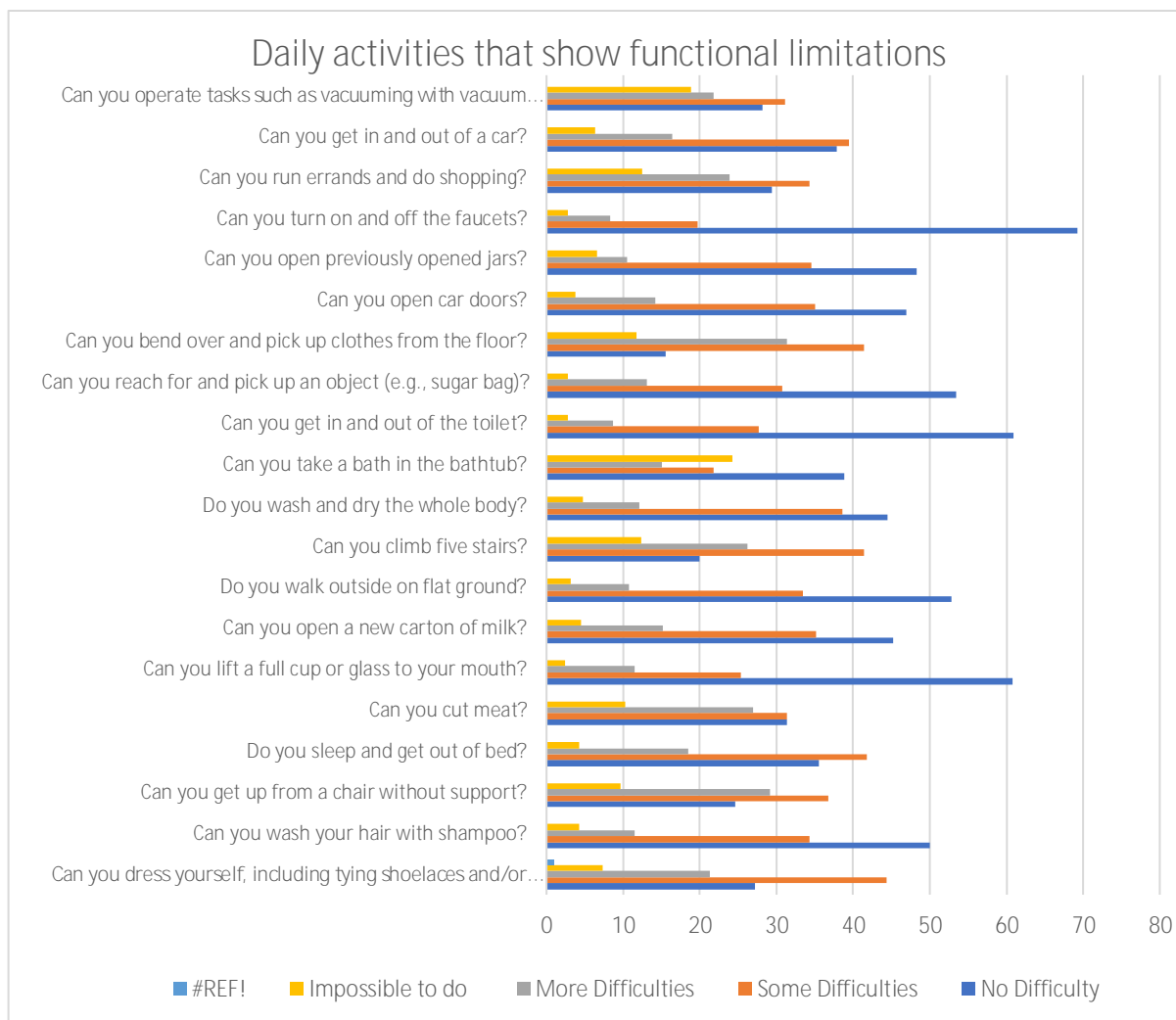
- Regarding the question 'Can you dress yourself, including tying shoelaces and/or buttoning?', 27.2% did not encounter any difficulties, 44.3% with some difficulties, 21.3% with some difficulties and 7.3% found it impossible to do so. This

shows that dressing can be a problematic activity for a significant part of the group.

Regarding the question 'Can you wash your hair with shampoo?', 50% have no difficulties, but 34.3% face some difficulties and 11.5% a lot. The activity seems easier than dressing, but about 15.7% of participants have a lot of difficulties or cannot perform it.

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Graph 1. Presentation of difficulties depending on the nature of the activity



2. Movement and mobility

- Regarding the question 'Can you get up from a chair without support?'. Only 24.6% have no difficulty, 36.7% encounter some and 29.1% a lot. 9.7% cannot do it. Sitting mobility-awareness of leg strength is a challenge for most.
- Regarding the question 'Do you sleep and get out of bed?', this activity seems a little easier. 35.5% no difficulty, but 18.5% a lot of difficulty and 4.2% found it impossible to do so.

3. Hand motor skills

- Regarding the question 'Can you cut meat?': 31.4% no difficulty, 26.9% very difficult, 10.3% impossible to do so. The cutting activity requires coordination and strength.
- Regarding the question 'Can you lift a full cup or glass to your mouth?', this activity seems relatively easier. 60.8% no difficulty, only 2.4% impossible to do so.
- Regarding the question 'Can you open a new carton of milk?', the results showed that 45.2% no difficulty, 15.2% very difficult and 4.5% found it impossible to do so.

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4. Walking skills

- Regarding the question 'Do you walk outside on flat ground?', 52.8% no difficulty, the activity seem easier than climbing stairs, but 10.7% very difficult and 3.1% cannot do it.
- Regarding the question 'Can you climb five stairs?', Heavy physical activity; only 20% no difficulty, 26.2% very difficult and 12.4% impossible. This is one of the most challenging mobility activities.

5. Skills to perform personal hygiene

- Regarding the question 'Do you wash and dry the whole body?', 44.5% have no difficulties, 38.6% face some, and 12.1% a lot of difficulties, while 4.8% cannot do it. Complete personal care poses challenges for a significant part.
- Regarding the question 'Can you take a bath in the bathtub?', A more problematic activity, as 24.2% cannot do it and 15.1% encounter a lot of difficulty. Only 38.9% do not encounter any problems. This shows that activities that involve bathing or immersion can be problematic for participants.
- Regarding the question 'Can you get in and out of the toilet?', 60.9% did not encounter any difficulties, 27.7% with some difficulties, 8.7% with a lot of difficulties and 2.8% found it impossible to do.

6. Picking up and lifting objects

- Regarding the question 'Can you reach for and pick up an object (e.g., sugar bag)?', 53.4% no difficulty, 13.1% very difficult and 2.8% found it impossible to do.
- Regarding the question 'Can you bend over and pick up clothes from the floor?', only 15.5% no difficulty, 31.4% very difficult and 11.7% impossible to do so.

7. Capturing skills

- Regarding the question 'Can you open car doors?', 46.9% no difficulty, 14.2% very difficult, and 3.8% found it impossible to do. Relatively manageable activity.

- Regarding the question 'Can you open previously opened jars?', 48.3% no difficulty, 10.5% very difficult and 6.6% impossible to do so.
- Regarding the question 'Can you turn on and off the faucets?'. Easiest activity. 69.2% no difficulty, 8.3% with great difficulty and 2.8% found it impossible to do.

8. Daily Activities and Housework

- Regarding the question 'Can you run errands and do shopping?': 29.4% no difficulty, 23.9% very difficult, and 12.5% impossible.
- Regarding the question 'Can you get in and out of a car?', 37.8% no difficulty, 16.4% very difficult, 6.3% impossible.
- Regarding the question 'Can you operate tasks such as vacuuming with vacuum cleaner, or broom in the yard?'. Physical activity required, only 28.2% no difficulty, 21.8% very difficult, and 18.9% impossible.

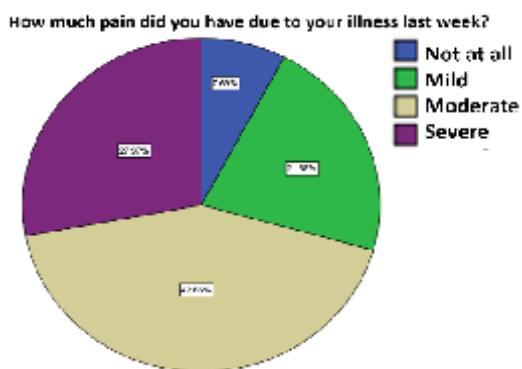
There is a clear trend where activities that require greater mobility and strength are associated with a higher percentage of "great difficulty" and "impossibility." Basic personal activities, such as dressing and washing hair, maintain a significant level of independence, but a significant proportion report mild to moderate difficulty. Activities that require balance, strength, and coordination indicate the need for assistive interventions and physical support. This information can be used to plan rehabilitation programs, adapt the environment, and create strategies to maintain individuals' independence in ADLs.

Arthritis pain in the past week

From graph 2 it can be seen that Of the total of 290 individuals who participated in this questionnaire, only 286 or 98.6% are valid, while 4 or 1.4% are unidentified. According to the valid data, it results that 7.7% have not had any pain at all, 21.7% have pain, and 28.0% have had severe pain.

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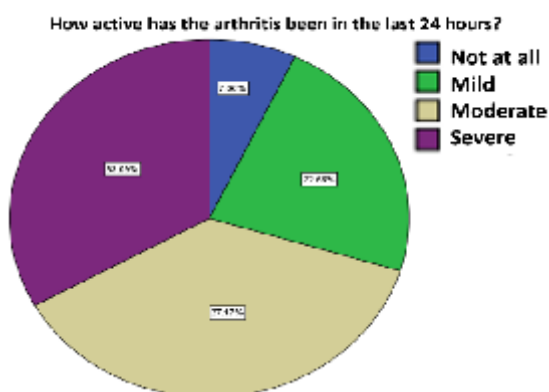
Graph 2. Nature of pain due to arthritis during the past week.



How active was arthritis in the Last 24 hours?

Of the total of 290 individuals who participated in this questionnaire, only 269 or 92.8% are valid, while 21 or 7.2% are unidentified.

Graph 3. Arthritis activation in the LAST 24 HOURS?



According to valid data, it results that in 7.1% the arthritis was not active at all, in 22.7% the arthritis was active to a mild degree, in 37.2% the arthritis was active to a moderate degree, and in 33.1% the arthritis was active to a severe degree.

Pain in the past week and socio-demographic variables

We performed ordinal regression to examine the effect of gender, age, marital status, educational level, employment status, and place of residence on the variable "How much PAIN did you have due to your illness in the PAST WEEK?".

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	611.713			
Final	479.249	132.464	65	.000

According to the data, 167 women or 64.2% have had more pain during the past week, which corresponds to a higher percentage than men. This is because women are also subject to other physiological processes (pregnancy, menstruation or in the postpartum period), and they even have smaller sizes and values of formations (amount of blood, cells, tissues, etc.) in the body than men. Due to these factors, women are more exposed to feeling joint pain than men. Regarding age, with increasing age, the tendency for joint pain also increases because the functioning of organs and the body's immune defence forces weaken. According to these data, the 13 individuals between the ages of 55 and 65 with a percentage of 5.0% have the highest percentages. Regarding civil status, 208 married individuals with a percentage of 80.0% make up the majority who have had joint pain. Regarding the educational level, 134 individuals or 51.5% with an 8-9 years-old level prevail, who have less knowledge about arthritis and may neglect the treatment or medication of the pathology. Regarding the employment status, the majority who have had arthritis pain are 130 retired individuals or 50.0%, where due to concomitant pathologies or physiological factors they are more exposed to arthritis. Regarding the residence, the majority are 166 individuals or 63.8%

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who live in their own home. Unfavourable housing conditions increase the symptoms of arthritis.

Arthritis in the last 24 hours and socio-demographic variables

We performed ordinal regression to examine the effect of gender, age, marital status, educational level, employment status, and place of residence on the variable "How active has your arthritis been in the LAST 24 HOURS?".

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	29.704			
Final	29.704	.000	1	.987

Variable Active Arthritis in the last 24 hours is not affected by variable gender.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	328.356			
Final	227.510	100.846	55	<0.001

The variable Active Arthritis in the last 24 hours is affected by the variable age. As mentioned above, with increasing age, other pathologies may appear, the function of various organs decreases, and the sensitivity of the organism increases. All these factors will favour the activity and activity of arthritis.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	46.642			
Final	44.262	2.380	3	0.497

Variable Active Arthritis in the last 24 hours is not affected by variable marital status.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	50.959			
Final	42.061	8.898	2	0.012

The variable Active Arthritis in the last 24 hours is affected by the variable education level. An individual with a high level of education may have more knowledge about arthritis, they may have in their social circle or family members who are part of the health personnel, and even the income of an individual with a higher education and a diploma is higher than that of an individual with a low level of education. All these factors give individuals with a high level of education more opportunities to manage the symptoms of arthritis.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	88.093			
Final	58.882	29.211	3	<0.001

The variable Active Arthritis in the last 24 hours is affected by the variable employment status. An individual with a higher-paying job is more likely to manage arthritis.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	41.014			
Final	38.334	2.680	2	.262

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Variable Active Arthritis in the last 24 hours is not affected by variable place of residence.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	41.014			
Final	38.334	2.680	2	0.262

Discussion

The present study provides important evidence regarding the burden of rheumatoid arthritis on functional capacity and perceived health status among adults experiencing chronic rheumatoid symptoms. The findings indicate that rheumatoid arthritis substantially compromises the ability to perform activities of daily living, particularly those requiring mobility, physical endurance, postural stability, and coordinated motor function. A progressive pattern of functional limitation was observed across activities demanding greater musculoskeletal effort. Tasks such as climbing stairs, bending to pick up objects, carrying out household activities, and maintaining prolonged physical activity were associated with considerably higher levels of difficulty and dependency. In contrast, less physically demanding self-care activities demonstrated relatively preserved autonomy. This distribution of limitations suggests that functional decline in rheumatoid arthritis is closely associated with the physical demands of everyday activities and the cumulative effects of chronic pain and joint impairment. Pain perception represented one of the most influential dimensions affecting participants' quality of life. Individuals reporting moderate and severe pain also demonstrated poorer functional performance and reduced independence in routine activities. These findings support

previous evidence indicating that pain in rheumatoid arthritis extends beyond nociceptive experience and contributes significantly to physical restriction, psychological burden, and social limitation. The analysis additionally revealed the influence of socio-demographic characteristics on disease experience. Female participants and older adults reported higher levels of pain and functional impairment, a finding that may reflect both biological vulnerability and age-related decline in musculoskeletal resilience. Educational also appeared to influence disease management and symptom perception, suggesting that health literacy and access to healthcare-related information may affect self-management behaviours and treatment adherence. Employment status emerged as another relevant determinant associated with arthritis activity and perceived disability. Retired and economically inactive participants tended to report greater disease burden, potentially reflecting the combined impact of aging, comorbidities, reduced physical engagement, and social dependency. These findings underline the importance of considering social and economic determinants when planning long-term management strategies for chronic rheumatic conditions. The results of this study reinforce the need for comprehensive and patient-centred models of care in rheumatoid arthritis management. Although pharmacological treatment remains essential, the complexity of rheumatoid arthritis requires multidimensional interventions integrating rehabilitation, patient education, psychosocial support, and strategies aimed at preserving functional independence. Early identification of functional deterioration and continuous monitoring of patient-reported outcomes may contribute to more individualized and effective approaches to chronic disease management. Furthermore, the study highlights the relevance of incorporating quality-of-life assessment into routine clinical practice, particularly in populations exposed to prolonged disease activity and functional decline. Understanding patients' subjective experiences may facilitate more

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holistic healthcare interventions and improve long-term therapeutic outcomes.

Conclusion

Rheumatoid arthritis exerts a substantial impact on functional independence, pain perception, and overall quality of life among affected individuals. Functional limitations were particularly evident in activities requiring mobility, strength, and sustained physical effort, highlighting the multidimensional burden associated with chronic rheumatic disease. The study findings indicate that socio-demographic characteristics, particularly age, gender, educational level, and employment status, may influence both pain experience and functional performance. These results emphasize the importance of individualized and patient-centred management approaches that address not only clinical symptoms but also functional and psychosocial needs. The integration of rehabilitation strategies, health education, and supportive interventions into routine care may contribute to improving self-management, preserving autonomy, and enhancing long term well being in individuals living with rheumatoid arthritis.

Recommendations

The findings of the present study indicate the necessity of strengthening of multidisciplinary management approaches for individuals living with rheumatoid arthritis, particularly in populations presenting functional limitations and persistent pain symptoms. Healthcare professionals should place greater emphasis on the early identification of functional decline through regular assessment of daily living activities, pain intensity, and mobility status. Periodic evaluation may facilitate timely rehabilitation interventions and improve long-term functional outcomes. Educational interventions targeting self-management strategies, adherence to treatment, physical activity, and joint protection techniques should be incorporated into routine healthcare services for

patients with rheumatoid arthritis. Increasing patient awareness may contribute to better symptom control and improved participation in everyday activities. Special attention should be directed toward older adults, woman, and retired individuals, as these groups demonstrated greater vulnerability to pain severity and functional impairment within the present study population. Tailored supportive programs may help reduce dependence and preserve autonomy in these categories of patients. Future investigations are encouraged to include broader population groups and additional clinical and psychological variables in order to obtain a more comprehensive understanding of factors influencing quality of life in rheumatoid arthritis. The use of longitudinal approaches may further contribute to evaluating disease progression and the effectiveness of supportive interventions over time. In addition, collaboration between healthcare institutions, rehabilitation services, and community-based support structures may improve continuity of care and contribute to enhancing the overall well-being of individuals affected by chronic rheumatic diseases.

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Original Research

Evidence-Based Practice Competence Questionnaire for Nursing Students: A Validation Study in Albania

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Abstract

Evidence-based practice (EBP) is a key element among nurses to ensure high-quality, advanced care in contemporary healthcare systems. Nursing students, as future healthcare professionals, must develop competence in EBP. However, in the Albanian context, there is a lack of instruments to assess EBP competence among undergraduate nursing students.

This study aimed to translate, culturally adapt and validate the Evidence-Based Practice Competence Questionnaire (EBP-COQ) into Albanian, and to test its psychometric properties.

A cross-sectional validation study was conducted using a convenience sample of undergraduate Albanian nursing students. The translated EBP-COQ was tested for reliability and construct validity. Construct validity was initially assessed using an exploratory factor analysis (EFA), and internal consistency was assessed using Cronbach's alpha and McDonald's omega.

A total of 357 nursing students participated, with a mean age of 22.25 years and 82.6% female. The internal consistency of the Albanian EBP-COQ was high (Cronbach's alpha = 0.866; McDonald's omega = 0.855). Exploratory factor analysis identified three factors: Attitude toward EBP, Perceptions toward EBP, and Knowledge and Skills in EBP. The three factors together explained 44% of the total variance, comparable to values reported in previous validation studies of the EBP-COQ. All three factors showed statistically significant positive correlations with overall EBP competence. This study has some limitations, including data collection from a single university and the absence of test-retest reliability assessment, which may limit the generalizability of the findings. Conclusions: The Albanian EBP-COQ shows strong validity and reliability for assessing attitudes, skills, and knowledge in EBP among nursing populations in this geographic area. This scale can be used to assess baseline competence

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and guide educators and researchers in designing strategies to strengthen EBP. Additionally, it may be used to evaluate the effectiveness of EBP-related courses or workshops, monitor changes in students' competence over time, and identify factors associated with EBP competence.

Keywords: evidence-based practice; nursing; validation; students; validity

Introduction

Nurses face several challenges in delivering high-quality patient care. One key element for nurses to ensure safe and advanced care is their competence in evidence-based practice (EBP) [1,2]. EBP is a process in which healthcare personnel's clinical expertise is combined with the most up-to-date research evidence and patient values and preferences to achieve the best clinical outcomes [3]. According to the literature, although nurses have a positive attitude toward EBP, they lack several skills and knowledge related to it. Additionally, their inability to adopt EBP in their clinical routine was underscored [4-7]. Recognising the significance of evaluating nurses' EBP skills, attitudes, and knowledge, a Delphi study identified 24 core EBP competencies for nurses and synthesised them into a research tool to achieve this goal [8].

EBP is a beneficial approach for all participants in healthcare, first for patients and second for nurses, as it ensures optimal patient outcomes and boosts nurses' self-confidence and satisfaction [9]. Additionally, EBP has been positively correlated not only with quality improvement but also with reduced clinical errors among nurses. Apart from those, there is evidence that healthcare costs can be reduced through the provision of more effective care, which is achieved by the adoption of EBP by medical and nursing staff [10-12].

Nursing students, as future healthcare professionals, need to be competent in EBP to meet the requirements of modern healthcare systems.

However, it is widely recognised that adopting and implementing EBP in clinical practice confronts obstacles, including nurses' educational backgrounds and their knowledge, attitudes, and skills regarding EBP [1,13]. Academia plays a crucial role in developing educational strategies to address these barriers and prepare upskilled nursing students to embrace EBP in their future profession [14,15]. A descriptive study across six European countries, including 162 faculties and 276 nursing programs, found that most have not yet integrated EBP as an independent course within their curricula [15]. Therefore, teaching EBP early in their studies should be a primary goal, enhancing nursing students' self-efficacy and critical thinking skills [15,16].

A review of the scientific literature identified 34 instruments exploring EBP competence among healthcare workers as of 2023, with the majority implemented among nurses [17]. Regarding research tools to measure nursing students' knowledge, attitudes, and skills in EBP, over the last few decades, the Evidence-Based Practice Competence Questionnaire (EBP-COQ) has gained traction, as it has been used in numerous studies [18]. It has been translated and validated into Turkish [19], Polish [20], English [21], Persian [22], and Greek [23]. Additionally, the EBP-COQ has been validated and culturally adapted in Colombian nursing students [24].

A recent systematic review and meta-analysis underscores the lack of published studies in European countries, especially in the Balkan region [25]. In addition, Komuhangi et al.'s systematic review (2025) contributed evidence on nursing students' EBP competence, but only one study was from Central Europe [26]. These findings highlight the lack of published studies regarding undergraduate nursing students' EBP competence in the Albanian regional context. This evidence gap is further compounded by the absence of valid, reliable research tools to assess EBP competence in this setting. This fact remains an obstacle to illuminating the current situation in Albanian nursing students regarding EBP. Therefore, the primary aim of the current study is to

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translate and validate the Albanian version of EBP-COQ, testing its psychometric properties to address the existing knowledge gap regarding EBP.

Materials and Methods

Design and Setting

An observational validation study to test the psychometric properties of the tool was performed at the Faculty of Health of the University of Vlora "Ismail Qemali" in Albania. The university offers a three-year bachelor's degree program in nursing. Data was collected using a convenience sampling method. Although this approach facilitated access to the target population, it may have introduced potential selection bias, as these participants may not be representative of the wider population. Consequently, the generalizability of the findings should be interpreted with caution. Future investigations using random sampling methods could further enhance the representativeness of the results.

The data collection was conducted from January to April 2022 among a sample of undergraduate nursing students. A total of 1100 undergraduate nursing students were approached to participate in the present study, completing an online questionnaire distributed via their official university email addresses. In the present study, test-retest reliability was not assessed due to the study's methodological design and practical constraints related to recontacting participants for a second measurement (online questionnaire administration).

The questionnaire

The participants completed a self-reported questionnaire divided into two parts. In the first part of the tool, nursing students are invited to complete demographic information including age, gender, academic year, possession of other bachelor's or master's degrees and education in research methodology. The second section of the questionnaire encompassed the EBP-COQ. The tool was first designed and validated in Spanish

by Ruzafa-Martinez et al. (2013) and explores nursing students' attitudes, skills and knowledge towards Evidence-Based Practice (EBP), combined with their English proficiency, previous education in EBP, methodology, statistics, and computer skills [18]. The EBP_COQ consists of 25 items organised in 3 dimensions: 1. Attitude toward EBP, 2. Skills in EBP and 3. Knowledge in EBP. Each item of the tool is assessed using a 5-point Likert scale from 1 (totally disagree) to 5 (totally agree). The subscale "Attitude toward EBP" consists of 13 items exploring nursing students' perceptions and the possible benefits of implementing EBP in their future clinical routine. The second subscale, using 6 items, assesses nursing students' skills in EBP, while the third subscale, "Knowledge in EBP," investigates their knowledge of research methodology applied to EBP. The EBP_COQ is applicable and friendly to student populations due to its short completion time and ease of formation.

Translation

The initial questionnaire was developed in Spanish. The questionnaire translation from Spanish to Albanian was conducted by two individuals who independently translated the original Spanish version. Both were fluent in Spanish and Albanian. After this phase, a reconciled translation (1st reconciliation version) was produced by a third party, representing a consensus between the two versions. Then, this agreed-upon version was translated into Spanish (back translation) by a two-language speaker (whose native language was Albanian), a qualified translator who was unfamiliar with the original questionnaire. An expert panel then reviewed all versions of the questionnaire to ensure equivalence between the original and translated versions, producing a semi-final Albanian version of the EBP-COQ.

After the cross-cultural adaptations of the semi-final version of Albanian EBP-COQ, the ten nursing students from the target population completed the derived version of the tool to assess its face validity [27]. Feedback indicated that all

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items were clearly understood and culturally relevant. The nursing students reported no difficulties understanding the questions, and none of the items was identified as confusing or inappropriate.

Statistical Analysis

The software IBM® SPSS® version 29 (IBM Corp., Released 2023. IBM SPSS Statistics for Windows, Version 29.0.2.0, Armonk, NY: IBM Corp) was used to statistically analyse the data. The level of statistical significance was set at 0.05. Exploratory factor analysis was conducted using Principal Component Analysis with the Equamax Rotation Method. A KMO value above 0.60 is considered acceptable for proceeding with factor analysis [28]. The final model factor retention was based on specified criteria: (i) Scree plot analysis, retaining factors appearing before the inflection point (elbow) in the curve [29]; (ii) a minimum of three items with factor loadings 0.40 should be comprised in each factor [30]; (iii) eigenvalues greater than one were included according to the Kaiser criterion analysis [31]. Cronbach's alpha and McDonald's omega were evaluated to assess the internal consistency of the scale. Discriminant validity was assessed using a t-test.

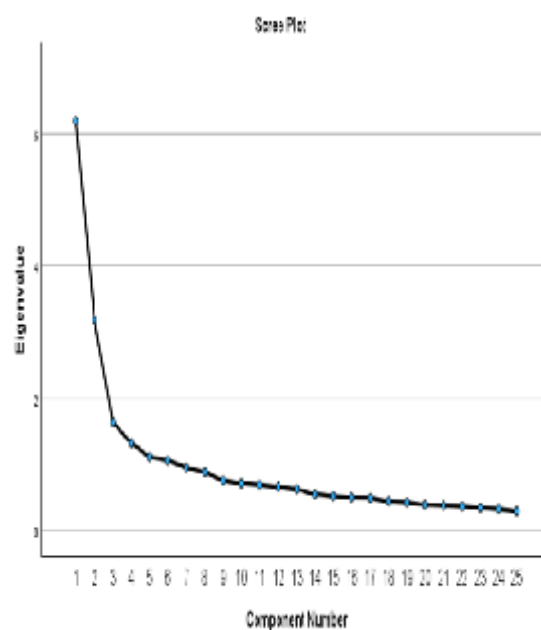
Results

The sample comprised 357 undergraduate students enrolled in this study. The sample consisted of 295 female students (82.6%) 60 male participants (16.8%), and two students (0.6%) who did not specify their gender. The mean age of the participants was 22.25 years with a standard deviation of 7.36, ranging from 18 to 53 years. Most students were enrolled in the 1st to 3rd semesters (190 students, 53.2%), whereas 167 students (46.8%) were in the 4th to 9th semesters. The translated questionnaire was initially piloted with a small, representative sample of 10 nursing students. Participants indicated that the items were clear, comprehensible, and culturally appropriate. No ambiguities or misunderstandings

were identified, and none of the items was perceived as problematic. Given the absence of issues requiring modification, it was determined that the translation successfully maintained the conceptual integrity of the original scale.

Construct validity was estimated via a principal component factor analysis. The Kaiser-Meyer-Olkin (KMO) sample adequacy analysis was 0.865. At the same time, Bartlett's test of sphericity yielded a value of 2923.39 ($p < 0.001$). All items demonstrated adequate Measures of Sampling Adequacy (MSA), exceeding the acceptable cut-off of 0.5. Following the Equamax rotation, three components were extracted, each with eigenvalues greater than 1 (4.33, 2.63, and 4.07, respectively), accounting for a cumulative variance of 44.10%. Based on the scree plot (Fig.1), the Kaiser criterion (eigenvalues > 1) [31], and the minimum acceptable explained variance (exceeding 50%), the optimal number of factors was determined to be three.

Figure 1. Scree plot of exploratory factor analysis



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Few differences were observed when comparing the results with those of the original Spanish version, as the item loadings on the extracted components did not follow the pattern reported by the original developers. Specifically, the initial Attitude toward EBP scale was divided into two subscales: Attitude toward EBP and Perceptions toward EBP. Conversely, the original subscales of Skills and Knowledge in EBP were combined into a single subscale, labelled Skills & Knowledge in EBP.

Tables 1 and 2 present the descriptive statistics for each item, including the mean and standard deviation, along with exploratory factor analysis (EFA) indices such as Measures of Sampling Adequacy (MSA), factor loadings, and results

from reliability analysis (Cronbach's alpha). Items A9, A10, A11, H2, H3, H5, C3, and C5 reflected negatively worded statements and were therefore reverse-scored so that lower values consistently indicated higher levels of the component. In the EFA, negative factor loadings indicate an inverse relationship between the item and the latent factor; after reverse scoring, the direction of these items aligns with the interpretation of the factor. Cronbach's alpha ranged from 0.707 to 0.844, while McDonald's omega was estimated between 0.708 and 0.840 in the three subscales of the tool. Subsequently, the internal consistency for the overall scale was calculated as 0.866 (Cronbach's alpha) and 0.855 (McDonald's omega), respectively.

Table 1. Summary of responses for the Albanian version of the Evidence-Based Practice Competence Questionnaire (EBP-COQ)

	Totally Disagree		Disagree		Neither Agree nor Disagree		Agree		Totally Agree	
	<i>n</i>	%	<i>N</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
A1	1	0.3	5	1.4	57	16.0	242	67.8	52	14.6
A2	0	0.0	27	7.6	126	35.3	189	52.9	15	4.2
A3	0	0.0	8	2.2	91	25.5	218	61.1	40	11.2
A4	2	0.6	13	3.6	133	37.3	177	49.6	32	9.0
A5	1	0.3	8	2.2	108	30.3	205	57.4	35	9.8
A6	3	0.8	15	4.2	115	32.2	182	51.0	42	11.8
A7	0	0.0	8	2.2	75	21.0	225	63.0	49	13.7
A8	2	0.6	17	4.8	140	39.2	174	48.7	24	6.7
A9	101	28.3	146	40.9	72	20.2	30	8.4	8	2.2
A10	54	15.1	149	41.7	125	35.0	27	7.6	2	0.6
A11	65	18.2	126	35.3	133	37.3	29	8.1	4	1.1
A12	9	2.5	14	3.9	98	27.5	197	55.2	39	10.9
A13	6	1.7	9	2.5	91	25.6	191	53.7	59	16.6
H1	12	3.4	70	19.6	141	39.5	120	33.6	14	3.9
H2	28	7.8	124	34.7	125	35.0	79	22.1	1	0.3
H3	29	8.1	132	37.0	131	36.7	61	17.1	4	1.1
H4	2	0.6	38	10.6	110	30.8	183	51.3	24	6.7
H5	22	6.2	132	37.0	127	35.6	70	19.6	6	1.7
H6	4	1.1	51	14.3	128	35.9	158	44.3	16	4.5
C1	18	5.0	86	24.1	117	32.8	120	33.6	16	4.5
C2	26	7.3	97	27.2	120	33.6	100	28.0	14	3.9
C3	35	9.8	128	35.9	110	30.8	75	21.0	9	2.5
C4	10	2.8	87	24.4	140	39.2	110	30.8	10	2.8
C5	21	5.9	77	21.6	166	46.5	83	23.2	10	2.8
C6	18	5.0	73	20.4	146	40.9	92	25.8	28	7.8

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Table 2. Explanatory factor analysis for the Albanian version of the Evidence-Based Practice Competence Questionnaire (EBP-COQ)

Item	Mean ± SD	MSA	Factor loadings	Cronbach's alpha / McDonalds' omega
Attitude towards EBP				0.820 / 0.818
A1	3.95 ± 0.62	0.888	0.639	
A3	3.81 ± 0.65	0.891	0.714	
A4	3.63 ± 0.72	0.898	0.579	
A5	3.74 ± 0.67	0.877	0.709	
A6	3.69 ± 0.77	0.896	0.723	
A7	3.88 ± 0.65	0.866	0.763	
A12	3.68 ± 0.82	0.834	0.553	
Perceptions towards EBP				0.707 / 0.708
A2	3.54 ± 0.70	0.864	0.330	
A8	3.56 ± 0.71	0.856	0.527	
A9	2.15 ± 1.00	0.821	-0.729	
A10	2.37 ± 0.85	0.797	-0.642	
A11	2.39 ± 0.91	0.797	-0.582	
A13	3.81 ± 0.80	0.845	0.431	
Skills & Knowledge in EBP				0.844 / 0.840
H1	3.15 ± 0.90	0.882	0.615	
H2	2.72 ± 0.90	0.850	-0.543	
H3	2.66 ± 0.89	0.854	-0.539	
H4	3.53 ± 0.79	0.837	0.416	
H5	2.74 ± 0.90	0.885	-0.474	
H6	3.37 ± 0.82	0.910	0.554	
C1	3.08 ± 0.98	0.868	0.716	
C2	2.94 ± 1.00	0.858	0.741	
C3	2.71 ± 0.99	0.882	-0.604	
C4	3.06 ± 0.88	0.888	0.619	
C5	2.96 ± 0.89	0.851	-0.487	
C6	3.11 ± 0.98	0.878	0.637	

The discriminant validity analysis of the Albanian version of the EBP-COQ (EBP-COQ_ALB) is summarized in Table 3 according to gender and prior education in EBP or research methods. No significant differences were observed between male and female participants regarding their attitudes towards EBP ($p = 0.618$) or perceptions of EBP ($p = 0.073$). However, EBP skills and knowledge of EBP showed statistically significant differences, with higher scores among female students ($p = 0.042$). Regarding EBP education, participants with more than one hour of prior EBP education demonstrated significantly higher scores in attitude ($p = 0.002$), perceptions ($p = 0.043$), and skills and knowledge ($p < 0.001$) compared to those with one hour or less of prior

education. Similarly, students with more than one hour of education in research methods scored significantly higher in attitude ($p = 0.033$) and skills and knowledge ($p < 0.001$). In contrast, perceptions towards EBP did not differ significantly between the groups ($p = 0.404$).

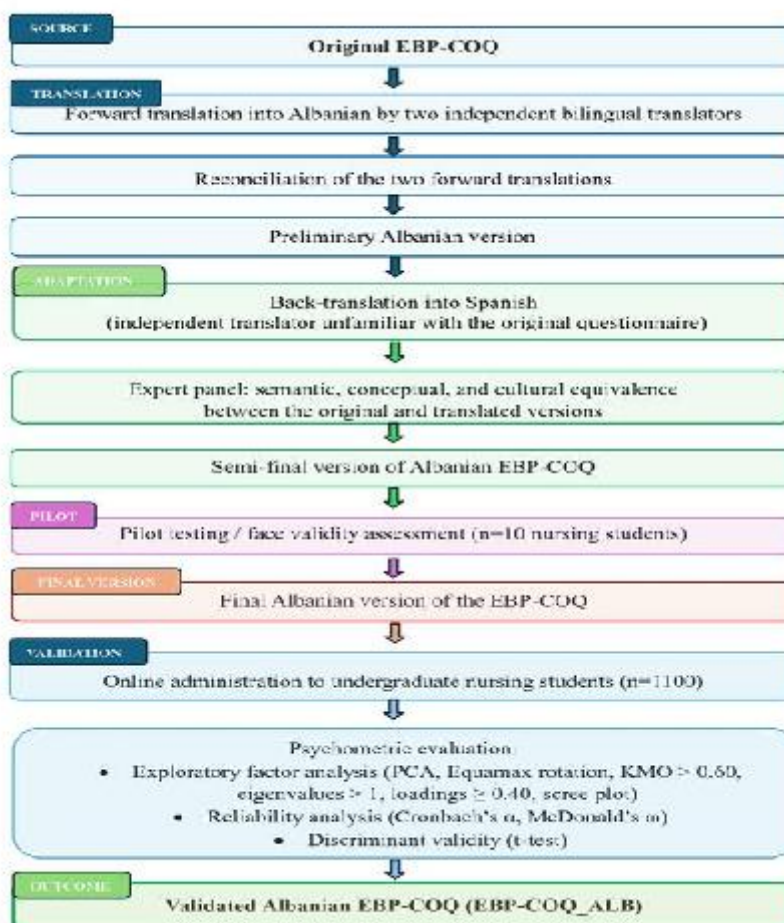
The translation and validation process of the Albanian version of the tool are presented in Figure 2.

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Table 3. Discriminant validity of the Evidence-Based Practice Competence Questionnaire (EBP-COQ) according to gender, education in EBP factor analysis for the Albanian version

	Attitude towards EBP	Perceptions towards EBP	Skills & Knowledge in EBP
Gender			
Male	26.57 ± 3.63	21.30 ± 3.35	36.87 ± 6.13
Female	26.33 ± 3.37	22.11 ± 3.16	38.78 ± 6.73
P	0.618	0.073	0.042
Effect size (95% CI)	0.07 (-0.21, 0.35)	-0.25 (-0.53, 0.02)	-0.29 (-0.57, -0.01)
Education in EBP			
1 hour	25.90 ± 3.34	21.72 ± 3.17	36.86 ± 6.68
>1 hour	26.95 ± 3.41	22.30 ± 3.22	40.35 ± 6.13
P	0.002	0.043	<0.001
Effect size (95% CI)	-0.31 (-0.52, -0.10)	-0.18 (-0.39, 0.03)	-0.54 (-0.75, -0.33)
Education in Research Methods			
1 hour	25.83 ± 3.35	21.78 ± 3.07	35.29 ± 6.39
>1 hour	26.65 ± 3.41	22.09 ± 3.27	39.99 ± 6.24
P	0.033	0.404	<0.001
Effect size (95% CI)	-0.24 (-0.46, -0.02)	-0.09 (-0.32, 0.13)	-0.75 (-0.97, -0.52)

Figure 2. Flowchart of the translation and psychometric validation process



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Discussion

The EBP-COQ Albanian version (EBP-COQ_ALB) is a research tool designed to investigate EBP competence among Albanian nursing students. It consists of 25 items that precisely and rapidly explore the attitudes, perceptions, skills, and knowledge of the target group. The main purpose of the study was to assess the psychometric characteristics of the EBP-COQ Albanian version, as established by the original authors, Ruzafa-Martinez et al. (2013) [18]. The psychometric properties of the EBP-COQ_ALB were tested. The instrument's estimated psychometric adequacy indicates that it can effectively capture the different dimensions of EBP competence among Albanian nursing students, supporting its suitability for academic research.

The internal consistency of the entire tool was calculated, yielding Cronbach's alpha and McDonald's omega of 0.866 and 0.855, respectively. These measurements highlight that the EBP-COQ_ALB demonstrates acceptable reliability, consistent with the original authors' report (Cronbach's alpha 0.880) [18]. Furthermore, these results align with most published validation surveys, in which EBP-COQ's Cronbach's alpha ranges from 0.700 (Persian version) to 0.880 (original Spanish version), with the majority exceeding 0.810 [18-24]. In particular, Cronbach's alpha values were 0.888, 0.856, 0.830, and 0.811 for the Spanish, Polish, English, and Greek versions of the EBP_COQ, respectively [18,20,21,23]. Additional studies documented values of 0.700 for the Iranian version, 0.826 for the Turkish version, and 0.890 for the Colombian version [19,22,24]. Despite these slight variations, evidence supports the view that the EBP_COQ is a valid, cross-culturally adaptable, and reliable tool that can be confidently applied across diverse nursing student populations worldwide. Additionally, the high reliability coefficients observed in the Albanian version suggest that the scale item measure the same underlying constructs of

EBP competence. This indicates that the questionnaire provides robust evidence when applied to the Albanian region.

The construct validity tests underscored some variation between the original Spanish version and the one proposed in this study. Although the initial tool consists of three factors, the EBP-COQ_ALB that emerged is more familiar with the Greek version [18,23]. The factors derived in both EBP-COQ_GR and EBP-COQ_ALB were again three, but they differed from those in the Spanish EBP-COQ. Specifically, the extracted components exhibited a distinct pattern from that reported by the developers, as the original subscale Attitude toward EBP was divided into two subscales, Attitude towards EBP (7 items) and Perceptions towards EBP (6 items), and the original subscales Skills and Knowledge were combined into one subscale named Skills and Knowledge in EBP (12 items) [18]. It is noteworthy that the EBP-COQ differs across versions, as factor loadings vary due to the unique characteristics of each study population [18-24]. Moreover, such differences may reflect cultural, educational, or contextual characteristics of the population in which the instrument is applied.

Furthermore, the discriminant validity analysis of the EBP-COQ_ALB revealed positive correlations between sex and Skills and Knowledge, whereas no correlations were observed between sex and Attitude and Perceptions toward EBP. Additionally, strong positive correlations were observed between Albanian students educated in EBP and their perceptions, attitudes, skills, and knowledge regarding EBP. These findings align with those derived from the EBP-COQ_GR study but differ from those in the Spanish study [18,23]. Moreover, although high correlations were found between Albanian nursing students educated in research methods and their attitudes, skills, and knowledge regarding EBP, this relationship was not confirmed in the Greek nursing population, where students educated in research methods showed a positive correlation with their perceptions of EBP [18]. This situation underscores the need to identify the factors that

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affect and shape EBP readiness and competence in each context. Moreover, the results underline the important role of education in EBP. At the same time, they emphasise that associated factors, such as demographic, cultural, and educational factors, may influence students' readiness to apply EBP in clinical practice. These findings suggest that nursing educators in Albania can use the EBP-COQ_ALB to identify potential gaps in students' EBP competence and to design targeted courses and curriculum improvements.

Limitations & Practical Implications

It is important to acknowledge the limitations of this study. Data were collected from a single university in Albania, which may limit the generalizability of the findings. Therefore, the study should be replicated with a larger sample of nursing students from multiple universities across Albania to confirm and extend these results. Additionally, the test-retest reliability method was not employed to assess consistency over time due to the survey's methodological design and the practical limitations in inviting participants to complete the questionnaire again online. Although the extracted factors explained 44% of the total variance, this level is considered acceptable in social science research, where complex behavioral constructs are often examined, and lower variance thresholds may still provide meaningful explanatory power.

Despite the limitations, it is important to note that this is the first attempt to translate and validate the EBP_COQ into Albanian, thereby establishing steps for implementing the tool among more nursing students in the Albanian context to assess their EBP competence. To date, no previously published papers have addressed the readiness and competence of Albanian nursing students in EBP. The current tool aims to bridge the existing knowledge gap among this specific population. Implementing the EBP-COQ_ALB will illuminate the current situation of Albanian nursing students, and the results can be used to tailor more EBP-targeted strategies, educational programs, and interventions in their curriculum.

Moreover, the results can guide not only curriculum development but also the integration of EBP principles into clinical training, promoting evidence-based decision-making in nursing practice across Albania.

Conclusion

In conclusion, the EBP-COQ_ALB is a valid and reliable research tool for effectively assessing attitudes, perceptions, skills, and knowledge in EBP among students enrolled in Albanian universities. The Albanian version of the EBP-COQ is a high-quality scale comparable to the original Spanish version and can be used repeatedly in the Albanian context. Additionally, the implementation of the EBP-COQ_ALB will serve not only as the cornerstone for assessing EBP competence among Albanian nursing students but also as a benchmark for future research in the nursing profession.

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Original Research

Urban-Rural Differences in the Management of Arterial Hypertension in Primary Health Care: An Observational Study in the Health Centers of Vlora

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Abstract

Hypertension is the main preventable risk factor for cardiovascular disease and all-cause mortality worldwide. Factors such as access to health services, medical follow-up and health education directly affect the long-term management of HTA. The aim of the study is to assess the situation and management of HTA in the population of the Vlora district.

The study is observational and is based on the analysis of data on patients with chronic diseases reported in 17 health centers of the Vlora district, including the control of blood pressure values from the population. The Chi-square test was used to assess statistical differences between groups.

The data resulted in 32,334 chronic patients, of whom 15,003 were diagnosed with HTA. From

the data analysis, it is seen that the prevalence of HTA is similar in both urban and rural areas, but its management is significantly better in urban areas (58%) compared to rural areas (41.1%), with statistically significant differences where the probability of the Chi-square distribution is $p=0.0000$, ($p<0.05$).

Arterial hypertension accounts for almost half of all chronic diseases, affecting both urban and rural populations equally, but its management varies significantly. Inequalities in access, service quality and human resources create major differences in disease control. Management of HTA is significantly better in urban areas than in rural areas. Improving HTA monitoring requires systemic interventions focused on rural areas, increasing staff, strengthening nursing, addressing the health personnel crisis and improving the

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functioning of low-performing centers, to reduce health inequities.

Keywords: arterial hypertension, primary care, urban area, rural area, health management.

Introduction

Hypertension (HTN) is one of the most prevalent chronic diseases globally and contributes significantly to the burden of cardiovascular disease. Although diagnosis is relatively simple and effective treatment exists, a large proportion of patients remain with uncontrolled blood pressure (BP). Factors such as access to health services, medical follow-up, and health education directly affect the long-term management of HTN.

According to the National Program for the Prevention and Control of Chronic Diseases in Albania, in the WHO report, cardiovascular diseases are the leading cause of mortality, accounting for 59% of all deaths in Albania. (WHO, 2016-2020) Hypertension ranks as the leading preventable risk factor for cardiovascular disease (CVD) and all-cause mortality worldwide^{1,2}. (Stanaey JD 2018, GBD 2017)

We are referring to WHO data on the prevalence of hypertension (defined as systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mmHg, or taking medication for hypertension) in adults aged 30-79 years, which results in an estimated 1.4 billion individuals aged 30-79 years worldwide having hypertension in 2024; which represents 33% of the population in this age range. Of these, two-thirds of adults aged 30-79 years with hypertension live in low- and middle-income countries³.

About 600 million adults with hypertension (44%) are unaware that they have HTN and are undiagnosed. Approximately 630 million adults with hypertension (44%) are diagnosed and treated, and approximately 320 million adults with hypertension (23%) have it under control.

Therefore, hypertension is and remains the leading cause of premature death worldwide and constitutes one of the global targets for non-communicable diseases to reduce the prevalence of uncontrolled hypertension by 25% during 2010-2025³. (WHO, 2025). It is therefore seen that hypertension constitutes the most important risk factor in the global burden of chronic diseases.

In the study by Mills KT (2020) on the Global Epidemiology of HTA, it is cited that high blood pressure is the largest risk factor in the global burden of disease. While evidence shows that lowering blood pressure can significantly reduce morbidity and mortality from cardiovascular problems, To reduce the burden of diseases related to HTA, health systems must ensure that levels of treatment and control of high blood pressure are achieved. Blood pressure control is promoted as a measure of universal health coverage, especially in the context of non-communicable diseases. Therefore, achieving universal health coverage is a target of the UN Sustainable Development Goals^{4,5,6}.

Hypertension care is seen as a measure of health systems performance, with studies reporting very low hypertension control and highlighting that low- and middle-income countries achieved blood pressure control in less than 5% of patients with hypertension.⁷ (Chow, Clara K et al)

In particular, rural areas often face structural and social barriers that limit quality healthcare. In Albania, data on urban and rural differences in HTA control are still limited. This study aims to contribute to this gap, by assessing the management of HTA in the population and analyzing the situation in health centers in Vlora.

Methodology

Study design

The study is cross-sectional, conducted in the Vlora district during 2025. Basic health care for adults is provided by the family doctor and nurse, at 17 Primary Health Care centers spread throughout the territory of the Vlora district, covering all residential areas.

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Study Setting and Participants

The study was conducted in the Vlora district, where the study included adult age, the total number of patients with chronic diseases, patients with HTA, and patients with BP values within the norm.

Data Collection Instruments and Procedures

Data from periodic reports on chronic diseases from Primary Health Care Centers referred to the Public Health of the Vlora district were used. The data show that there are 32,334 chronic patients, of which 15,003 patients suffer from HTN.

Statistical Analysis

Data were analyzed according to chronic diseases, patients with HTA and patients with HTA

managed with values within the norm, differences in HTA management between gender, residence, health centers, rural and urban areas. Statistical analysis was performed using the SPSS program, version 21. Differences between groups were tested with the Chi-square test, setting the statistical significance level at $p < 0.05$.

Results

Based on data reported by 17 Health Centers in the Vlora district, there are 32,334 chronic patients, of which 15,003 patients are diagnosed with HTN.

Table 1. Data on the number of chronically ill and HTN patients by health centers

Health Center	Total number of chronically ill people	Arterial hypertension		
		Total HTA Cases	Cases with HTA ,Females	No. of patients with HTA, with BP values within the normal range
1. HCNo. 1 Vlore	4602	1272 (27.6%)	660 (51.9%)	750 (59.9%)
2. HCNo. 2 Vlore	4179	2496 (59.7%)	1253 (50.2%)	1943 (77.8%)
3. HCNo. 3 Vlore	4030	1820 (45.2%)	890 (48.9%)	1700 (93.4%)
4. HCNo. 4 Vlore	5249	2343 (44.6%)	1233 (52.6%)	382 (16.3%)
5. HCNo. 5 Vlore	2043	1201 (58.8%)	714 (59.5%)	196 (16.3%)
6. Orikum	1278	538 (42.1%)	320 (59.5%)	377 (70.1%)
7. Himare	1197	713 (59.6%)	303 (42.5%)	713 (100.0%)
8. Selenice	688	324 (47.1%)	182 (56.2%)	150 (46.3%)
9. Novosele	3331	1672 (50.2%)	644 (38.5%)	195 (11.7%)
10. Shushice	1169	387 (33.1%)	205 (53.0%)	199 (51.4%)
11. Vllahine	673	129 (19.2%)	65 (50.4%)	10 (7.8%)
12. Armen	445	306 (68.8%)	139 (45.4%)	297 (97.1%)
13. Kote	562	174 (31.0%)	74 (42.5%)	110 (63.2%)
14. Sevaster	145	75 (51.7%)	36 (48.0%)	75 (100.0%)
15. Brataj	492	246 (50.0%)	125 (50.8%)	231 (93.9%)
16. Vranisht	266	215 (80.8%)	114 (53.0%)	202 (94.0%)
17. Narte	1985	1093 (55.1%)	627 (57.4%)	445 (40.7%)

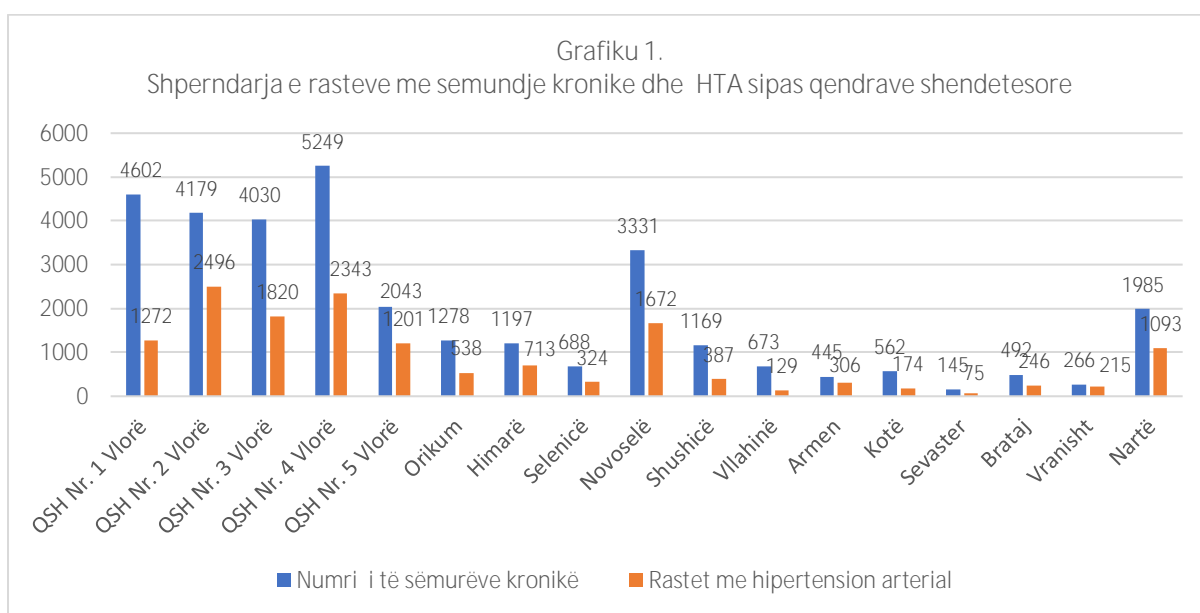
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From **Table 1** it is noted that: according to health centers (HCs), the highest number of cases with chronic diseases is observed in HCs no.4, HCs no.1, HCs no.2, HCs no.3, Novoselë and Nartë. These health centers also have the highest number of cases with HTA and cases of women with HTA.

It is also seen that the health centers with the highest % of HTA management are: HC no. 3 Vlora with

93.4%, Himara with 100%, Sevasteri with 100%, Armen 97%, Vranishti with 94% and Brataj with 93.9%.

The lowest management is observed in the Vllahina HC with 7.8%, Novoselë HC with 11.7%, HC no. 4 with 16.3% and HC no. 5 with 16.3%



The distribution by residence shows that 72% of chronically ill people live in the city and 28% in

the countryside, which is also based on the concentration of the population in urban areas Tab 2.

Table 2. Distribution of chronic diseases by place of residence

Residence	Cases with HTA	%	Other diseases	%
City	10707	71.4%	12559	72.5%
Countryside	4296	28.6%	4772	27.5%
In total	15003	100.0%	17331	100.0%

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As can be seen from the data in Table 2, the majority of cases of hypertension, around 72%, belong to urban areas and 28% to rural areas, while 73% of other chronic diseases belong to urban areas and 27% to rural areas, which also goes parallel to the concentration of the population in urban areas.

Prevalence of Hypertension by Place of Residence

From the data in Table 3, it can be seen that arterial hypertension constitutes the same problem for both the urban and rural population, which means that the place of residence has no influence and is not part of the factors that affect HTA.

Table 3. Distribution of Hypertension and Other Chronic Diseases by Place of Residence

Residence	Cases with HTA	%	P (Chi-square)	Other chronic diseases	%	P (Chi-square)
City	10707	46.0%	0.959	12559	54.0%	0.643
Village	4296	47.4%		4772	52.6%	

In Table 3 it is observed that in the city 46% of chronic diseases are HTA and 54% other chronic diseases while in the village 47.4% are HTA and 52.6% other chronic diseases. There are no statistically significant differences in

the distribution of cases with HTA and other chronic diseases according to the place of residence. In this case the probability of the Chi-square distribution is $p > 0.959$, ($p > 0.05$) for HTA and $p = 0.643$, i.e. $p > 0.05$, which indicates that the changes in values are random.

Table 4. Distribution of Hypertension Cases by Place of Residence and Gender

Residence	Cases with HTA	Female	%	P (Chi-square)
City	10707	5555	51.9%	0.720
Village	4296	2029	48.1%	

In Table 4 we note that the distribution of female cases with HTA is similar in both urban (51.9%) and rural areas (48.1%), without a statistically significant difference $p = 0.720$ ($p > 0.05$), which indicates that the differences in values are random, and that gender and residence are not factors influencing HTA. Biological and lifestyle factors influence more than

residence. Women in rural areas are not less at risk, but less followed by the system.

This is also reported by similar studies, where the NCD Risk Factor Collaboration, 2021 refers to the fact that, The prevalence of hypertension by gender is similar in urban and rural settings, but the level of treatment varies. (Lancet 2021.)

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Table 5. Distribution of HTA cases and managed cases by residence

Residence	No. of patients with HTA, with BP values within the normal range	%
City	6211	77.88%
Village	1764	22.12%
In total	7975	100.00%

In Table 5, it is noted that by analyzing the total number of patients with HTA (N-7975), with BP values within the norms, it is clearly seen that in the majority of them, about 78% of managed HTA

are residents of the city and in rural areas, it results that BP values within the norm in patients with HTA are only in 22% of patients.

Table 6. Distribution of managed HTA cases by location

Residence	Cases with HTA	No. of patients with HTA, with BP values within the normal range	%	P (Chi-square)
City	10707	6211	58.0%	<0.001
Village	4296	1764	41.1%	

In Table 6 we note that: Cases managed with HTA under control in the city are higher than in the countryside, with a comparable value of 58% in the city and 41% in the countryside.

Statistically significant differences are observed in the distribution of cases with HTA values within the norm in rural and urban areas. In this case, the probability of the Chi-square distribution is $p=0.0000$, $p<0.05$. So the main difference is observed in blood pressure control according to residence where:

- City: 58% of patients with HTA have values within the norm
- Village: only 41.1% of patients are well managed

These values are far from the norms for managing HTA, as one of the risk factors for death in our

country, indicating the need for interventions studied based on concrete needs in the population, follow-up and monitoring according to WHO protocols and guidelines.

Discussion

From the analysis of the study data, it is observed that arterial hypertension affects almost the same number of urban and rural populations (46% vs 47.4%, $p=0.959$), but it turns out that its management varies significantly. This was also observed in the study by Mansouri, who emphasized that Hypertension is one of the most widespread diseases in both urban and rural areas, without major differences in prevalence. (Mansouri, Asieh et al 2023).

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The problem is not "how often HTA occurs", but "how well is it controlled"

The management of hypertension differs significantly between urban and rural areas. This element is clearly evidenced by the data of this study, where patients with arterial hypertension living in urban areas present higher levels of blood pressure control compared to those in rural areas (58% versus 41.1%, $p < 0.05$), where its management is significantly poorer in rural areas.

This result is related to better access to health services, more regular medical follow-up and more frequent health education in urban areas. The study findings are also consistent with international studies, which report that rural populations have poorer control of hypertension due to structural and social barriers to health care (Mills et al., 2020; WHO, 2021; Chow et al., 2013). This means that people in rural areas are not less sick, but they are less treated and less monitored. This finding is directly related to: faster access to health services in the city, with more regular medical follow-up, with continuous blood pressure monitoring and better health education. While in rural areas, difficulties in accessing health are often observed: with delays in seeing a doctor, lack of periodic check-ups, economic difficulties and transportation. But as a result of uncontrolled hypertension, the risk of: myocardial infarction, cerebral stroke, renal failure and premature death increases.

The role of health access is also emphasized in WHO reports (2021) where: urban systems have better health coverage and rural areas are more exposed to uncontrolled hypertension.

The study by Mills et al., 2020, a global study on hypertension, highlights that populations in rural areas have lower blood pressure control rates due to limited access to healthcare and poor therapeutic adherence, as also seen in this study. *For these reasons, it is necessary to organize a health service to serve residents living in rural areas, with low accessibility, as an essential right to life, mainly for categories in economic difficulty*

and impotence, for the lonely elderly and without family support.

In Albania, the health system continues to face a shortage of family doctors and specialists, creating gaps in the system in rural areas and increasing health inequalities. Albania ranks among the countries with the lowest density of doctors in Europe, with about 1.2 doctors per 1000 inhabitants, a figure much lower than the European average (3.5-4.0/1000 inhabitants). This shortage is particularly felt: in rural areas, in remote villages, in peripheral health centers where the service is often limited or intermittent. The Basic Package of Services in Primary Health Care states that "On average, each HC serves a population of 8,000-10,000 people (this figure varies significantly in urban and rural areas), having a doctor/patient ratio of about 1 to 2,500 and a nurse/patient ratio of about 1 to 400 inhabitants."

But in urban areas, the ratio is usually 1 nurse for 3000-4000 inhabitants, which makes it impossible to provide health care to so many inhabitants. Meanwhile, based on the definition made in the Basic Package of Services in Primary Health Care, this ratio is determined to be 1 nurse and 400 inhabitants. The time set for a medical visit is 30 minutes per patient. Based on the monthly working time for an employee is 160 hours, so a nurse can check about 80 inhabitants per month. This makes it totally impossible to care for all inhabitants according to the legislation. Increasing the nursing staff based on the number of population would reduce health inequalities, complications and preventable mortality, by providing regular follow-up for chronic diseases.

Difference between health centers

Very large differences were observed between Health Centers (HCs) in the level of HTA management (e.g. centers with >90% control vs. centers with <20%), from which we can also hypothesize that "the capacity exists", but "the implementation is not the same". This is

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consistent with the concept of "quality of care": where the real quality of service often explains the results better than the mere presence of the service. So the data suggest that the main problem is not the occurrence of the disease, but the quality and continuity of healthcare.

Patients in urban areas benefit by having better opportunities for:

- faster access to services
- more regular medical follow-up
- continuous monitoring
- more frequent health education

While patients in rural areas face:

- transportation difficulties
- lack of periodic check-ups
- limited health information

The large differences between health centers suggest that the organization of the service and the active role of health personnel, especially nurses, are decisive factors for the control of HTA, so it is possible to have better management of HTA as in centers with >90% control (HC no. 3)

The analysis of the results clearly shows the need for:

- systematic monitoring programs in rural areas
- active nursing follow-up
- standardization of care protocols
- reduction of health inequalities
- ongoing health education for patients

Conclusion

Arterial hypertension is a major health problem in the studied population, accounting for almost half of all chronic diseases in both urban and rural areas. This indicates that HTA is a widespread and ongoing burden on the health system.

The prevalence of HTN does not vary by location, which means that risk factors affect urban and rural populations equally. However, differences are clearly evident in the management and control phase of the disease.

Management of hypertension is better in urban than rural areas, with 58% of urban patients achieving blood pressure values within the normal range compared to only 41.1% of rural patients. This difference is statistically significant and reflects real inequalities in health care.

Urban-rural differences are not related to gender, as the distribution of female cases with HTA is similar in both settings. This suggests that the main barriers are structural and organizational, rather than biological.

It was found that there are large variations in the level of HTA control between health centres, with some centres achieving very high management rates (HC 3) and others with very poor performance. This shows that service quality and local organisation have a decisive impact on clinical outcomes, confirming that the main barriers are structural and organisational, not biological.

The lack of health personnel, especially in rural areas, represents a key factor explaining the poor management of hypertension, influenced by the massive emigration of doctors and nurses from Albania. This human resource crisis limits continuous monitoring and health education of patients.

Strengthening the role of nursing and primary care is essential for improving the control of HTA, especially in rural areas, through active follow-up, health education, standard protocols, and the use of evidence-based care models.

At the end of the study, we conclude that in the population of the Vlora district arterial hypertension is equally prevalent in urban and rural areas, but disparities in access, service quality, and human resources create major disparities in disease control. Improving the management of HTA requires systemic interventions focused on rural areas, increasing staffing, strengthening nursing, and addressing the health workforce crisis. Targeted interventions in rural areas and improving the functioning of low-performing centers are essential for

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improving public health and reducing health inequalities.

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TECHNICAL AND NATURAL SCIENCES

Original Research

User-Centered Experimental Evaluation of Recommendation Strategies in Online Education

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Abstract

Users of online education platforms often struggle to select courses that align with their needs and interests. This challenge arises because there are a large number of online courses. Recommendation systems can help address this challenge by directing users toward courses that are more relevant to their preferences. This paper presents a pilot experimental evaluation of recommendation strategies in online educational systems to assess their impact on user decision-making. A web-based platform was developed as an experimental framework to compare the effects of different recommendation strategies on user behavior. Three recommendation strategies were implemented in this platform: a standard interface without recommendations, a popularity-based recommendation strategy, and a content-based personalization strategy. This experimental platform was distributed to 51 Computer Science students at the University of Vlora in January 2026.

During the periment, the system recorded student interactions and course selections. The collected data was then

evaluated using several behavioral metrics: the average number of selections per user, the total number of selected courses, the selection rate, and diversity.

To compare the three experimental groups, Repeated-Measures ANOVA was used as a statistical test.

The results show that the standard system reflects a high level of exploration, but with lower efficiency. The popularity-based method reduces the number of choices and was linked to increased user focus. While the content-based approach appears to be more effective, it achieves the highest selection rate and a better balance between exploration and orientation. The Repeated-measures ANOVA showed that recom-

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mendation strategies produce statistically significant differences in users' behavior during course selection. Bonferroni post-hoc comparisons showed significant differences between the standard method and both recommendation methods (popularity-based and content-based). In contrast, no statistically significant difference was found between the content-based and popularity-based approaches.

The study contributes to the literature by providing a user-centered experimental perspective on recommender systems in online education. It shows how different recommendation strategies influence user interaction and decision-making beyond traditional measures of algorithmic performance.

Keywords: user behavior, recommender systems, online education, course recommendation, ANOVA

Introduction

The widespread use of online platforms in education offers students a wide range of learning resources. As these resources grow over time, students need to identify the courses that best suit them amid today's information overload. In 1997, Resnick and Varian first introduced recommender systems to help users navigate large information spaces by providing them personalized suggestions based on their preferences and behavior. Over time, recommendation systems have improved, and with the development of artificial intelligence, they have become even more advanced. Nowadays, recommendation systems are very important on modern digital platforms because they help users find content that best suits their interaction history. Recommendation systems are widely used across many fields, such as e-commerce, online education, media, web search, social networks, online advertising, entertainment, and employment platforms (Ricci et al., 2022; Rodriguez et al., 2023; Ko et al., 2022). Recommendation strategies are categorized into collaborative filtering, content-based filtering,

and hybrid methods. In collaborative filtering, the system recommends items based on similarities among users or their history. Whereas, content-based filtering focuses on recommending items that share characteristics with those the user previously preferred, i.e., based on their history. Also, hybrid methods are very important. These methods combine multiple approaches to improve recommendation accuracy and overcome the limitations of the first two categories (Adomavicius and Tuzhilin, 2005; Chaudhari et al., 2024).

In order to improve the personalization and quality of recommendation systems, machine learning and artificial intelligence techniques are being integrated. For example, the use of deep learning has demonstrated the ability to model complex relationships between students and courses, leading to more accurate recommendation systems (Zhang et al., 2019; Chen et al., 2021; Anvitha et al., 2025). In online education platforms, recommender systems are used to support personalized learning and to help students discover appropriate educational resources (Drachler et al., 2015). According to Blythe (2001), the design of online courses should be done not only according to technical or administrative logic, but should be built in collaboration with students, making them part of the learning and design process. To understand student behavior, we first conduct a pilot study in this project. Kundu et al. (2020), in their study, emphasize that recommendation systems in e-learning are important because they suggest appropriate courses, help students find relevant materials, personalize the learning experience, and increase efficiency and motivation. The future education will be personalized, intelligent, and data-driven, but it must be developed with ethical and pedagogical care (Bekarystankyzy et al., 2026).

Different approaches have been seen in the literature, such as content-based filtering, collaborative filtering, hybrid methods, or machine learning methods, which aim to improve the personalization and accuracy of recommendations in online education (Ma, 2025; Lynn and Emanuel,

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2021; Yin et al., 2020; Amer and Jamal, 2016; Tatineni, 2020). Most of these papers study the optimization of recommendation approaches based on user data or algorithm performance. Meanwhile, a smaller number of studies have addressed the aspect of user behavior when interacting with online learning recommendation systems. However, they often remain limited to descriptive analyses and do not provide direct comparisons between different recommendation strategies in a controlled experimental setting. According to Maphosa et al. (2020), from 2010 to 2019, very few articles were published on course recommendation systems in online learning: only 24 out of 16,000 research papers. Indeed, there is a gap in the literature regarding the impact of different course recommendation strategies in education on user behavior.

Our work aims to address this gap by providing a user-oriented experimental evaluation that compares three different recommendation approaches on an e-learning platform. This study is a pilot experimental evaluation of recommendation strategies in online educational systems. An experimental framework platform was used, called CourseChooser, which is designed to evaluate how three recommendation strategies affect user behavior when selecting online courses. The collected data was then evaluated using multiple evaluation metrics: the average number of selections per user, the total number of selected courses, the selection rate, and diversity. To compare the three experimental groups, we have used Repeated-measures ANOVA, which compares the same user across several conditions to determine whether the conditions produce different results. Bonferroni post-hoc comparisons were used to show differences between pairs of recommendation methods. Groups compared are: Standard vs. Popularity, Standard vs. Content, and Popularity vs. Content.

Given the challenges identified in the wide range of information in online education environments, this study addresses three research questions:

Research Question 1: Does the use of recommendation systems affect user interaction on online course selection platforms?

Research Question 2: Are there statistically significant differences between the methods?

Research Question 3: Which recommendation strategies produce significantly different user selection patterns regarding exploration, focus, and diversity?

This paper is organized into several sections. First, the research methodology is presented, then comes the experimental part of the study, the results, and finally the relevant discussions and conclusions.

Research Methodology

This study aims to design a user-centered experiment to evaluate how different recommendation strategies influence user behavior when selecting courses in an online learning environment. A within-subject repeated-measures design was adopted, in which the same participants interacted with all experimental conditions. The research methodology is based on three main phases: the development of the web platform that serves as an experimental framework, the experimental evaluation, and then the data analysis. This methodology is based on the literature, common research practices in recommender system evaluation combine system implementation, controlled experiments, and data-driven analysis to evaluate the effectiveness of recommendation algorithms (Ricci et al., 2022; Li and Ye, 2020).

Firstly, a web-based platform was developed to simulate an online course environment. This platform was called CourseChooser. The platform's user interface was developed using standard web development technologies (HTML, CSS, and JavaScript). Figure 1 visually presents the system architecture of the CourseChooser platform. The architecture consists of the User Interface, the environment in which students view and select courses. The interface is designed to be simple and intuitive, to minimize usability barriers during the experiment. The data received

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from the user interface is passed to the recommendation engine, which generates course suggestions. Three recommendation strategies have been implemented: the standard strategy, the popularity-based strategy, and the content-based strategy. Another part of the architecture is the Database, responsible for storing information for each course. Information such as course titles, descriptions, and tags was used for recommendation calculations. All user interactions are recorded in the Data Collection Module. Then, these data were used for evaluation and analysis. As mentioned above, the study implemented multiple recommendation strategies on the course selection platform, CourseChooser. Based on the literature, these strategies represent commonly used methods in recommender systems and enable comparison between non-personalized and personalized recommendation methods (Ricci et al., 2022; Hui et al., 2022; Lahiassi et al., 2023).

Below is a brief description of each recommendation system.

a. Standard Recommendation System

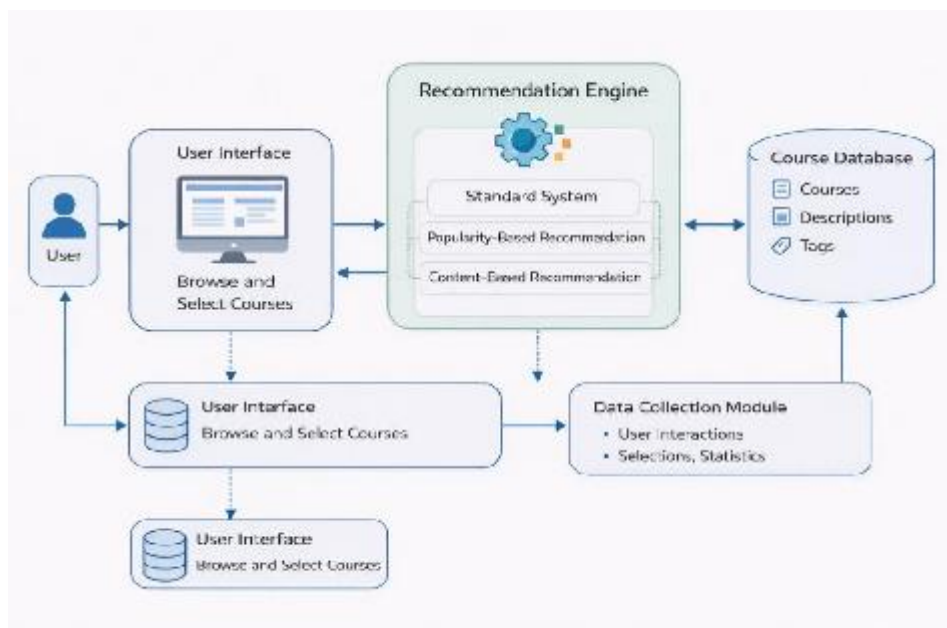
In the standard selection system, all courses are listed without any recommendation logic. Users are free to explore and choose based on their individual interests.

b. Popularity-Based Recommendation System

The popularity-based recommendation strategy suggests courses based on the frequency of their selection by all users. Courses that are selected more frequently by users yield higher recommendation scores. This strategy assumes that the most popular courses are more likely to be relevant to other users. Due to their ease of implementation and immediate results, popularity-based methods are commonly used in online platforms (Chen et al., 2021; Islam et al., 2022; Elahi et al., 2021). Recommendation points are calculated using the following formula:

$$Scores(course) = selection\ numbers \quad (1)$$

Figure 1. CourseChooser Architecture System



a. Content-Based Recommendation System

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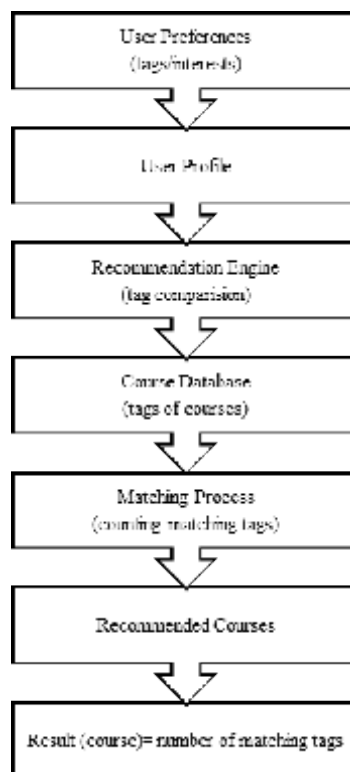
The content-based recommendation strategy evaluates how well the course characteristics match the user's interests. Each course is accompanied by descriptive tags representing topics or fields (for example, AI, Web, Data Science, programming). The recommendation process with this strategy is shown in Figure 2. When a user interacts with the system, the recommendation engine compares these tags with the user's preferences and assigns a score based on the number of matching labels. The recommendation score is

calculated using the following formula (Li and Sun, 2025):

$$Scores(course) = \text{number of matching tags} \quad (2)$$

Content-based filtering is widely used in recommender systems because it allows systems to personalize recommendations according to individual user preferences and item characteristics (Adomavicius and Tuzhilin, 2005; Son and Kim, 2017; Ricci et al., 2022).

Figure 2. Content-based Recommendation Process



Unlike traditional approaches that focus primarily on algorithmic accuracy, this study emphasizes interaction-based metrics that capture how users engage with the system. To assess the impact of different recommendation strategies on user behavior, a set of user-centered evaluation metrics was used. Such metrics are widely used

in recommender systems research to evaluate user experience and behavior patterns (Ricci et al., 2021). The first used metric is the average number of selected courses, which represents the average number of items selected by each user. This metric indicates the level of user exploration, with

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higher values indicating broader interaction, while lower values suggest more focused decision-making. The other metric is selection rate, is defined as the ratio between the number of selected items and the total number of items presented to users. This metric reflects the efficiency and relevance of the recommendation process. Higher values indicate that users are more likely to select items from the recommendations provided. While the diversity metric was used to assess the variety of user choices. Diversity is measured as the number of distinct categories among selected courses. Diversity is commonly used in recommender system evaluation to capture the extent to which recommendations span different topics or domains (Shani and Gunawardana, 2010). Higher diversity values indicate a broader range of interests, while lower values suggest more specialized preferences.

To determine whether the observed differences between recommendation strategies are statistically significant, a Repeated-Measures ANOVA was applied. Repeated-Measures ANOVA is a widely used statistical method when the same participants are tested under multiple conditions, allowing comparison of group means while accounting for within-subject dependence (Field, 2024). Assumptions for repeated-measures ANOVA were checked and found acceptable. Bonferroni-adjusted post-hoc comparisons were also performed to identify pairwise differences. Effect size measures were reported to assess the practical magnitude of the observed effects (Field, 2024). The inferential statistical analysis is based on the number of courses selected, while the metrics of selection rates and diversity are presented in a descriptive manner to interpret user interaction patterns.

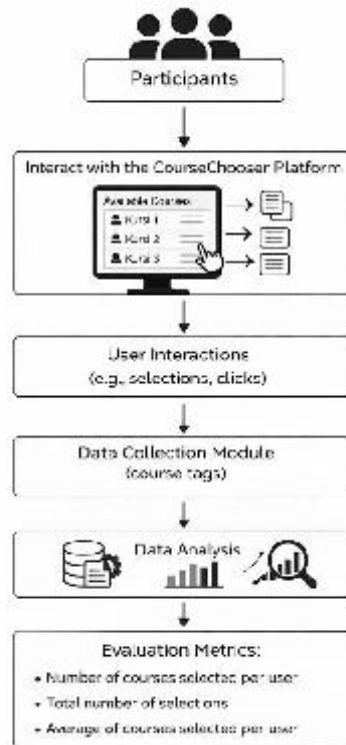
Experimental study

The web-based platform was used as a testing environment for comparing methods. It shows course lists and recorded users' choices. The platform included a list of courses from various fields. The courses were categorized into topics such as AI / Data Science, Programming, Networks, Mathematics, etc. The same 51 students interacted with the course selection platform using all three recommendation approaches, administered sequentially in order: standard, popularity-based recommendation, and content-based recommendation. Users were asked to choose the courses they considered most relevant or interesting in each session. The system automatically recorded user interactions through the data collection module. These selections generated datasets containing information about the selected courses, user behavior, and recommendation performance. Experimental evaluation using user interaction data is a widely used method in recommender system research, as it provides insights into how users respond to different recommendation strategies in real-world scenarios (Zhanget al., 2019; Chen et al., 2021; Kundu et al., 2020).

The data obtained from the students included information about course selection, their behavior, and system interactions recorded during the experiment. Microsoft Excel and Jamovi (The Jamovi project, 2024) were used to process and analyze the collected data. We first organized, cleaned, and structured the three sets of experimental data. Then, we calculated the evaluation metrics and summarized them in tables and graphs. This analysis enabled the comparison of three recommendation strategies implemented in the CourseChooser platform. Figure 3 shows the flow of the experimental evaluation.

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Figure 3. Experimental flow of the CourseChooser Platform



Results

The results provide insights into how different recommendation strategies influenced student interaction and course selection behavior on the online course platform. In this pilot study, 51 users participated. In the first case, no recommendation was applied, and all courses were displayed uniformly in the platform interface. Users selected 176 courses in total, averaging 3.45 courses per user. This high average indicates that when users browse courses without algorithmic recommendations, they tend to explore more options before making decisions. In the second case, the popularity-based recommendation system was implemented, and a total of 115 courses were selected, averaging 2.25 courses per user. The lower average indicates that popularity-based recommendations can more easily guide

users toward more frequently selected courses. In the case of a content-based recommendation system, users selected a total of 117 courses, averaging 2.29 per user. Although this average is slightly higher than the popularity-based approach, it remains significantly lower than the standard system, suggesting that personalized recommendations can influence users in the course selection process. In conclusion, the results show that recommendation strategies that combine popularity and content guide users toward more focused selections. The content-based recommendation strategy was associated with the highest selection rate. Meanwhile, the diversity of course choices is almost the same for all three approaches, meaning that diversity is not greatly affected by method.

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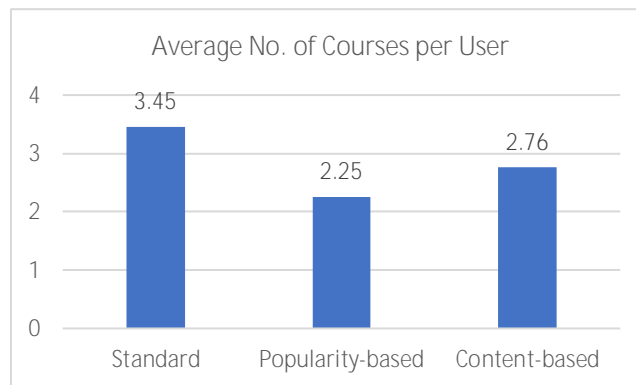
The results of descriptive statistics, including 95% confidence intervals, are presented in Table 1.

Figure 4 shows a graph comparing the average number of courses selected through the three recommendation strategies implemented in the experimental *CourseChooser* platform

Table 1. Comparison of Recommendation Strategies

Recommendation Strategies	Strate-	Number of Users	of Total tions	Sele-	Average No. of Courses per User	95% CI	Selection Rate (%)	Diversity
Standard		51	176		3.45	[2.88, 4.02]	7%	2.24
Popularity		51	115		2.25	[2.00, 2.47]	12%	2.24
Content		51	117		2.29	[2.06, 2.53]	16%	2.21

Figure 4. Comparison of Recommendation Strategies Based on Average Number of Courses Selected per User



A repeated-measures ANOVA revealed a significant effect of recommendation strategy on the number of selected courses, $F(2,102) = 17.30, p < .001, \eta^2_p = 0.253$ (Table 2). The analysis confirms that the recommendation strategy has a significant and practically important effect on the number of courses users select.

Table 3 shows the results of pairwise comparisons: Standard versus Popularity,

Standard versus Content, and Popularity versus Content.

Bonferroni post-hoc comparisons showed significant differences between the standard method and both recommendation methods (popularity-based and content-based) ($p < .001$). No statistically significant difference was found between the content-based and popularity-based conditions ($p = 1.000$) (Lenth, 2023).

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Table 2. Results of Repeated-Measures ANOVA analysis.

Effect	df	F	p-value	Partial η^2
Recommendation Strategy	(2, 102)	17.30	< .001	0.253

Table 3. Bonferroni Post-Hoc Comparisons.

Comparison	Mean Difference	p-value
Standard vs Popularity	1.2157	< .001
Standard vs Content	1.1569	< .001
Popularity vs Content	-0.0588	1.000

Discussion

According to experimental findings, it is shown that recommendation systems may affect not only what users choose, but also how they make decisions, how many options they choose, and the extent to which they explore available courses. This highlights the practical importance of recommendation design for improving user experience in e-learning environments, where effective guidance and personalization can support more efficient and satisfying course selection. These findings answer the first research question of whether recommender systems affect user interaction. In the standard system, users explored a larger number of courses on average because they received no guidance from recommendation algorithms. They simply do a manual browsing and exploration to discover available courses. This behavior is consistent with the study by Ricci et al. 2022, which suggests that users tend to explore more extensively when recommendation support is not available.

The second research question is answered by repeated-measures ANOVA analysis, which confirmed statistically significant differences among the three evaluated conditions, suggesting that the design of recommendation mechanisms plays an important role in shaping user interaction patterns. Bonferroni post-hoc comparisons showed that the standard approach differed significantly

from the popularity-based and content-based approaches. While no statistically significant differences were found between popularity-based and content-based recommendation approaches. These changes are more noticeable at the level of exploration and focus of choices, while diversity remained relatively stable across the three strategies. Diversity remained relatively stable means that recommendation strategies influenced how users chose courses more than the overall range of their interests. Thus, students tended to choose courses from similar subject areas regardless of the recommendation method applied. All findings of this study align with other researchers who show that recommender systems can support more efficient content discovery and reduce the cognitive effort required when users search for relevant information (Adomavicius and Tuzhilin, 2005; Zhang et al., 2019). In the field of education, personalized recommendation systems have also been shown to help students identify appropriate courses and navigate very large databases (Drachsler et al., 2015; Kundu et al., 2020).

Conclusion

This pilot study analyzes the impact of recommendation strategies on user behavior in an online learning environment. A web-based platform was built as an experimental framework to

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lay the foundations for comparing different recommendation strategies. The platform, called *CourseChooser*, enables students to choose the courses they are interested in from a wide range of courses. Three recommendation strategies were tested and evaluated through *CourseChooser*: the standard recommendation strategy, the popularity-based recommendation strategy, and a content-based recommendation strategy. The same 51 students interacted with the course selection platform using all three recommendation approaches, administered sequentially in order: standard, popularity-based recommendation, and content-based recommendation.

Several user-centric metrics were used for the evaluation: average course selection, selection rate, and diversity. It is concluded that recommendation strategies influenced user behavior. The standard approach led to a higher number of courses selected, reflecting greater exploration but lower efficiency, while the popularity-based approach encouraged more focused choices. The content-based approach achieved the highest selection rate, indicating more relevant and effective recommendations. While diversity remained relatively stable across all three approaches, suggesting that recommendation strategies influenced selection behavior more than the range of user interests. Repeated-measures ANOVA analysis showed that there are statistically significant differences between the three strategies tested. This leads us to conclude that the recommendation strategy really influences user behavior.

The *CourseChooser* platform provides a flexible foundation for evaluating recommendation strategies from a user-centric perspective and for integrating more advanced approaches in future work, including AI-based methods. In this way, the proposed system serves as an experimental framework for analyzing user behavior and supporting the future development of intelligent recommendation strategies in online learning environments.

From a practical point of view, this work shows that implementing recommendation strategies

on e-learning platforms appears to improve the user experience. Personalized recommendation strategies can help students reduce information overload and navigate more efficiently.

The findings of this study contribute to the literature by enabling a user-centered experimental perspective on recommender systems in online education. It shows how different recommendation strategies influence user interaction and decision-making beyond traditional measures of algorithmic performance. Our work also has some limitations that will be taken into account for future studies. Since the data was collected as part of a pilot study, the sample size is limited. Also, the participants are relatively homogeneous, which limits the generalizability of the results. We have only tested basic recommendation methods, and the metrics focused primarily on user behavior rather than directly measuring predictive accuracy. Another limitation of this study is that all participants went through the recommendation conditions in the same fixed order (first standard, then popularity-based, and then content-based). As a result, some of the observed differences may partly reflect effects of ordering, familiarization, or learning, and not just the recommendation strategy.

Despite the results obtained from this research, it is intended that in future works we will expand into a broader study, both in techniques and in datasets. Integrating more advanced recommendation algorithms, such as collaborative filtering or hybrid recommendation systems, which combine different recommendation techniques to increase personalization and accuracy (Ricci et al., 2022). Another area to delve deeper into in the future is to add other metrics for evaluation, such as perceived relevance of recommendations, user satisfaction, or long-term user engagement with recommended courses. Meanwhile, increasing the number of users would bring a more powerful statistical analysis. Also, integrating deep learning and machine learning techniques into a recommendation engine can further improve personalization. Deep learning models can capture much more complex relationships between

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users and items, enabling more appropriate and accurate recommendation systems (Zhang et al., 2019; Chen et al., 2021). Future studies should use randomized or counterbalanced experimental designs to reduce potential bias from ranking and improve internal validity.

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Original Research

Assessment of *Escherichia coli* Levels in Vjosa River using Standard Microbiological Indicators

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Abstract

The Vjosa River one of the few wilde large European rivers is increasingly exposed to human-driven pressures may put at risk its microbial quality. This study estimate the surface-water microbiological status of the Vjosa using *Escherichia coli* (*E. coli*) as a primary indicator of faecal contamination. Sampling was performed between October 2024 and October 2025 at 13 locations (seven on the main channel and six on tributaries) in accordance with ISO 19458 for water-quality microbiology. *E. coli* concentrations were determined by using the Most Probable Number (MPN) method following ISO 9308-1:2014. The results showed contamination in different areas of the river. Average *E. coli* levels resulted between Class I-II (slight to moderate pollution), yet the several sites repeatedly reached Class III levels (severe pollution), especially in the catchments of

Sites 03, 11, 13, 15, and 16. These hotspots are related to sites impacted by untreated wastewater discharges, agricultural runoff, and animal activities. A strong positive correlation is between *E. coli* and intestinal enterococci confirmed that the contamination is originated from faecal sources. Vjosa River generally maintains a moderate microbiological quality, episodic episodes of intense faecal input create public-health concerns. High concentrations of *E. coli*, total and faecal coliforms, and enterococci render the water unsuitable for recreation or drinking. The study underscores the value of *E. coli* as a rapid proxy for overall microbial safety and recommends sustained monitoring together with improved catchment-area management to curb faecal pollution in the river's surface waters.

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Keywords: *Vjosa river, Escherichia coli, MPN, Faecal coliform, Heterotrophic bacteria, water quality status*

Introduction

1. The Vjosa River originates in the mountainous regions of Greece and flows to the Adriatic coast of Albania, representing an important freshwater system both ecologically and socio-economically (Ahmed et al., 2018; Brunkard et al., 2011; Farnleitner et al., 2010). In recent decades, population growth within the watershed and the expansion of agricultural activities have increased its vulnerability to faecal pollution (Dassenakis, et al., 1998; Field&Samadpour, 2007 ; ISO .2014). The river supports rich biodiversity, contains valuable natural habitats, and is widely used for irrigation, recreation, and household water needs(Boehm & Soller, 2019 ; Byamukama et al., 2005; EEA. 2018). Microbiological monitoring of surface waters is commonly based on the detection of faecal indicator bacteria, mainly *Escherichia coli* and intestinal enterococci (EF), which are strongly associated with human and animal faecal contamination (APHA, 2017 ; Bartram & Rees, 2000).
 Higher concentrations of these indicators are related to increased public health risks, especially for recreational and agricultural water use. In this context, *E. coli* is mostly considered the primary indicator of faecal pollution because it persists in freshwater environments and is closely related to the possible presence of enteric pathogens (Boehm & Soller , 2019).
 The microbiological quality of waters is based on standardized international regulations, on which this study is supported. For field sampling, the ISO 19458 standard method was applied, while the determination of *E. coli* was carried out according to ISO 9308-1. In addition, the Most Probable Number (MPN) technique was used to estimate the total number of *E. coli* (Borrego et al., 2002; Brunkard et al., 2011). There are very few studies, if any, on the water

quality of the Vjosa River. Previous studies of Albanian freshwater systems often confirm localized faecal contamination, which is most evident where waters flow downstream from populated urban areas and intensive domestic animal operations (Byamukama et al. ,2005). Since there is a lack of systematic monitoring of microbiological parameters across the entire Vjosa River, this study provides more comprehensive information on its microbiological pollution (Byamukama et al. ,2005). Over a one-year period, *E. coli* and faecal enterococci concentrations will be measured at thirteen strategically selected sampling stations along the river's main course and its primary tributaries (Field & Samadpour , 2007) This spatial and temporal dataset will reveal patterns of faecal contamination by highlighting the most polluted areas, which can become a primary focus for intervention by institutions responsible for developing water management strategies in Albania (Coffey et al., 2020).

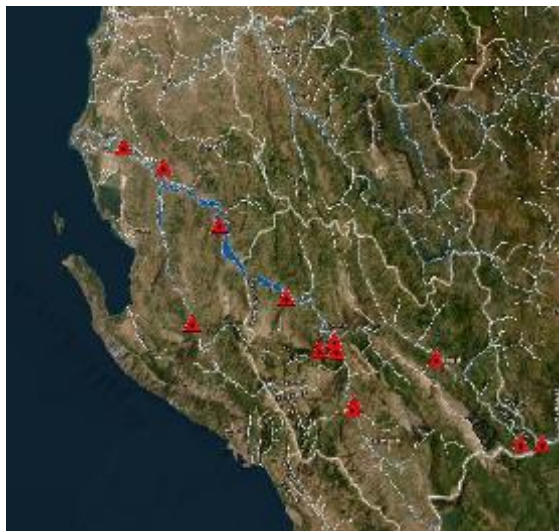
Material and Methods

Study area and sampling design.

Sampling was taken every month from October 2024 to October 2025 at 13 stations distributed along the main channel and 6 major tributaries of Vjosa river (Figure 1), by following recommendations for assessing the microbiological water quality in different areas of the river (Dassenakis et al., 1998). The sampling for this study was based on 13 monitoring points, which included locations from the upper part of the river as well as areas near agricultural and urban zones, providing a comprehensive overview of microbiological pollution over a full year (EPA, 2012).

Figure 1. Sampling stations along the Vjosa River

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At each site, 200 mL grab samples were collected using sterile glass containers at 30-50 cm depth and transported at 4°C to the laboratory, where analyses were carried out within 6-7 hours (Borrego et al., 2002). Numerical determination of faecal indicator bacteria (*E. coli* and intestinal enterococci) followed the Most Probable Number (MPN) approach using serial dilutions interpreted through probability tables ((APHA, 2017). Heterotrophic plate counts were earned via the pour-plate protocol on PCA medium and incubated at 22 °C and 35 °C to quantify psychrophilic and mesophilic communities (European Commission, 2020). Water-quality classes were assigned based on *E. coli* concentrations expressed in CFU/100 mL in agreement with internationally known microbiological limits. (European Commission, 2020).

Enumeration of faecal indicator bacteria.

Escherichia coli (*E. coli*) and intestinal enterococci were quantified using the Most Probable

Number (MPN) method. Serial dilutions (0, I, II, III) were prepared for all samples, and results were calculated based on standardized MPN statistical probability tables (Dassenakis et al., 1998). Enumeration and confirmation of *E. coli* and intestinal enterococci followed the procedures set by ISO 19458 for microbiological sampling and laboratory handling (Borrego et al., 2002). For heterotrophic determination, the pour plate technique was applied on PCA medium, they were incubated at 22 °C and 35 °C for 48 hours up to 5 days in a biological thermostat, allowing the detection of both psychrophilic and mesophilic bacterial groups (EPA, 2012). Microbiological water status was classified based on *E. coli* concentrations expressed in CFU/100 mL according to accepted international thresholds for recreational water and surface-water quality classification (European Commission, 2020).

Results

Spatial variation of *E. coli* concentrations
Faecal contamination along the entire Vjosa River is reflected in (Table 1), which outlines the mean and maximum *E. coli* concentrations measured across 13 stations over the monitoring year (Brunkard et al., 2011). The data collected during this year clearly show that the points with the lowest levels of contamination are those located in the upper part of the river, such as Site-01 (MIF) and Site-09 (VJO). The highest levels of pollution were observed in the downstream section of the river, where urban areas and livestock development zones are concentrated, specifically at Site-03, Site-11, Site-13, Site-15, and Site-16 (European Environment Agency, 2018).

Table 1. Summary of mean and maximum E. coli (FC) and intestinal enterococci (EF) concentrations and microbiological water quality class for each station along the Vjosa River (October 2024 - October 2025).

Code	Zone	FC mean	FC max	EF mean	EF max	Class
Site-01	Mifol	136	460	162	1100	II

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Site-02	Hambare	229	499	81	460	II
Site-03	Poçem	165	1100	153	460	III
Site-05	Memaliaj	188	460	95	150	II
Site-06	Dragot	174	460	153	460	II
Site-07	Kelcyre	145	460	106	460	II
Site-09	Vjose	111	460	136	460	II
Site-11	Sarandoporo	166	1100	90	240	III
Site-13	Gjorm	218	1100	137	460	III
Site-14	Bençe	121	460	187	1100	II
Site-15	Drino	300	1100	74	150	III
Site-16	Kardhiq	245	1100	149	240	II
Site-17	Gjrokaster	214	460	145	240	II

We used annual mean values as well as maximum values of Faecal Coliforms (FC) as indicators of contamination (Figure 2), where a comparison was made among the 13 sampling points. During this monitoring year, a change between maximum and mean values was observed at all sampling sites. The overall distribution shows that most locations present a moderate contamination (Class II). This suggests that, in most of these points, pollution is not constant throughout the entire year but rather episodic, possibly related to different activities such as climatic variations (for example rainfall) or agricultural discharges occurring at different periods by local farmers (Farnleitner et al., 2010).

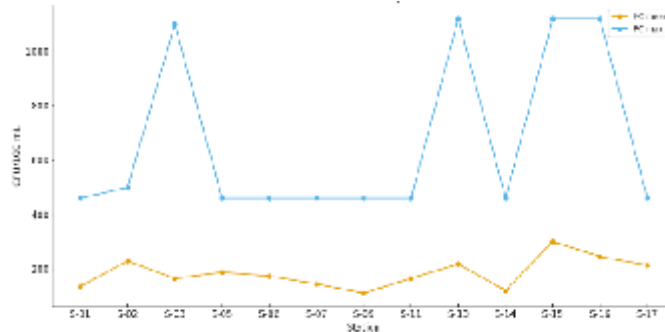
The highest contamination peaks, reaching up to 1100 CFU/100 mL, were recorded at four locations: Site-03 (Poçem), Site-11 (Sarandoporo), Site-15 (Drino), and Site-16 (Kardhiq). These locations indicate significant localized contamination, which is most likely the result of untreated wastewater discharge, intensive agricultural runoff, and livestock operations (A gradient in FC

levels was also observed. The lowest concentrations were found at Site-01 (Mifol), Site-09 (Vjose), and Site-14 (Bençe), which may be associated with upstream locations or minimal anthropogenic influence (Haller et al., 2009). Mean FC concentrations varied between 110-300 CFU/100 mL, with the highest averages mostly recorded at Site-15 (Drino). The consistently high levels at Site-15 identify it as the most impacted site throughout the study. From Figure 2, differences between the maximum and minimum values of pollution distribution can be observed, showing high intensity and clear localization near populated areas and agricultural zones along the Vjosa River (Hlavsa et al., 2015).

Collectively, these findings reveal that FC pollution along the Vjosa River is not diffuse but is strongly driven by specific local anthropogenic sources, including livestock, wastewater effluents, and agricultural runoff (ISO, 2006).

Figure 2. Average and maximum Escherichia coli (FC) concentrations across sampling stations along the Vjosa River (October 2024–2025).

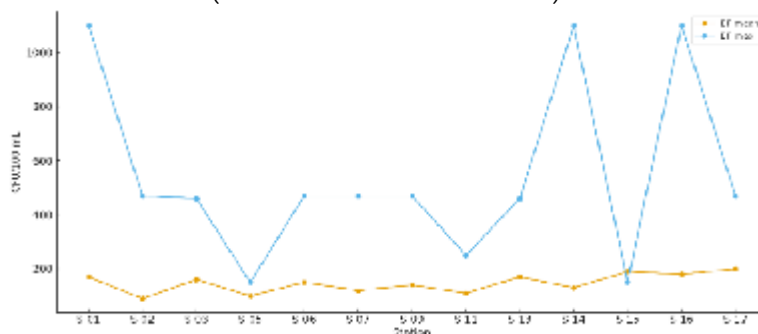
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Spatial variation of intestinal enterococci
Looking the pattern in fecal coliforms (FC), the lower mean concentrations compared to maximum EF values across all sites (Figure 3) it means that contamination run by sporadic, acute pollution events rather than continuous, background faecal loading during the monitoring period (ISO, 2014). Peak enterococcal pollution was intense, reaching 1100 CFU/100 mL at the most locations: Site-01 (Mifol), Site-14 (Bençe), and Site-16 (Kardhiq). The most, Site-15 (Drino) presented a microbiological exception: it showed the lowest mean EF concentration despite having previously shown the highest FC mean. This difference observed between each site provides important information about pollution sources as well as variations in the survival rates of microorganisms (Kavka et al., 2006). Overall EF mean concentrations were gathered, ranging between

80-200 CFU/100 mL (with Site-14, Bençe, recording the highest average). This tight range suggests that while EF contamination peaks dramatically in specific locations, its average distribution is particularly more uniform than that of FC (Field & Samadpour, 2007). Contrasts between average and peak E. coli levels vividly reveal episodic contamination events (EEA, 2018). These spikes are most showed at stations situated close to farming areas, urban zones, and domestic animal operations (Byamukama et al., 2005). This geographical distribution of E. coli contamination clearly indicates that pollution mainly originates from occasional sources, such as human or animal waste, rather than from continuous sources, which could become concerning at high levels for the population living around the Vjosa River (Kay et al., 1994).

Figure 3. EF mean and EF max concentration across stations of the Vjosa River (October 2024 - October 2025).



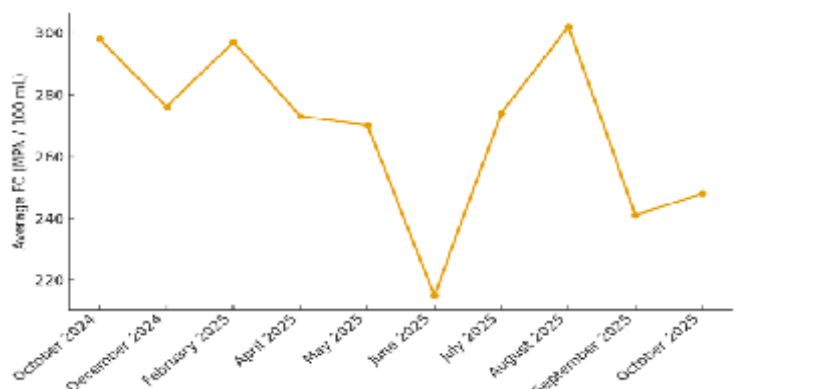
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It is observed that faecal contamination in the Vjosa River shows strong seasonal variation (Figures 1 and 2) and also indicates consistent pollution. During the monitoring period, this contamination did not meet the recommended limits required to classify the river as a low-pollution and safe aquatic environment (Kavka et al., 2006). The data collected over this year revealed a predictable annual pattern: a slight decline in early summer was followed by a sharp increase in mid-summer. Contamination reached its highest values in August 2025 (Figure 4), recording the highest monthly average of the study (~ 301 MPN/100 mL). This peak in contamination was not random; it coincided with the peak of tourist activity and intensive recreational use of Vjosa River areas (Boehm & Soller, 2019). Additionally, agricultural activity is another factor influencing microbial growth (Byamukama et al., 2005). Another important factor to consider is the increase in temperatures during the summer months, which contributes to enhanced microbial growth and is accompanied by a reduction

in water discharge (Ulanovsky et al., 2002). Together, these conditions maximized both bacterial growth and the concentration of existing contaminants (Hlavsa et al., 2015).

The minimum average value was recorded earlier, in June 2025 (~ 216 MPN/100 mL). This minimum observed in spring is related to the wet season effect, during which increased river flow leads to water dilution and a reduction in bacterial levels. A decrease in faecal coliforms is observed after August, and this decline continues throughout the autumn months. Based on Figures 1 and 2, Figure 3 clearly shows that faecal contamination in the Vjosa River is sporadic and related to climatic conditions. It appears to be localized and exhibits seasonal variation linked to the hydrological regime (EEA, 2018). Based on these results, continuous monitoring is considered necessary during the summer season, since contamination levels increase significantly during these months and may pose a risk to water users, as well as cause negative effects on downstream ecosystems (Ulanovsky et al., 2002).

Figure 4. Monthly average Fecal Coliform (FC) concentrations in the Vjosa River (October 2024 – October 2025).



As shown in Figures 1, 2, and 3, the comparison of the mean concentrations of FC and EF across the 13 stations clearly indicates that microbial pollution along the Vjosa River is not random but

is associated with sites located closer to urban areas. This suggests that the contamination mainly originates from human activities (McAllister & Topp, 2012). The stations that consistently recorded the highest FC values also showed elevated

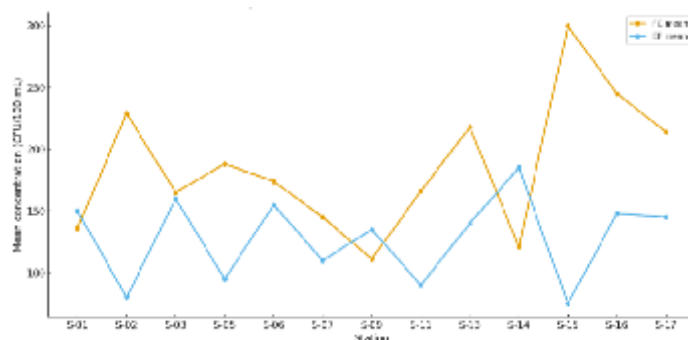
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EF values, indicating that both indicators respond similarly to contamination pressure. The highest monthly mean concentration was recorded in August 2025 (~302 MPN/100 mL), suggesting increased contamination during the summer season, likely influenced by higher temperatures, intensified recreational and agricultural activities, and reduced water flow (Leclerc et al., 2001). The lowest concentration was observed in June 2025 (~216 MPN/100 mL), potentially linked to higher river discharge and dilution effects at the peak of the wet season.

During autumn and winter (October-February), average FC values remained relatively stable (275-300 MPN/100 mL), indicating a continuous input of faecal pollution sources independent of seasonal variation (EEA, 2018). After reaching their seasonal minimum in June, FC levels rose sharply again in July and August, followed by a gradual decrease during September-October 2025 (Ulanovsky et al., 2002). Overall, the figures

show that FC contamination in the Vjosa River is strongly influenced by weather conditions and human activities, highlighting the need for continuous management and the implementation of mitigation strategies to protect both environmental and public health (McLellan & Eren, 2014).

Figure 5. Comparison of mean Escherichia coli (FC) and intestinal enterococci (EF) concentrations across sampling stations



Discussion

This 12-month monitoring and assessment of microbial contamination in the Vjosa River showed that, in several months and at several sites, the recommended permissible limits for surface wa-

ters were exceeded (Dassenakis et al., 1998). Although upstream sections such as Site-01 (Mifol), Site-02 (Hambare) and Site-09 (Vjose) usually showed lower microbial loads, mid- and downstream segments showed recurrent critical peaks, often surpassing 1,100 CFU/100 mL (Kavka et al., 2006). These results indicate that the Vjosa River experiences measurable faecal pressure, in agreement with previous studies on

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riverine systems affected by agricultural and domestic wastewater inputs (Molina et al., 2014). The most persistent hotspots were identified at Poçem (Site-03), Sarandoporo (Site-11), Gjorm (Site-13), Drino (Site-15) and Kardhiq (Site-16) (Kavka et al., 2006). The above-mentioned areas are associated with residential zones that also have agricultural activities carried out by the local inhabitants, which are factors that contribute to the growth and introduction of faecal bacteria into the river's aquatic environment (Byamukama et al., 2005). The high *E. coli* maxima watched at Poçem, Kardhiq and Gjirokaster indicate major episodic contamination, likely driven by upstream livestock discharge and runoff from agricultural land during rainfall periods (Pinto et al., 2012). Same thing also, with the Sarandoporo and Drino tributaries contributed to elevated values, show us

that the microbiological state of the Vjosa River is firmly influenced by its tributary network rather than the main channel alone (EEA, 2018). The strong relationship between *E. coli* and intestinal enterococci makes it clear that both indicators respond in a directly proportional manner to faecal contaminants, and their combined use provides a broader assessment of surface-water quality, as in this case for the Vjosa River (McAllister & Topp, 2012). Mean values remained mostly within Class II water quality (100-1,000 CFU/100 mL), showing moderate contamination in most parts of the river. However, maximum values in most sites reached Class III, related to critical water quality. This indicates that although the baseline microbial load may remain moderate, episodic pollution pulses represent a significant concern, especially during high-flow seasons or rainfall-driven runoff events (Psomas et al., 2016). If this assessment is viewed from a public-health perspective, some sections of the river cannot be considered safe for use in agriculture, livestock activities, or irrigation. Areas influenced by river tributaries, such as the Gjorm, Kardhiq, and Gjirokaster sites, can be considered to present a high sanitary risk; therefore, improved water management is required in these zones for

such uses (Reischer et al., 2008). Overall, the results collected over this one-year period show that the Vjosa River is an important ecological habitat and remains under faecal contamination pressure along its entire course. Continuous microbiological assessments throughout the river are necessary to prevent health and ecological risks (McLellan & Eren, 2014).

Conclusion

This comprehensive one-year assessment of the entire Vjosa River has provided an overall picture of microbial contamination, particularly from *Escherichia coli*, demonstrating that faecal pollution is widespread along the river's full length and represents a chronic, year-round issue (Ahmed et al., 2018; Boehm & Soller, 2019; Byamukama et al., 2005). In the middle and downstream segments of the river, higher contamination is observed compared to the upstream areas, such as Hambare or Vjose (Bartram & Rees, 2000; Coffey et al., 2020; EEA, 2018). Critically, persistent hotspots identified repeatedly at Poçem, Sarandoporo, Gjorm, Drino, Kardhiq, shows that this contamination is not a sporadic event but a deeply periodic issue (Boehm & Soller, 2019; EEA, 2018; Kavka et al., 2006). While the majority of average pollution index remained within Class II (moderate), maximum *E. coli* peaks frequently are into Class III (critical pollution), telling periods of significant sanitary risk (Bartram & Rees, 2000); Brunkard et al., 2011; Lederer et al., 2001).

From a public health point of view, these results show that several parts of the river especially near tributary are not microbiologically safe for recreational use or for irrigating edible crops (Borrego et al., 2002; ISO, 2006; European Commission, 2020). In addition, the consistent agreement between *E. coli* and intestinal enterococci values supports the use of these two indicators together for routine surface-water quality assessments (APHA, 2017; Coffey et al., 2020; Kavka et al., 2006). Generally, the findings highlight that protecting the ecological habitat of the Vjosa

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River and the health of the communities that depend on it requires coordinated action (EPA, 2012 ; Haller et al., 2009); Kay et al.,1994) . The priority steps should include targeted measures in high-risk areas, rapid investment in improved wastewater infrastructure, stricter control of livestock activities, and continuous, integrated watershed monitoring and management programs [Byamukama et al.,2005; Hlavsa et al., 2015) ;McLellan & Eren,2014)

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Original Research

Estimates of the Frequency Distribution (FTL%) for the Length-Classes Present in the Stocks of Ohrid Trout (*Salmo letnica*) and Belushka (*Salmo ohridanus*) from the Albanian Part of Lake Ohrid

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Abstract

Based on morphometric analyses of individuals sampled from commercial catches, the frequency distribution of length classes present in the stocks of Ohrid trout (*Salmo letnica*) and belushka (*Salmo ohridanus*) in the Albanian part of Lake Ohrid was assessed. No significant differences were found in mean total length (TL, cm) among the three spatial fractions of either stock ($P > 0.05$), suggesting the existence of a single stock for each species. The dominant length class in the Ohrid trout stock was 31.8–35.8 cm ($F\% = 44.39$), whereas in the belushka stock the dominant length class was 30.1–33.0 cm ($F\% = 30.99$). The length-frequency distributions of both species were monomodal. Polynomial relationships were identified between total length (TL, cm) and

frequency of occurrence ($F\%$). For Ohrid trout, the relationship was described by:

$$F\% = -0.6724TL^3 + 7.2586TL^2 - 16.559TL + 10.847 \quad (R^2 = 0.624; r = 0.790),$$

whereas for belushka the relationship was:

$$F\% = -0.3256TL^3 + 4.0984TL^2 - 11.486TL + 12.028 \quad (R^2 = 0.697; r = 0.834).$$

The results provide useful information for stock assessment, sustainable fisheries management, and conservation of these endemic salmonid species in Lake Ohrid.

Keywords. *Ohrid trout (Ohrid trout), Belushka, commercial fishing, stock, length-class frequency, monomodal (bimodal) distribution, endemic species, fishing/repopulation.*

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Introduction.

The Ohrid trout (*Salmo letnica* Karaman, 1924) and the belushka (*Salmo ohridanus* Steindachner, 1892) are two salmonid (Family Salmonidae), endemic to Lake Ohrid. According to published information, Ohrid trout reaches a maximum total length of 76.0 cm and a maximum body weight of 6.5 kg. The average total length at first maturity was estimated at 37.6 cm, with reported values ranging from 36.0 to 39.7 cm (FishBase, 2023). For belushka, the highest reported total length and body weight are 33.6 cm and 685 g, respectively (FishBase, 2023). The analysis of fish population structure based on body-size distribution is one of the most commonly used components in stock assessment studies. The size structure of a population reflects recruitment dynamics, growth characteristics, and fluctuations in total mortality (Neumann and Allen, 2007). Length-frequency data provide valuable information on fish population dynamics and may help identify problems such as temporal variability in cohort structure, slow growth, and excessive mortality (Anderson and Neumann, 1996; Neumann and Allen, 2007). In most cases, the interpretation of length-frequency data is complemented by other assessments, including catch-per-unit-effort analysis, age and growth studies, recruitment analysis, mortality estimates, and body condition assessments (Miranda and Bettoli, 2007).

In fisheries science, the study of body-size distribution has a long history and numerous practical applications (Froese et al., 2018). Theoretical concepts related to body-size distribution under different growth and mortality conditions were initially developed by Beverton and Holt (1957) and later incorporated into stock-assessment models based on length-frequency data, including those proposed by Hordyk et al. (2015a), Hordyk et al. (2015b), Froese et al. (2018), and Kokkalis et al. (2017). According to classical theory, the shape of body-size distributions depends largely on the relationship between growth and mortality rates.

Changes in body-size distribution result from the interaction of four major factors related to the characteristics of individuals within a population or cohort:

- (1) initial size;
- (2) the distribution of growth rates resulting from random differences of genetic or environmental nature between individuals and ages;
- (3) the dependence of individual growth rates on size and time (age) resulting from the interaction of biological characteristics with the environment;
- (4) mortality, which may differentially affect particular length-classes (Huston and DeAngelis, 1987).

In fish populations, length-frequency distributions may be monomodal (single peak) or bimodal (two peaks), reflecting differences in population structure and growth patterns. A monomodal distribution generally indicates the dominance of a single cohort or age group, whereas a bimodal distribution suggests the presence of two distinct size groups or age classes that may result from differences in growth rates and recruitment characteristics (Laslett et al., 2004).

Information on the demography of endemic salmonids from Lake Ohrid, particularly regarding length-frequency distributions, remains limited. Previous studies by Spirkovski (1991) and Jahollari (2014) have provided valuable information on Ohrid trout populations. Additional morphometric assessments of Ohrid trout and belushka have been reported by Filipi (1959), Petrova-Reckoska (1993), Spirkovski and Ilic-Boeva (2004), Belichovska (2010), Palluqi and Spirkovski (2017), and Kolaneci and Bllaca (2024). By carrying out a stock assessment based on the analysis of the population structure of two endemic trouts in the Albanian part of Lake Ohrid, we aimed to indirectly reveal their real structure according to the size of individuals, while simultaneously demonstrating a model for assessing the responsible use and predicting the future of Ohrid trout and belushka stocks.

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Material and Methods

Study period and location: The study was conducted during 2025 in the Western and Southern areas of Lake Ohrid (Figure 1). The object of the

study were the stocks of two endemic trout for this lake, the Ohrid trout (*Salmo letnica*) and the belushka (*Salmo ohridanus*). The fish sampling areas included three commercial fishing regions; the Lin region, the Piskupat-Udenisht region (Western shore of the lake) and the Pogradec-Tushemisht region (Southern shore of the lake).

Figure 1. (a) Three endemic trout fishing areas (shown with oval shapes) in the Albanian part of Lake Ohrid; (b) Belushka (*S.ohridanus*); (c) Ohrid trouti (*S.letnica*); (d) Imitation treble hooks used by professional fishermen for catching Ohrid trout and belushka.



Fish sampling: Fish sampling was carried out within the period when the capture of the two ichthyic species included in the study is allowed (MBZHR, 2022). Of the total number of individuals included in the samples (coran N=216; belushka N=242) the largest number was taken from commercial fisheries, which are allowed to exploit the coran after reaching a length of TL=32 cm and the belushka starting from a length of TL=30 cm (Palluqi and Spirkovski, 2017). A limited number of individuals were taken from test catches (carried out with "long-lines" hooks, like commercial catches), which have provided individuals with smaller sizes than those mentioned.

The inclusion of individuals in the samples for morphometric analyses was done without prior selection, i.e. randomly. Since the catches were carried out at night, the coran and The salmon were sampled and measured in the morning. Demographic assessments were made for both sexes taken together. The ichthyological analysis for demographic assessment was focused only on the measurement of total length or zoological length (TL, cm) (Figure 2). The measurement was performed by applying the scheme for morphometry of fish of the Salmonidae Family, according to Piria and Bashkaut. (2020).

Calculation of frequencies for the length-classes present:

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The values of the interval between consecutive length-classes were 4.0 cm for the Ohrid trout and 2.9 cm for the Belushka. The measured individuals were grouped according to the identified length-classes, determining at the end of the analysis of the total sample the number of individuals for each length-class. The frequency for each of the length-classes was calculated in the mean, applying the formula:

$$FTL\% = (n \cdot 100) / N$$

FTL% -frequency of the length-class

n -number of individuals in a respective length-class

N -total number of individuals in the next sample.

Figure 2. Measurement of total length (TL, cm) in an individual of the Ohrid trout (*S. letnica*).



The numerical data for *n*, *N* and *FTL%* were entered into a table and further processed to be presented in graphical form.

Mode of the frequency curve for the present length classes

The discovery of the mode of the frequency-size distribution was carried out after regression and correlation analysis for the polynomial correlation ($y = -ax^3 + bx^2 - cx + d$) between the variables "length class (*x*)" and "frequency of presence" (*y*). According to Selvaraju (2021), the mode of the distribution is determined by the number of vertices in the curve resulting from the solution of the respective regression. In addition to the mode of the distribution, it was determined whether the frequency-length curve was symmetrical or asymmetrical. When the curve was asymmetrical, it was tested whether the asymmetry was caused by its "distortion" to the right or left of the

imaginary line that intersects the X-axis, at that point that represents the average value calculated for the average total length. (*TLM*, cm), characteristic of the stock being analyzed (Selvaraju, 2021).

Results

Estimations for the stock of the Ohrid trout (*Salmo letnica*).

Estimation of the three fractions in the Ohrid trout stock according to the interval-length (TL_{min}-TL_{max}) and the average value of the total length (TLM): The numerical results set out in Table 1 as well as the differences in the height of the columns in the histogram of Figure 3 proved the existence of differences in the average values (*M*) of the total length (TL, cm) as well as in the values of the variance (*Var%*) between the three spatial

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fractions of the Ohrid trout stock, which were exploited by commercial fishing in the respective hunting areas.

Table 1. Average values, values of two biometric indicators and intervals (min-max) of values for total length (TL, cm) of the Ohrid trout (S. letnica) according to three spatial features of this species, in the Albanian part of Lake Ohrid.

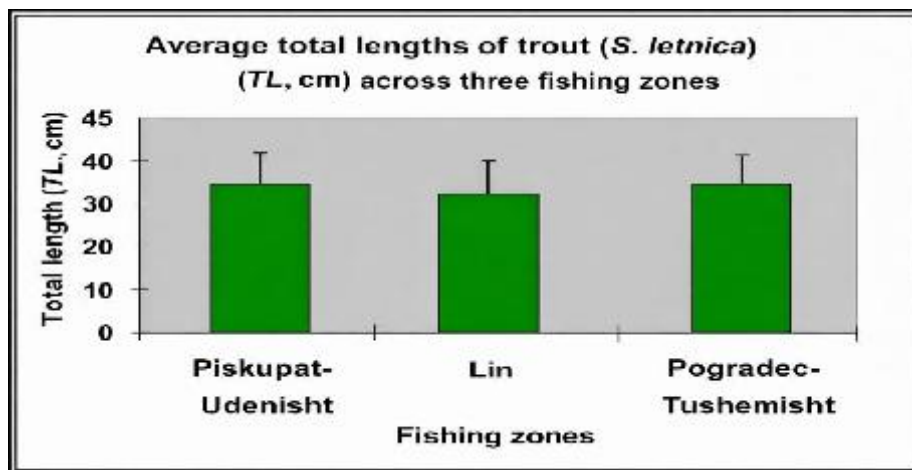
Biometric indicator	Piskupat-Udenisht	Lin	Pogradec-Tushemisht
M (cm)	33.01	30.69	32.24
D	7.789	7.826	8.068
Var%	23.59	25.5	25.02
Min-Max (cm)	19.6-44.8	18.7-42.8	20.7-44.3

From the analysis of fish caught during 2025, it resulted that the average length of the Ohrid trouts fished in the Lin area was 2.32 cm smaller compared to the Ohrid trouts that were fished in the Piskupat-Udenisht area. The average length was 1.55 cm smaller when compared to the Ohrid trouts fished in the Pogradec-Tushemisht lake area. The total catch of Ohrid trouts in the Lin area, judged by the degree of variability of the size of individuals, was distinguished by the highest values of variability (Var%=25.50), compared to the catches made in the other two fishing regions (Var%=23.59 in the Piskupat-Udenisht area and 25.02% in the Pogradec-Voloreka area).

However, despite the real differences that manifested the average values of the parameter being evaluated, the differences between them, according to the one-way analysis of variance (ANOVA), in none of the three cases compared were significant ($t < 0.25; P > 0.05$). This assessment can be used as evidence to assert that the three spatial fractions of the Ohrid trout belong to a single stock. If further studies prove the stability of spatial changes for the average values of the parameter TL, cm, which were found in our study in the Ohrid trout stock, then it may be sought to discover the influencing factors.

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Figure 3. Average total length (TLM, cm) and standard deviation (SD) values for three spatial fractions in the stock of Ohrid trout (*S. letnica*), according to the analysis of samples taken from commercial harvests in 2025



Ohrid trout stock: The results from the measurement of the total length (TL, cm) in 214

The total length intervals, from the individual found with the lowest total length value to the individual found with the highest value of this morphometric indicator, reflected, to a certain extent, the distribution of the average total length values, according to the three spatial fractions in the Ohrid trout stock. In the order of values from TL=18.7 cm (the minimum identified value) to TL=44.8 cm (the maximum identified value), the fraction exploited in the Lin area belonged to both the lowest value on the left side (TL=18.7 cm) and the lowest value on the right side (TL=42.8 cm) of the respective order (or the increasing side of the TL values). In the Pogradec-Tushemisht fraction we found the highest value encountered at the minimum end of the order of TL values (TL=20.7 cm), while from the commercial records that were realized in the Piskupat-Udenisht fraction we measured the individual with the largest total length value (TL=44.8 cm).

ii. Results from the frequency distribution analysis (F%) for the length-class (TL, cm) present in the

Ohrid trout individuals, which made up the total sample, were grouped according to length-classes with an interval of 4.0 cm from each other (except for two extreme length classes in which individuals with TL<19.5 cm and individuals with TL>44.0 cm were included, respectively). Based on the respective number of individuals found for each length-class (n) and the number of individuals that made up the total sample (N), the frequency of presence (F%) was calculated for each length-class in percentage (Table 2).

The histogram in Figure 4 demonstrates the variability of the frequency values (F%) for the length-classes present in the stock of the Ohrid trout, which is concentrated in the Western and Southern areas of Lake Ohrid. It is important to clarify first that our results refer to the "stock" of this species, that is, that part of the population that is vulnerable to commercial fishing (or is catchable by the relevant fishing gear) and not to

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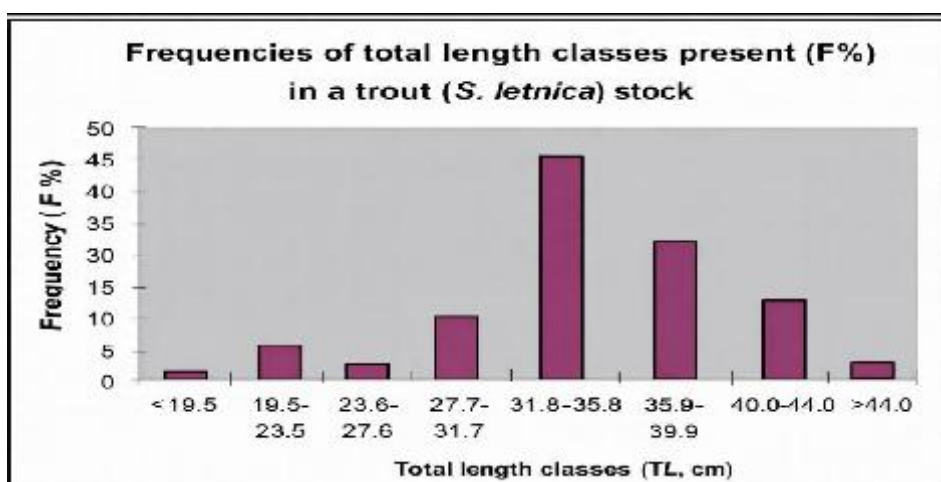
the "population" as a whole. Sampling based on the catch made with commercial fishing gear is a

methodological requirement for "stock assessments", including demographic assessments.

Table 2. Basic data, from the analysis of samples taken from commercial catches, for the assessment of the frequency distribution for the length-classes present in the stock of the Ohrid trout (*S. letnica*).

Class-Length (TL,cm) [Interval 4.0 cm]	Number of individuals (n)	Frequency by number (F%)
<19.5	2	0.94
19.5-23.5	10	4.67
23.6-27.6	6	2.81
27.7-31.7	21	9.81
31.8-35.8	95	44.39
35.9-39.9	49	22.89
40.0-44.0	25	11.68
>44.0	6	2.81
Total	214	100

Figure 4. Presence frequencies (F%), calculated based on the number of individuals (n) per length-class (TL, cm) present in the stock of the Ohrid trout (*S. letnica*), according to the results of the analysis of commercial stocks.



Returning to the commentary on the figures listed in the F% column of Table 2 and the order

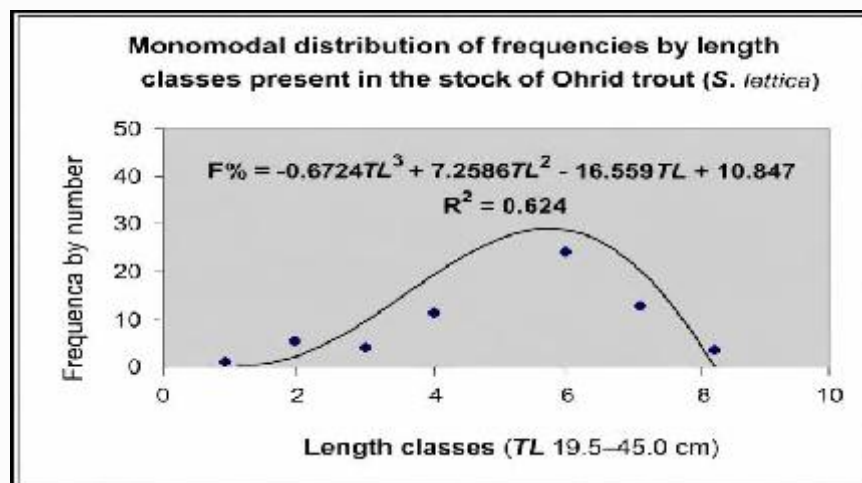
of variability represented by the columns in the histogram in Figure 4, it resulted that 18.23% of

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the individuals included in the catches had not reached the minimum size allowed for exploitation (MBZHR, 2022). In reality, this size (TL=32 cm) corresponds to the age at first maturity (3+), mainly of male individuals of this species (Rakaj and Filoko, 1996). In the measure of approximately 67.5%, the catch was dominated by length classes from 31.8 to 39.9 cm. Both of these length classes included females and males of the Ohrid trout that reached sexual maturity and entered the first increase (Filipi, 1959; Rakaj and Filoko, 1995). The "press" of the weighting or the peak of the order of The length-frequency, represented by the length class 31.8-35.8 cm (44.39% of the sampled individuals), mainly included individuals of the Ohrid trout that were included in the first catch (32 cm, according to the MABR, 2022).

Individuals included in the length class of 40 cm and over (n=31 individuals and F%=14.49) were relatively rare in the Ohrid trout catches. However, we think that it may be a misconception to consider this conclusion as a feature of the respective stock. There is a high possibility that Ohrid trout individuals with a length of over 45-50 cm "avoid" the catch, as they can concentrate in the deeper levels of the lake's pelagic zone, and even in "shelters" present in the coastal areas, especially in the periods preceding spawning. The tendency of adults to live solitary lives greatly reduces the possibility of their capture by hunting tools, especially hooks.

Figure 5. Monomodal curve and corresponding regression equation ($R^2=0.624; r=0.790$) for the polynomial correlation between the variables "length-class (TL, cm)" and "frequency of presence (F%)" for a stock of Ohrid trout (*S.lentica*) exploited by commercial fishing in the Albanian part of Lake Ohrid.



Regression and correlation analysis resulted in the identification of a polynomial correlation between the variable "class-length" and the variable "frequency of presence" (Figure 5). The coefficients calculated for the corresponding equation were as follows:

$$F\% = -0.67247L^3 + 7.25867L^2 - 16.559TL + 10.847$$

$$R^2 = 0.624 ; r = 0.790$$

This equation can be used as an empirical formula for estimates of the frequencies of presence of the corresponding length classes in the stock of the Ohrid trout, e.g. the frequencies of presence of individuals entering the first capture or those maturing for the first time, knowing in ad-

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vance the average values of TL, cm in the first capture as well as in the first maturation. In any case, it would be necessary to make the corresponding corrections, using for this purpose the calculated value of the correlation coefficient (r).

The above polynomial relationship corresponded to an asymmetric monomodal curve (Figure 5). The asymmetry of the curve was caused by its negative "skewness", as a consequence of the fact that the average value of the total length (TL=33.66 cm) in the Ohrid trouts included in the dominant length class (TL=31.8-35.8; F%=44.39) did not coincide with the imaginary central perpendicular line, the origin of which marked the average value of the total length, characteristic for the respective stock (TL=31.98 cm), but was deviated to the right side of this line (or in relation to the observer of the written material).

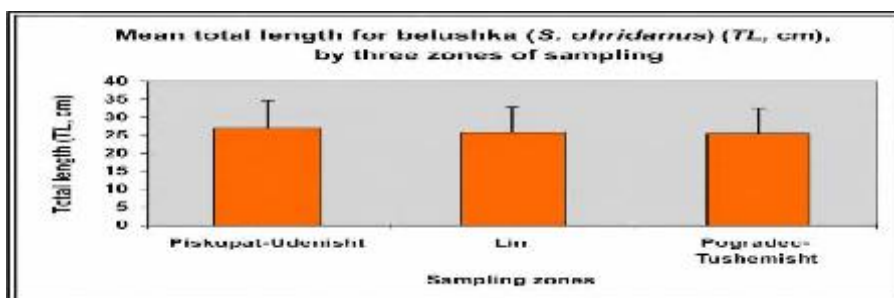
Estimations for the stock of the belushka (*Salmo ohridanus*).

Evaluation of the three fractions in the belushka stock according to the length interval (TLmin-TLmax) and the average value of the total length (TLM): The numerical data that we have placed in Table 3 as well as in the histogram of Figure 6 proved that the average values for the total length of belushka (TL, cm), which were fished during 2025 in three hunting areas, in the Albanian part of Lake Ohrid, had very small differences (from 0.23, when comparing the fraction of the stock that was exploited in the Lin area with the fraction exploited in the Pogradec-Tushemisht area, to 0.97 cm, when comparing the fraction of the stock exploited in the Piskupat-Udenisht area with the Pogradec-Tushemisht fraction).

*Table 3. Average values, values of two biometric indicators and intervals (min-max) of values for total length (TL, cm) of the belushka (*S.ohridanus*) according to the three spatial distributions of this species in the Albanian part of Lake Ohrid.*

Biometric indicator	Piskupat-Udenisht	Lin	Pogradec-Tushemisht
M (cm)	27.01	26.27	26.04
SD	6.631	6.480	6.398
Var%	24.55	24.67	24.57
Min-Max (cm)	15.4-36.5	15.1-36.8	14.9-36.3

*Figure 6. Mean total length (TLM, cm) and standard deviation (SD) values for three spatial fractions in the stock of belushka (*S.ohridanus*), according to the analysis of samples taken from commercial stocks in 2025*



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Analysis of variance (ANOVA) for Student's t-test resulted in t-criterion values that were within the range of 0.03 to 0.12. Under such conditions, the significance of the differences between the mean total length values among the three spatial fractions in the stock of belushka was not proven. As we had found for Ohrid trout, this assessment proved that the belushkas that were exploited in the Western and Southern areas of Lake Ohrid also belonged to a single stock.

The interval of total length (TL, cm), from the individual with the smallest value, included in the analyzed samples of the belushka, to the individual with the largest value of this parameter, was 14.9 cm-36.8 cm.

The samples analyzed in the Piskupat-Udenisht area were distinguished by the smallest difference between the two extreme lengths (21.1 cm), while the samples analyzed in the Lin area were

distinguished by the largest value of this difference (21.7 cm).

The belushka with the shortest height was measured in the Pogradec-Tushemisht area (TL=14.9 cm) while the belushka with the longest height was measured in the Lin area (TL=36.8 cm). Judging from the average values of variance (Var%) we can state that we did not find significant changes in the variability of the sizes of individuals between the species of the Ohrid trout (Var%=24.70) and the belushka salmon (Var%=24.59).

Results from the analysis of the frequency distribution (F%) for the length-class (TL, cm) present in the belushka stock:

Table 4. Basic data, from the analysis of samples taken from commercial stocks, for the evaluation of the frequency distribution for the length-class present in the belushka stock (S.ohridanus).

Class-Length (TL,cm) [Interval 2.9 cm]	Number of individuals (n)	Frequency (F%)
<15.1	5	2.07
15.1-18.0	18	7.45
18.1-21.0	12	4.95
21.1-24.0	23	9.5
24.1-27.0	38	15.7
27.1-30.0	36	14.88
30.1-33.0	75	30.99
33.1-36.0	26	10.74
>36.0	9	3.72
Total	N=242	100

The results of the estimation of the number of length classes (interval 2.9 cm; total 9 length classes) as well as the number of individuals (n) included in each of the length classes present in the

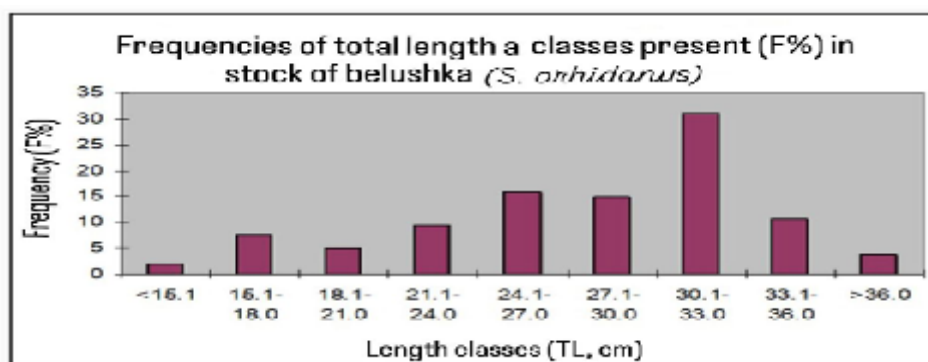
total sample of sea urchins are shown in Table 4

Based on the values of n and the value of N (total number of sea urchins in the total sample), we calculated (in %) the values of the frequencies of

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presence of each length class (F) in the estimated sample. The results of the calculations are shown in Table 4 and the diagram in Figure 7.

Figure 7. Frequencies of presence (F%), calculated based on the number of individuals (n) per length-class (TL, cm) present in the stock of belushka (*S. ohridanus*), according to the results of the analysis of commercial records

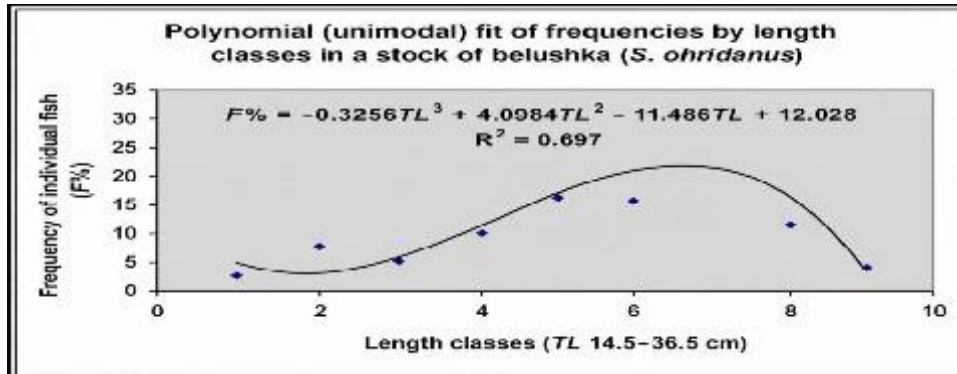


According to the evaluation of the belushka samples, it resulted that individuals of this species with a total length (TL) less than 15.1 cm constituted the length-class with the lowest frequency (F%=2.07) in the catches of this species. On the other hand, individuals of belushka included in the seventh length-class (30.1-33.0 cm) were distinguished by the highest value of the frequency of presence in the stock of this species. The frequency of presence of individuals included in the length interval from 30.0 cm to more than 36 cm, i.e. from the sixth length-class to the ninth length-class, was 53.31% (since in the length-class 27.1-30.0 cm the number of individuals that had a total length TL=30.0 cm was 19).

Based on the minimum value of the total length of the belushka, determined for the introduction of this species into exploitation (MARDZHR, 2022), it resulted that 46.69% of the belushka caught were undersized. The inclusion in the catch of individuals that are introduced in lengths from 17.0 cm to 24.0 cm (length classes II-IV) (approximately 18.60% of the total sample) damages the reproductive capacity of the stock, while, according to Filipi (1959), this size interval includes males and females that mature for the first time.

Figure 8. Monomodal curve and corresponding regression equation ($R^2=0.697; r=0.834$) for the polynomial correlation between the variables "length-class (TL, cm)" and "frequency of presence (F%)" for a stock of belushka (*S. ohridanus*) exploited by commercial fishing in the Albanian part of Lake Ohrid.

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As for the Ohrid trout stock, for the belushka stock, the polynomial correlation between the variable "length class (TL, cm)" and the variable "frequency of presence (F%)" corresponded to an asymmetric monomodal curve, with negative "skew" (Figure 8). In this case, the average value of total length (TL=32.05 cm) for the belushkas that were included in the dominant length class (TLcm=30.1-33.0; F%=30.99) was clearly deviated to the right of that position on the X-axis where the average value of total length (TL=26.44 cm) is placed, characteristic of the stock being evaluated.

The calculated coefficients for the polynomial regression TL,cm (x)-F% (y), for the belushka stock, were:

$$F\% = -0.32567TL^3 + 4.09847TL^2 - 11.4867TL + 12.028$$

$$R^2 = 0.697 ; r = 0.834$$

The use of the regression corresponding to the quality of the empirical equation, if for application purposes knowledge of the frequencies of presence for specific sizes of the belushka were required, would require taking into account the value of the parameter "r", in order to guarantee the real accuracy of the results.

Discussion

Analysis of the average total length (TL, cm) of Ohrid trout sampled from the three fishing areas showed slightly lower values in the Lin fraction compared with those from Piskupat-Udenisht

and Pogradec-Tushemisht. However, the biometric analysis did not reveal statistically significant differences among the three fractions, suggesting that the sampled individuals belong to a single stock. The slightly smaller average length observed in the Lin area may be associated with local management practices, including the periodic release of hatchery-produced juveniles. Although the present study was not designed to evaluate the effects of stocking programs, artificial repopulation may influence local stock structure and deserves further investigation.

Regarding the frequency distribution of length classes in the Ohrid trout stock, our results were compared with previous assessments carried out by Spirkovski (1991) and Jahollari (2014). Despite differences in class intervals used by different authors, the results indicate several common features in the structure of commercial catches. Regarding the frequency distribution of length-classes present in the Ohrid trout stock, we compared our results with similar estimates previously carried out by Spirkovski (1991) and Jahollari (2014). Assuming an interval of 2.0 cm between consecutive length-classes, Spirkovski (1991) identified 20 length-classes, starting from the smallest total length (TL=19.0 cm) to the largest total length (TL=59.0 cm). The dominant length-class was found to be 35-37 cm (13.6%), while Ohrid trouts included in the length interval from 31 cm to 37 cm (three length-classes) constituted about 38.5% of the stock of this species. Undersized individuals (TL<32 cm), were in-

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cluded in seven length classes, constituting approximately 19.5% of the stock. From such findings the author concluded that the Ohrid trout population in Lake Ohrid manifested a reduction in abundance as well as fitness disorders, in terms of self-recruitment. Jahollari (2014), accepting the interval of 2.9 cm between consecutive length-classes [except for the two extreme length-classes ($TL < 25.9$ cm and $TL > 44.0$ cm)], had identified in the samples of Ohrid trout taken from commercial catches the presence of eight length-classes. The dominant ($F = 26.06\%$) was the V-th length-class (35.0-37.9 cm) while Ohrid trouts that were included in the length-classes from 32.0 to 40.9 cm constituted 57.99% of the catch. Individuals included in the length-class $TL > 40$ cm were represented in the catch with about 28% of it while individuals with sizes smaller than 32 cm were present with a frequency of 23.5%.

For some analogous estimates, we have compared our figures with those obtained by the two aforementioned authors.

These estimates include:

a. *Sizes at first maturity:*

According to our calculations, individuals of the Ohrid trout with sizes that were characteristic for the first maturity of males and females (31.8-39.9 cm) were present in the occupations of this species with a frequency of $F = 67.5\%$. According to the estimates of Spirkovski (1991) and Jahollari (2014), individuals of the indicated sizes were present in the occupations with the corresponding frequency values of $F = 57.5\%$ and $F = 55.5\%$.

b. *Undersized specimens:*

The specimens of individuals of the Ohrid trout with a length of $TL < 32.0$ cm were encountered with a frequency of $F = 18.23\%$ in our estimates, $F = 19.50\%$ in the estimates of Spirkovski (1991) and 23.5% in the estimates of Jahollari (2014).

c. *Dominant length-class*

Despite the differences in the value of the interval between consecutive length-classes (the interval, which for this comparison should be the same), we had identified as dominant in the Ohrid trout stock ($F\% = 44.39$) the length-class 31.8-35.8 cm. For Spirkovski (1991) the dominant ($F\% = 13.60$) was the length-class 35.0-37.0 while according to Jahollari (2014) the length-class 35.0-37.9 cm had the highest frequency of presence ($F\% = 26.06$). As noted above, the magnitude of the value of the parameter $F\%$ was affected by the width of the interval between consecutive length-classes.

d. *Dimensions over 40 cm.*

The percentage of Ohrid trout manuscripts with $TL > 40.0$ cm was: 14.49%, according to our estimates, 28.5%, according to Spirkovski (1991) and 27.3% according to Jahollari (2014).

These estimates result in high figures for the inclusion in commercial fishing of individuals entering the first spawning season and quite low figures for the exploitation of individuals over 40 cm in length. Although the inclusion in fishing of a fraction of the Ohrid trout stock consisting of individuals with a length smaller than the allowed one was 2.5 to 3.7 times smaller compared to the inclusion of individuals spawning for the first time, their boarding and trading should be discontinued. Undersized Ohrid trouts should be considered by fishermen as "by catch" and, as such, should be returned unharmed to the lake immediately after capture. Similarly, fishing techniques should be controlled and improved (e.g. by applying lines with "imitating" hooks associated with accessories that guarantee their immersion in the depths of desired) in order to increase the frequency of capture for individuals with high values of total length, which populate deeper areas of the lake.

Regarding the stock of the belushka (*S. ohridanus*), we were unable to find estimates of the distribution of length classes, which would allow comparisons with our data. Some information on the change in the sizes of this species, in time and

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space, is found in the analyses of catches. According to Spirkovski (1991), in the catches of the belushka, carried out with static traps, individuals with a length greater than 30.0 cm are rare. According to Stefanovic (1948), the belushka reaches an average length of 28.5 cm and an average weight of 171 g in the ninth year (8+), while the highest annual growth rate was experienced during the fourth year (3+) of life. According to estimates made by Belichovska (2010), the average length and weight of the belushka depended on the sampling areas and status. physiological. According to the areas of the lake where the samples were taken, the average total length in the interval between two consecutive increases varied from 21.74 cm to 22.19 cm and in the reproduction period, from 22.04 cm to 22.50 cm. Analyzing the catches of the belushka according to the total length of the individuals at the respective ages, Filipi (1959) had found the figure TL=14.0 cm as the smallest value and the figure TL=32.5 cm as the largest value for this morphometric parameter. According to our estimates, the average value of the total length of the belushka, according to the analysis of the samples taken from the commercial catches, was 26.44 cm, while the range of values for the total length was from 14.9 cm to 36.8 cm.

It is very likely that the differences for two estimated indicators (average total length and maximum identified length), between our data and the figures published by other authors, have their source in fishing practices and in particular in fishing gear. The use of hooks for fishing, compared to the use of nets (slings and single-line traps as well as the trammel net) increases the frequency of catching large individuals, extending the length-class range.

Conclusion.

By analyzing the frequencies of length-classes present in the commercial catches of Ohrid trout (S. letnica) and belushka (S. ohridanus), we

aimed to apply a solution for discovering the demographic structure of the stocks of these two endemic trouts for Lake Ohrid. From this analysis, data were obtained on the frequency of exploitation of individuals entering the first increase, individuals that were distinguished by smaller sizes compared to the minimum size allowed for exploitation, as well as the length-class that resulted more exploited than the others. Being aware of the shortcomings, mainly related to the time limitation of the assessments, we hope to have provided additional elements in the system of interpretation of data on catches, so that fisheries management can guarantee the conservation of Ohrid trout and belushka stocks.

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