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Generative Artificial Intelligence and Linguistic Justice in University Education: A Field Study on the Impact of Mother Tongue and Academic Specialization - The Annex of the Higher School of Teachers at the University of Bouira as a Model

Houda Houache

¹ Faculty of Letters and Languages
Department of Arabic Language and Literature
Specialization: Arabic Linguistics
h.houache@univ-bouira.dz

Abstract

This research aims to investigate the role of generative artificial intelligence in achieving linguistic justice within university education, in a context characterized by multilingualism and the diversity of mother tongues and academic specialization languages. This is done through a case study of the annex of the Higher School of Teachers in Bouira. The study starts from the following problematic question: To what extent does generative artificial intelligence contribute to achieving linguistic justice within university education in light of multilingualism and different academic specializations?

The research adopted a descriptive-analytical approach, based on a questionnaire directed to a sample of professors and students at the Higher School. The results subsequently showed that most of the sample members regularly use generative AI tools in various linguistic activities. They also revealed a variance in the perceptions of linguistic justice, which was linked to the difference in mother tongue and language of specialization, as some participants indicated that the representation of languages within generative AI tools remains unbalanced and is affected by the volume of available digital knowledge base for each language.

The study concludes that generative artificial intelligence represents a tool with promising potential to enhance linguistic justice within university education. However, achieving this goal remains dependent on framing its use, supporting multilingualism in its data, and training educational actors to utilize it consciously.

Keywords: Generative Artificial Intelligence, Linguistic Justice, Mother Tongue, Academic Specialization, the Annex of the Higher School.

Résumé

Cette recherche vise à examiner le rôle de l'intelligence artificielle générative dans la promotion de la justice linguistique au sein de l'enseignement universitaire, dans un contexte marqué par le multilinguisme et la diversité des langues maternelles ainsi que des langues de spécialisation académique. L'étude s'appuie sur une étude de cas menée au sein de l'annexe de l'École Normale Supérieure de Bouira.

La recherche s'articule autour de la question suivante : dans quelle mesure l'intelligence artificielle générative contribue-t-elle à la réalisation de la justice linguistique dans

l'enseignement universitaire, dans un contexte caractérisé par le multilinguisme et la diversité des spécialisations académiques ?

Afin de répondre à cette question, l'étude a adopté une approche descriptive et analytique, fondée sur un questionnaire adressé à un échantillon d'enseignants et d'étudiants de l'École Normale Supérieure.

Les résultats montrent que la majorité des membres de l'échantillon utilisent régulièrement les outils d'intelligence artificielle générative dans diverses activités linguistiques. Ils révèlent également l'existence d'une variation des perceptions de la justice linguistique, liée aux différences de langue maternelle et de langue de spécialisation. Certains participants ont indiqué que la représentation des langues dans les outils d'intelligence artificielle générative demeure déséquilibrée et qu'elle est influencée par le volume des ressources numériques disponibles pour chaque langue.

L'étude conclut que l'intelligence artificielle générative constitue un outil prometteur pour promouvoir la justice linguistique dans l'enseignement universitaire. Toutefois, la réalisation de cet objectif demeure tributaire de l'encadrement de son utilisation, du renforcement du multilinguisme dans les données qui l'alimentent, ainsi que de la formation des acteurs éducatifs à un usage conscient et critique de ces technologies.

Mots-clés: intelligence artificielle générative, justice linguistique, multilinguisme, enseignement supérieur, équité linguistique

1. Introduction

University education has been influenced in recent decades by the transformations and developments the world has witnessed following the spread of artificial intelligence technologies. This impact has encompassed broad aspects, including pedagogical, cognitive, and social ones, clearly contributing to the reshaping of teaching and learning patterns within the university institution. However, this transformation has come to raise an educational and linguistic problematic linked to the extent to which linguistic justice is achieved among learners, especially in a multilingual digital educational environment. Within the scope of this study, we focus on the annex of the Higher School of Teachers in Bouira as an environment where languages of instruction intersect, namely: the Arabic language and the French language, along with a diversity of learners' mother tongues (Arabic and Amazigh). This makes the issue of the fairness of generative artificial intelligence tools and their linguistic equity a scientific topic that requires investigation, as it poses the following problematic question: To what extent does generative artificial intelligence contribute to achieving linguistic justice within university education in light of multilingualism and different academic specializations?

1.1. Sub-questions: A set of sub-questions branches out from this main problem, which are: "the annex of the Higher School" Does the degree of benefit from artificial intelligence tools differ according to the mother tongue? Does academic specialization (Arabic Language / French Language) affect the perception of linguistic justice provided by these tools?

1.2. Study Hypotheses

Main Hypothesis: Generative artificial intelligence contributes to achieving linguistic justice in university education, but the degree of this contribution is affected by the difference in the language used and the academic specialization.

Sub-hypotheses: The degree of students' benefit from generative artificial intelligence tools differs according to their mother tongue. Generative artificial intelligence does not treat multiple languages fairly within university education. Academic specialization affects users' perception of the level of linguistic justice provided by artificial intelligence. There are statistically significant differences between the individuals of the Arabic language

specialization and the French language specialization in assessing the fairness of generative artificial intelligence tools in language teaching.

1.3. Study Objectives: Demonstrating the extent of generative artificial intelligence's impact on achieving linguistic justice within university education, in light of multilingualism and different academic specializations. Revealing the extent of the fairness of generative artificial intelligence tools' treatment of different languages in the university context. Determining the differences in the degree of students' benefit from generative artificial intelligence tools according to the difference in their mother tongue. Analyzing the contribution of academic specialization (Arabic Language / French Language) in perceiving the linguistic justice provided by these tools.

2. The Theoretical and Conceptual Framework of the Study

2.1. The Concept of Generative Artificial Intelligence:

Saif Al-Suwaidi and others define it as: A science that falls under computer science, which explores innovative and effective ways to accomplish tasks and provide suggestions and perceptions that somewhat align with human intelligence perceptions. Its purpose is reconstruction and problem-solving using various technological means (Al-Suwaidi, Al-Juhani, 2023, p. 26). As for Ray Kurzweil, he sees it as the art of creating machines that perform functions that require intelligence when performed by humans (Verma, 2023, p. 335).

It is noted through these two definitions that artificial intelligence is not limited to the technical dimension only, but goes beyond it to a functional and cognitive dimension, based on simulating human mental processes and adapting them to the requirements of the era, coupled with speed and accuracy in performing various functions.

Within the framework of this development, generative artificial intelligence emerged as one of the branches of artificial intelligence, and the most developed one due to its ability to create new data, such as: generating linguistic texts, images, and audio clips, by training artificial models on massive amounts of data. It can also be used in creating virtual assistants for electronic chats and serving learners, or creating music and artistic content for marketing or creative purposes, and others (Al Olama, 2023, p. 3).

Other researchers also consider it one of the artificial intelligence technologies that rely on machine learning, working to automatically produce new content in response to written commands in a natural language, instead of merely organizing or retrieving pre-existing content. It creates this content through the statistical analysis of massive data patterns on which it was trained, such as the distribution and sequence of words or visual elements, without possessing a true understanding of meaning or reality. Despite the ability of generative artificial intelligence to produce diverse texts, images, and content that appear coherent, the accuracy of its outputs is not guaranteed and cannot be completely relied upon, because it does not understand the real or social relationships upon which language is based (UNESCO, 2024, p. 8).

From this, the previous definitions of generative artificial intelligence highlight its dual nature; as it is considered a tool with great potential in supporting various functions, including educational ones, which are the focus of the study. On the other hand, its conscious use necessitates imposing ethical, cognitive, and methodological challenges, especially when linked to the academic context that relies on accuracy.

2.2. The Importance of Generative Artificial Intelligence in University Education

The emergence of generative artificial intelligence in education is not recent; its theoretical foundations date back to the 1960s. However, its actual presence in educational practices has only crystallized recently, following qualitative leaps in machine learning technologies and large language models. This transformation has contributed to its transition from a limited

research scope to an effective tool within university education, gaining widespread prevalence due to its ability to generate content, support learning, and facilitate access to knowledge. Hence, this growing presence is considered an indicator of a structural shift in educational patterns, given the capabilities generative artificial intelligence offers to reorganize the educational process, along with the accompanying cognitive and educational problematics that require solid scientific treatment.

Artificial intelligence has managed to bring about a change in our view of education and how it is delivered. To ensure its ethical and effective use in the education system, necessary measures and precautions must be taken (Al-Suwaidi, Al-Juhani, 2023, p. 26), especially since the education sector is one of the sensitive sectors. It is gaining increasing importance for teachers, given the supportive tools it provides that contribute to optimizing pedagogical effort, improving educational planning, and enhancing the effectiveness of educational practice. It helps teachers accommodate individual differences, which leads to improving the quality of learning for learners, in addition to presenting scientific material, identifying students' weaknesses, and the possibility of proposing remedial activities that align with students' needs. Furthermore, it has the ability to achieve educational goals related to developing skills, such as computer usage and self-learning (Al-Muqaiti, 2021, p. 50), not to mention providing rapid feedback to determine students' academic achievement and simultaneously analyze their performance. This is done without artificial intelligence replacing the cognitive and educational role of the teacher; rather, they integrate to perform the educational function more easily and efficiently.

It also contributes to rationalizing time, effort, and cost. It alleviates the burdens teachers suffer from, such as grading exams and evaluating assignments, thereby devoting more time to students. It also allows quick access to information and frees teachers from routine tasks associated with preparing content, grading assignments, and following up on activities. Moreover, it renews educational practices by diversifying educational media and methods, which adds a degree of interaction and enjoyment and limits monotony and boredom in teaching. This type of artificial intelligence also contributes to elevating the quality of education by providing high-quality educational materials and improving the possibilities of access to them for different groups (Al-Ghamdi, 2024, pp. 29–31), which enhances the principle of equal opportunities within educational environments.

2.3 The Concept of Linguistic Justice:

The term linguistic justice is considered a modern concept that embodies an interdisciplinary issue located at the intersection of politics and philosophy, as it is not limited to the linguistic dimension alone, but rather relates to rights, opportunities, and justice within multilingual societies. Although the concept of justice alone has occupied philosophers since antiquity, including the Greeks within the philosophy of justice or what is known as the social contract, scholars at that time did not concern themselves with linguistic justice or its precise function, or its modern application to languages. Thus, it generally focuses on anatomizing the linguistic reality and its socio-cultural outputs. This concept is new to Arab culture, as it is still in the stage of formation and crystallization even in Western liberal cultures. The first beginning of its appearance in Arabic writing dates back to the translation of a book by the French researcher Patrick Savidan entitled: (*Le multiculturalisme*) by Mustafa Hassouni (Azzouz, Khayen, 2014, pp. 7–8).

Since the concept of linguistic justice intersects with philosophical, political, and social issues, defining it is considered an essential entry point to understanding its dimensions and applications, as it is considered one of the tools for disseminating justice among individuals, and the mechanism through which justice is achieved among the languages that establish the general landscape of a given state, by adopting a pluralistic linguistic policy that recognizes the right of every linguistic group to use its language. It is based on the principle of freedom and

equality in cultural and linguistic rights, both individual and collective, for all citizens of the state (Azzouz, Khayen, 2014, pp. 14–15, 21–22). It can also be considered a respect for the individual's dignity under a rational linguistic policy that guarantees the linguistic rights of groups in a state, in accordance with what is approved by constitutions and systems of governance, or it is the symbolic equality between the circulating national languages (Charef, 2022/2023, p. 39), which makes it a tool to enhance linguistic empowerment within a single society.

Philippe Van Parijs believes that linguistic justice is based on several components or foundations represented in recognizing linguistic diversity within the borders of the state and the symbolic assertion of equality between languages, alongside adopting a common language that achieves interaction among members of society, which Parijs calls the intermediate language (*Lingua Franca*). He also mentioned the principle of linguistic regionalism, which is primarily based on recognizing the right of every linguistic group to use its tongue within the borders of its territory, provided that the state's citizens residing in that territory possess the courage and humility to learn the standardized local languages according to the principle of regionalism in those territories (Azzouz, Khayen, 2014, pp. 14–15, 21–22), and enabling fair participation of the language among individuals by reducing the structural disparities resulting from the dominance of a particular language.

Accordingly, several scholars emphasize the existence of a direct relationship between linguistic awareness, the recognition of linguistic rights and respect, and broader social, academic, and economic outcomes (Fernandes, M., & McIntyre, M. 2025). From this perspective, language is not merely a tool of communication, but a determining factor in shaping individuals' opportunities and access to resources within society.

3. The Methodological Framework and Results Analysis

3.1 Study Approach: The study relied on the descriptive-analytical approach, due to its suitability for analyzing the perceptions and attitudes of the study sample regarding the employment of generative artificial intelligence in achieving linguistic justice.

3.2 Study Tool: The questionnaire is among the most appropriate tools for addressing this topic. An electronic questionnaire was designed comprising five (05) axes (general data, linguistic justice, mother tongue and linguistic justice, academic specialization).

3.3 Study Population: The study population includes the target group consisting of students and professors of the annex of the Higher School of Teachers in Bouira.

3.4 Study Sample: The study sample consisted of 73 participants from the students and professors at the Higher School of Teachers, chosen purposively due to their direct connection to the field of language teaching. Consideration was given in the sample selection to represent the basic study variables, such as the status of student and professor, mother tongue (Arabic Language / Amazigh Language), and language of specialization (Arabic Language, French Language), which allows for conducting statistical comparisons related to the research hypotheses, without claiming a comprehensive statistical representation of the study population.

3.5 Study Limits: The temporal limits of the study are represented by the data collection period during the 2025/2026 academic season, while the spatial limits were within the framework of the annex of the Higher School in Bouira.

4. Generative Artificial Intelligence as an Approach to Achieving Linguistic Justice

4.1 General Data

The questionnaire data show that the study sample reached 73 participants, distributed between 22 professors at a rate of 30.1%, and 51 students at a rate of 69.9%, and this distribution reflects the constituent structure of the study sample. As for the academic specialization

variable, there are 36 participants from the French language specialization at a rate of 49.3%, compared to 37 participants from the Arabic language specialization at a rate of 50.7% of the total sample. This distribution shows a clear numerical convergence between the two specializations, which provides a balance in the representation of the sample members according to this variable.

Regarding teaching seniority among the professors, it was found that 4 professors have less than 5 years of experience, and 4 others recorded seniority ranging between 5 and 10 years, at a rate of 18.18%. Meanwhile, professors with experience exceeding 10 years constituted the largest number, with 14 professors, meaning a rate of 63.64% of the total participating professors. The results indicate that 64 participants have Arabic as their mother tongue, equivalent to 87.6%, and 9 participants reported that the Amazigh language is their mother tongue at a rate of 12.33%. Thus, the general characteristics of the study sample become clear.

4.2 The Use of Generative Artificial Intelligence in University Education:

The first question in the second axis seeks to measure the extent to which the sample members use generative artificial intelligence tools in learning and teaching. The results showed that the majority of the sample members acknowledge using generative artificial intelligence tools regularly, where 48 participants expressed their agreement with this proposition at a rate of 65.8%, while 9 participants reported that they strongly agree, equivalent to 12.3%. On the other hand, the neutral option recorded 14 participants, while only two participants expressed their opposition at a rate of 2.7%, and no case of strong opposition was recorded.

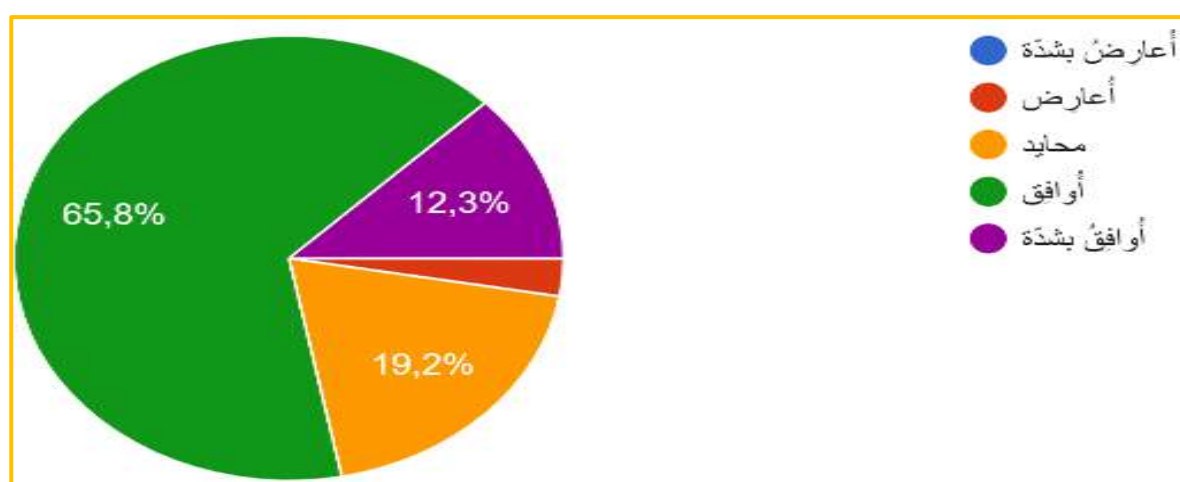
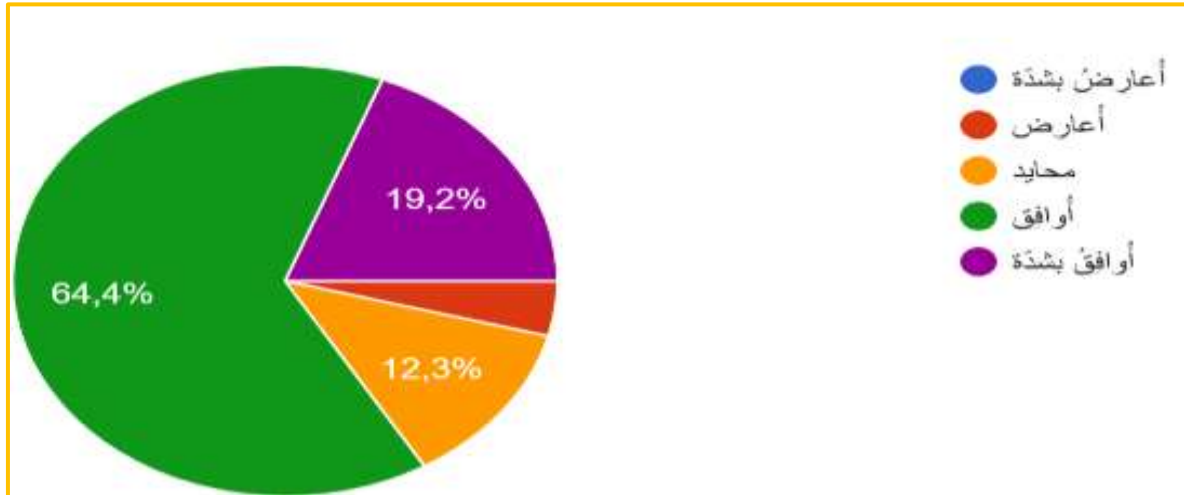


Figure N°1: Frequencies of using generative artificial intelligence tools in learning/teaching

Adopting these tools in university education can provide a flexible and open learning environment, as the educational process has transcended the classroom and the specific time for learning, and it even transcends the content, which is often limited and restricted, to a wider space that is more diverse and flexible. It provides opportunities to adapt the educational content and methods of communicating it according to the students' levels, their linguistic background, and their cognitive needs. These results highlight a general positive trend towards the regular use of generative artificial intelligence tools in the context of university learning and teaching, which indicates an actual presence of these tools in educational practice. Furthermore, the limited rates of opposition and the absence of strong opposition reinforce the idea of accepting these technologies within the university environment, which paves the way for a deeper analysis of their role in qualitative issues, headed by linguistic justice.

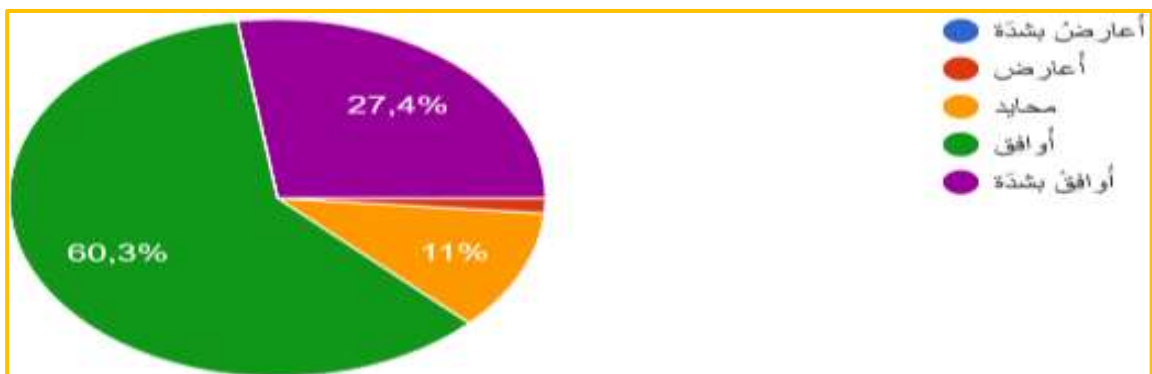
The second question aims to determine the extent of employing generative artificial intelligence tools in linguistic activities, such as writing, understanding, and translation. Forty-seven participants reported their agreement on using these linguistic activities at a rate of 64%, while 14 participants expressed their strong agreement at a rate of 19.1%. Conversely, the neutral option recorded 9 participants at a rate of 12.3%, while 3 participants declared their opposition, and no case of strong opposition was recorded (Al-Tamimi et al., 2018, p. 17).

Figure N°2: The degree of using generative artificial intelligence in linguistic activities



This distribution clearly confirms the positivity of this trend, as generative artificial intelligence tools are relied upon in accomplishing linguistic activities within the university context, which portrays the extent of awareness of their benefit in supporting various linguistic skills. Furthermore, the high rates of agreement and strong agreement, versus the limited rejection and the absence of strong opposition, indicate widespread acceptance of these tools as assistive means in language learning, paving the way for a deeper analysis of their role in achieving linguistic justice.

The third question focuses on measuring the sample members' perceptions regarding the contribution of generative artificial intelligence tools in facilitating the learning and teaching of languages. The results showed that 44 participants expressed their agreement with this proposition at a rate of 60.2%, while 20 participants reported their strong agreement. The neutral option recorded 8 participants, whereas only one participant expressed opposition, and



no case of strong opposition was recorded.

Figure N°3: The sample members' evaluation of the impact of generative artificial intelligence tools in learning/teaching languages.

This distribution clarifies the positive perception among the sample members regarding the facilitating role played by generative artificial intelligence in the field of language learning and teaching. Moreover, the noticeable rise in the rates of agreement and strong agreement against the limited rejection and absence of strong opposition indicates a general perception that considers artificial intelligence a supportive element for the educational process. Consequently, it can be concluded that generative artificial intelligence tools have come to enjoy a noticeable presence in the university context, whether at the level of regular use or in terms of their employment in various linguistic activities.

The data have shown that most of the sample members regularly use these tools in learning and teaching, and they also rely on them in multiple linguistic tasks, such as writing, translation, and explanation. This greatly helps in providing an educational environment that motivates the learner and increases their desire for it, which reflects on their motivation and speed in achieving the desired goals (Mazen, Al-Ani, 2015, p. 79), alongside their awareness of its role in facilitating the learning and teaching of languages. This general positive trend reflects a degree of acceptance and gradual integration of these technologies within university educational practices.

However, this widespread prevalence does not necessarily lead to the conclusion that linguistic justice is achieved automatically. The intensity of use does not necessarily mean equal opportunities to benefit among different linguistic groups or academic specializations. The issue of linguistic justice remains contingent upon the extent of generative artificial intelligence tools' ability to deal in a balanced manner with different languages and to provide equitable support for learners and specialists despite the diversity of their linguistic backgrounds.

4.3 Conceptions of the Sample Members Regarding Linguistic Justice When Using Generative Artificial Intelligence:

Moving to analyze the sample members' perceptions about the linguistic justice provided by these tools holds great importance, as it is the primary gateway to understanding the relationship between the actual use of generative artificial intelligence on one hand, and the level of linguistic justice achieved in university education on the other, in light of multilingualism and different academic specializations.

The first question in this axis aims to investigate the sample members' perceptions about the extent to which linguistic justice is achieved when dealing with generative artificial intelligence tools concerning different languages. The questionnaire results showed that 26 participants expressed their agreement with this proposition at a rate of 35.6%, while 3 participants reported their strong agreement. Conversely, the neutral option recorded 24 participants at a rate of 32.8%, while 17 participants expressed their opposition, and 3 participants showed strong opposition.

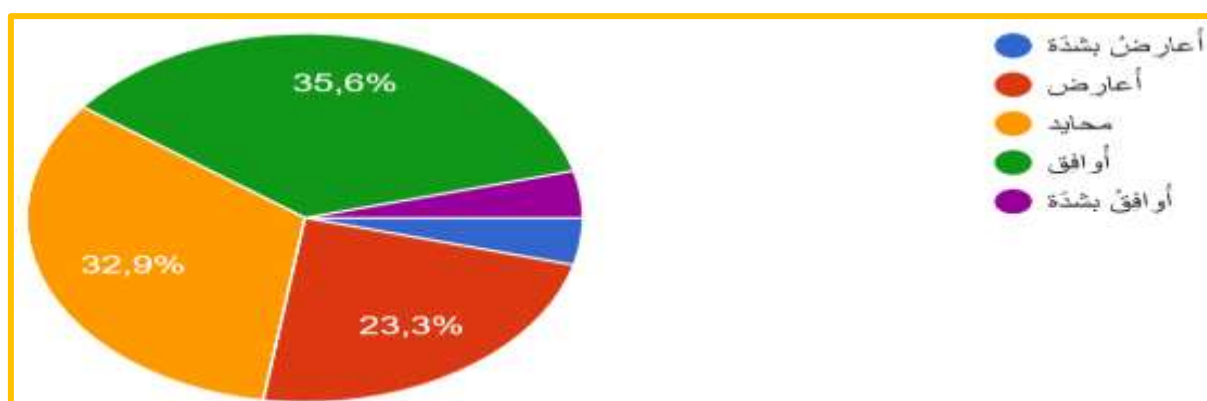


Figure N°4: The sample members' perceptions regarding the fairness of generative artificial intelligence's treatment of different languages.

This distribution reveals a clear variance in the sample members' perceptions regarding the level of linguistic justice provided by generative artificial intelligence, where a considerable percentage of the participants tend to acknowledge the existence of a degree of linguistic justice, against a clear presence of reserved or critical positions. This is manifested in the high rate of neutrality and opposition, and this disparity indicates that linguistic justice, in the context of using generative artificial intelligence tools, is not perceived as a constant, taken-for-granted characteristic in these tools. Rather, it is constructed based on varying usage experiences and different linguistic contexts, where it remains a relative matter affected by users' experiences and their linguistic backgrounds.

We notice the disparity and variance among opinions in that generative artificial intelligence tools do not provide the same level of support for all languages in terms of accuracy, lexical richness, and the quality of linguistic processing. This makes the perception of linguistic justice linked to the level of performance efficiency in the language actually used by the individual. Participants who deal with languages that enjoy broader representation within these tools may tend to evaluate them as more just, while others take more reserved positions due to their observation of limitations or imbalances in linguistic performance. This reinforces the idea that linguistic justice in generative artificial intelligence is still being shaped, and some languages still need expansion and representation of their linguistic data.

The results of the second question, which seeks to know the extent to which the mother tongue is fairly represented in generative artificial intelligence tools, clarified that 29 participants stated their agreement with the statement, while 5 participants expressed strong agreement. This indicates the existence of a considerable group that feels their mother tongue enjoys an acceptable degree of representation within these tools. Also, 18 participants recorded a position of opposition, and 5 participants clarified their strong opposition, which reflects a feeling among a not-insignificant segment of the existence of shortcomings or an imbalance in the representation of their mother tongue within generative artificial intelligence systems. As for the neutral group, its number reached 16 participants, which reflects a state of hesitation or an inability to form a clear position, perhaps as a result of varying personal experiences with these tools or the limited specialized use of them. This distribution highlights the lack of clear consensus on the extent to which linguistic justice is achieved in the representation of the mother tongue. This confirms that this dimension cannot be settled based on a single question, but rather becomes clearer by approaching it from multiple angles, taking into account the nature of the language, the context of use, the level of digital competence, in addition to the academic specialization of the users. Therefore, these results can be considered an initial indicator of the variance in opinions among the study sample regarding the representation of the mother tongue in generative artificial intelligence tools.

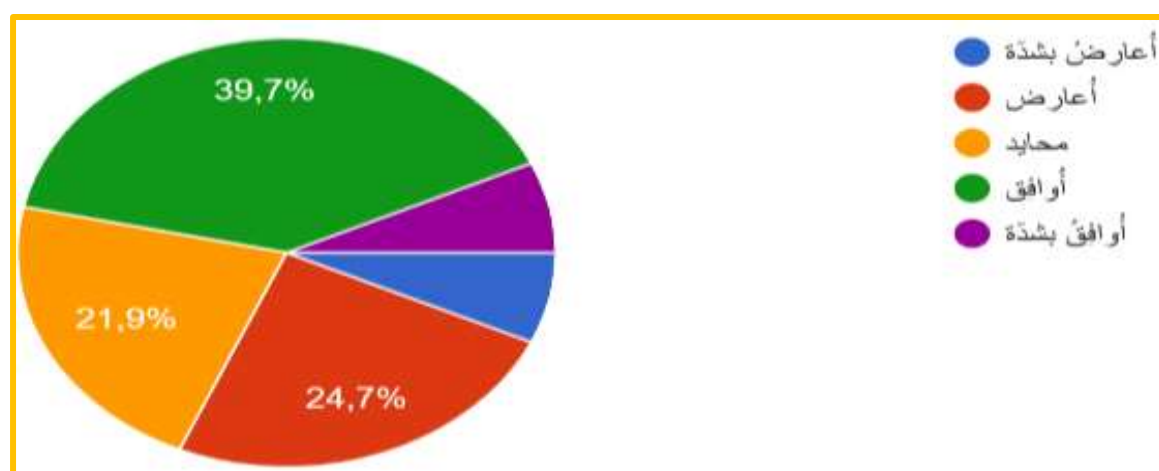


Figure N°5: The representation of the mother tongue in generative artificial intelligence tools.

The results of the professors' category perceptions regarding the contribution of generative artificial intelligence in reducing the linguistic gap among learners reveal diverse viewpoints regarding the pedagogical role of these tools within the university educational context. Fifteen professors, meaning approximately 44.1%, expressed a position supporting this contribution, backed by one professor who declared strong agreement. This indicates that nearly half of the sample sees generative artificial intelligence as a tool capable—to some extent—of reducing the linguistic disparity among learners, whether through facilitating understanding or supporting self-learning. This points to a fear among a segment of professors that these tools might lead to reproducing the linguistic gap instead of eliminating it, or to unequal benefit among learners according to their prior linguistic competencies.

As for the neutral position, it was represented by 8 professors. Adopting this opinion can be explained by two factors: first, the lack of clarity regarding the impact of these tools in educational practice; and second, the variance in pedagogical experiences related to employing generative artificial intelligence in teaching languages. From this, we realize that the professors' perception of the role of generative artificial intelligence in reducing the linguistic gap is not characterized by complete harmony. This confirms the idea that achieving linguistic justice is not linked to the tool itself, as much as it is connected to the conditions of its employment, the patterns of its use, and the educational contexts in which it is integrated. This necessitates looking into the rest of the linguistic and academic variables linked to it.

4.4 The Impact of Mother Tongue on the Perception of Linguistic Justice:

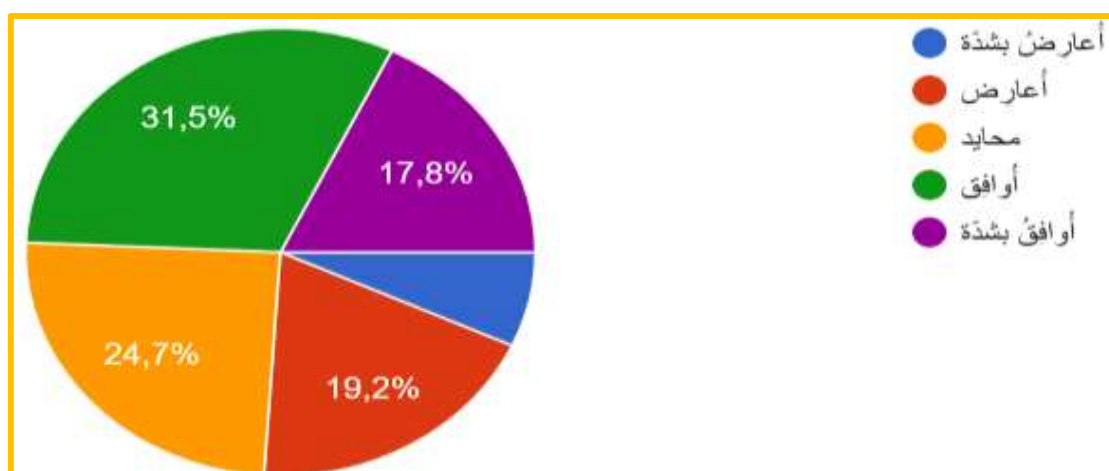
The opinions of the sample members differ regarding the impact of the mother tongue on the way they benefit from generative artificial intelligence tools, which illustrates the diversity of users' linguistic experiences within the multilingual university educational context. Twenty-three participants stated a position supporting the existence of this impact, backed by 13 participants who showed a higher degree of agreement, bringing the combined positive positions to approximately 49.3%. This percentage indicates that nearly half of the sample members are aware of a relationship between the mother tongue and the nature of interaction with generative artificial intelligence tools, whether in terms of ease of use, understanding the outputs, or employing them in learning. Fourteen participants expressed an opposing position,

in addition to 5 participants who expressed strong opposition. This indicates that a considerable group of the sample members does not see the mother tongue as a decisive factor in benefiting from these tools, or considers its impact limited compared to other factors of a technical or cognitive nature.

Figure N°6: The contribution of generative artificial intelligence in reducing the linguistic gap

As for those who adopted the neutral position, they were 18 participants, meaning 24.7%. This variance may be attributed to individual experiences in using generative artificial intelligence, or to the users' lack of direct awareness of the linguistic impact on their interaction with these tools, despite its implicit presence in practice.

This variance in the perceptions of the sample members can be interpreted in light of the idea that the mother tongue does not have a direct or uniform impact on benefiting from



generative artificial intelligence tools, as its impact is manifested through a group of intersecting factors. The degree of control over the interface language, the nature of the language used in entering commands, and the extent to which outputs align with the linguistic characteristics of the mother tongue are all factors that enhance some users' sense of the effectiveness of these tools, while weakening the experience of others. Opposing positions can also be attributed to the reliance of a number of users on dominant languages (Arabic, French, and English) while interacting with these tools, which may reduce their awareness of the impact of the mother tongue as a primary variable, even if it is implicitly present in the user's cognitive background. In this context, the possibility remains that awareness of the linguistic dimensions of interacting with generative artificial intelligence is an implicit awareness that forms gradually with the accumulation of experience, not with incidental use, from this perspective, it can be argued that addressing linguistic injustice requires an increasingly human-centered approach, one that foregrounds lived experiences and language practices (Fernandes, M., & McIntyre, M. 2025) rather than relying solely on technical or standardized solutions.

As for the neutral positions, they can be read as a reflection of a transitional stage in users' representations, where a clear picture has not yet crystallized regarding the relationship of the mother tongue to the quality of benefit from these tools, especially in the absence of explicit pedagogical guidance highlighting the impact of language in constructing commands and understanding outputs. This hesitation does not necessarily indicate the absence of an impact, but rather confirms its complexity and the difficulty of monitoring it in daily practice. This leads to the consideration that the perception of linguistic justice in the context of generative artificial intelligence is not achieved through formal equality between languages, but through the ability of these tools to respond to the actual linguistic differences of users, making the mother tongue an influential factor conditional upon context, usage patterns, and the level of linguistic awareness among individuals.

The second item of the fourth axis reveals a clear variance in the professors' perceptions regarding the linguistic challenges that learners with an Amazigh mother tongue might face, a variance that reflects different viewpoints on the impact of linguistic background on the university educational path. About 31.8% of the professors expressed their support for the existence of these challenges to varying degrees, suggesting that a segment of the professors notices linguistic difficulties that may be linked to the mother tongue, especially when it relates to academic language or when interacting with digital educational tools, as they do not always consider the linguistic specificities of the learners.

Meanwhile, 36.4% of the professors expressed their opposition to the idea, indicating that there are those who do not view the Amazigh mother tongue as a determining factor in producing linguistic challenges, and perhaps the difficulties that may appear are due to other factors, such as individual differences, the nature of courses, or adopted teaching methods. The neutral position represented about 31.8%, a percentage reflecting a degree of reservation among a segment of the study sample and their avoidance of issuing a clear, definitive judgment. It is likely that this opinion stems from the complex relationship between the mother tongue and academic linguistic performance, or from the disparity in the educational contexts in which students study. Through these results, we realize that the issue of linguistic challenges linked to the Amazigh mother tongue is not understood within a unilateral logic; rather, a broader understanding is required that includes complex interactions between linguistic, pedagogical, and institutional factors, which reinforces the idea that achieving linguistic justice in university education is not based on generalizing perceptions, but rather needs to absorb this diversity in expertise and experiences.

The results of the last question in this axis reveal that the sample members use several languages when interacting with generative artificial intelligence tools, reflecting linguistic usage patterns that sometimes bypass the mother tongue in favor of other languages perceived as more effective in the digital environment. The Arabic language came in first place, as 39 participants used it, indicating its presence as an effective communication language with these tools, whether as the language of the majority of participants or a common educational language within the university context.

The English language occupies the second place, as 21 participants adopted it, indicating the awareness of a considerable segment of the sample regarding the efficacy of English in this field as a dominant language in artificial intelligence; therefore, its outputs might be more accurate and diverse. As for the French language, it was used to a lesser extent, as its users did not exceed 13 participants, and it was found that their use of it was due to it being the language of their academic specializations. This restricts the use of French to some academic specializations, without reaching the level of Arabic or English in the context of interacting with generative artificial intelligence. This idea is further confirmed by the tendency of researchers to publish their research in English, and the rise in the rate of learning and using it among students in recent decades, not forgetting ministerial projects supporting this language.

We also found a complete reluctance to use the Amazigh language, as not a single case of its use was recorded. This sheds more light on the reality of linguistic justice from a scientific angle, as the absence of Amazigh from interactive practices with artificial intelligence suggests it may not be an individual choice as much as it is a result of the weakness and limited technical and linguistic support available for it within these tools. From this, we conclude that linguistic usage patterns do not necessarily reflect the linguistic background of users, but rather their adaptation to the languages they found more effective in the digital environment, in terms of use and the nature of the outputs.

4.4 The Role of Academic Specialization in Evaluating Linguistic Justice

This axis seeks to investigate the extent to which the sample members perceive the fairness of their specialized benefit from generative artificial intelligence tools. The first question of this axis shows the sample's perceptions regarding the lack of equal linguistic educational

opportunities provided by generative artificial intelligence tools, if read in light of the institutional specificity of the annex of the Higher School of Teachers in Bouira. There, linguistic training is limited to the specializations of Arabic language and French language, to the exclusion of other languages. Therefore, the perception of linguistic justice among the sample members is inseparable from an implicit comparison between these two linguistic systems in the level of their benefit from smart tools.

Forty-three participants stated their agreement that these tools provide fairer educational opportunities for some languages compared to others, reflecting a broad awareness of the existence of linguistic disparity in the level of support, whether in terms of content quality, processing accuracy, or the diversity of educational uses. This trend is reinforced by the presence of 6 participants who expressed their strong agreement, which shows that the majority perceive a disparity in the level of linguistic support when employing generative artificial intelligence in learning and teaching activities. In the context of the study, this variance is understood in light of the difference in the degree of digital maturity and cognitive accumulation between Arabic and French within these tools, whether in terms of the accuracy of answers, the diversity of examples, or the suitability of outputs for educational contexts.

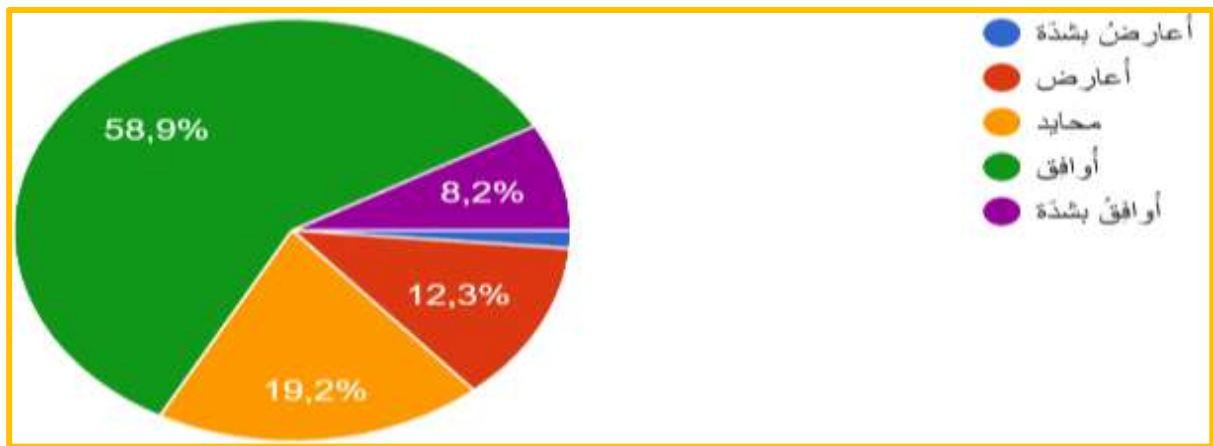


Figure N°7: The sample's perceptions regarding the fairness of educational opportunities among languages in generative artificial intelligence tools

As for those who opposed this proposition, their number was 9 participants, in addition to one participant who expressed strong opposition. This reflects educational experiences that do not see a fundamental difference between the two languages in the level of benefit, or consider that the existing differences do not compromise the principle of justice within daily pedagogical practice. The neutral category reached 14 participants, representing a significant middle ground. This trend can be explained either by the difficulty of separating the tool itself from the method of its employment, or by a preliminary awareness of the existence of a linguistic disparity without the ability to determine its nature or impact in light of current practices. Therefore, it is understood from these results that the issue of linguistic justice, in this specific institutional context, is not reduced to generative artificial intelligence being biased toward one language over another. Rather, it relates to the intersection of several factors such as language readiness, specialization context, pedagogical usage patterns, and creating the appropriate climate, whether intellectual or emotional, by creating internal stimulation for all affiliates of the system, or materially by providing the necessary equipment for the success of this process (Al-Saif, 2009, p. 22).

The foregoing discussion serves as a fundamental entry point to understanding the nature of the challenge posed by linguistic justice in the era of generative artificial intelligence (AI), while simultaneously providing a pathway to explore how these tools can be transformed from

technologies that may reproduce linguistic disparities into educational resources that support linguistic equity.

The results of the second question show a clear variance in the perceptions of the sample members regarding the extent to which generative AI tools respond to their needs in their linguistic specialization. Thirty-three participants expressed agreement that generative AI fairly meets the needs of their linguistic specialization, reflecting a generally positive trend toward perceiving these tools as supportive resources for language learning and teaching. This trend is reinforced by 6 participants who expressed strong agreement, highlighting a richer experience among this group.

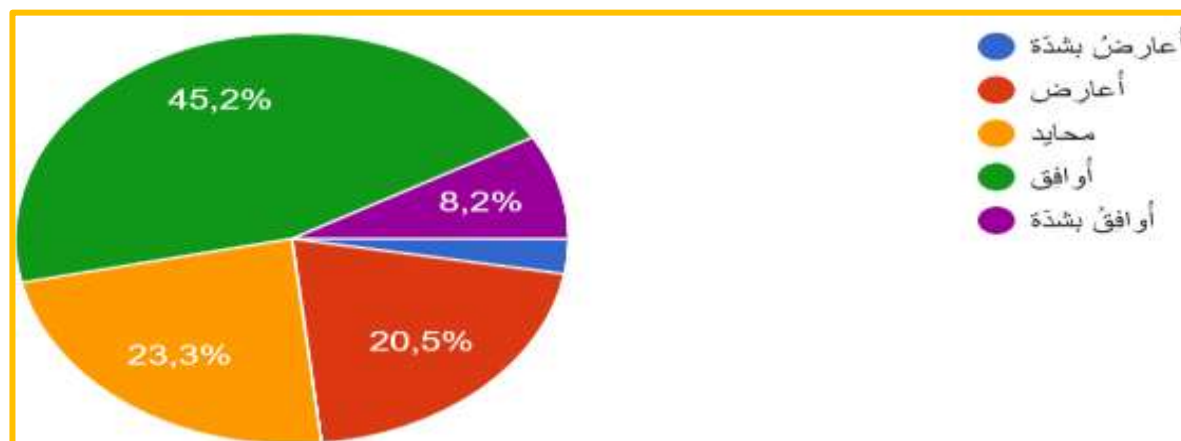


Figure N°8: The extent of the fairness of generative artificial intelligence's response to the needs of the linguistic specialization

Conversely, 15 participants recorded an opposing position, in addition to 2 participants who expressed strong opposition, indicating that a segment of the sample does not perceive these tools as providing fair support for their specialization needs. Reasons for this may include limited knowledge of functional usage, preference for traditional mechanisms, or insufficient support for certain languages within the tools, making them unsuitable for some academic specializations. Seventeen participants adopted a neutral position, which can be explained either by insufficient usage experience to judge accurately or by partial awareness of the tools' effectiveness without asserting complete fairness. In this context, it is necessary to emphasize that learners need certain characteristics to fully benefit from generative AI tools, including access to software, experience in use, motivation to learn, time management, initiative, and control over the learning environment (Asiri, Al-Muhayya, 2011, p. 116).

In light of these data, generative AI is currently viewed as a promising tool with an unequal impact. Linguistic justice is not achieved automatically or comprehensively but is contingent on factors such as the nature of the language used, academic specialization, and the level of representation of these variables within the tools. The outputs are directly linked to the volume and quality of data available for each specialization and language. In this regard, studies have shown that the application of artificial intelligence in language preservation faces several challenges, as machine learning models often exhibit biased behavior. They tend to favor dominant languages that possess large digital datasets (Butt et al., 2025), which consequently leads to the exclusion of less widely spoken languages.

Responses to the open-ended question on how to employ AI to achieve greater linguistic justice revealed diverse perceptions, reflecting a growing awareness of the capabilities and limitations of these tools. The discourse did not treat generative AI as a ready-made solution to linguistic justice, but rather as a pedagogical mediator activated under specific conditions. Some participants noted that AI can reduce linguistic and academic barriers by providing instant translation, simplifying complex texts, and rephrasing scientific content at different linguistic

levels. This contributes to helping students understand knowledge and overcome difficulties associated with the language of instruction, a critical issue in the context of the Higher School of Teachers, where linguistic training is limited to Arabic and French.

The responses also highlighted the role of AI in supporting individual differences and varying linguistic levels among students by offering adapted explanations, linguistic correction with clarifications, and improving written and oral skills. This reflects a transition of the concept of linguistic justice from formal equality to pedagogical justice: the tool serves to accompany learners according to their actual needs rather than enforcing uniformity. Generative AI also emerged as a linguistic bridge connecting the languages of knowledge, particularly in academic terminology and scientific references. However, this potential remains conditional upon the digital cognitive disparity between languages, which may reduce linguistic justice if not addressed by expanding linguistic databases.

Other participants emphasized that achieving linguistic justice through AI requires proper training and employment, both for professors and students. Conscious use, fine-tuning prompts, and maintaining clear boundaries between smart support and excessive reliance were highlighted as critical for preserving the human element and preventing the tool from becoming a new source of inequality. Reserved and administrative positions indicated insufficient experience or lack of institutional frameworks to judge AI's role in promoting linguistic justice. This underscores the need for structured training and support policies within the university context, furthermore, numerous studies emphasize the need for universities to shift from a proactive, observational approach to one that fosters pedagogical engagement with generative artificial intelligence (AI). This includes encouraging students to use these tools ethically and effectively, and adopting more inclusive and equitable assessment methods. These studies also highlight the importance of updating academic integrity policies to align with digital advancements and ensure linguistic equity. Their recommendations include integrating AI skills into the curriculum, providing clear usage guidelines, training instructors in comprehensive writing assessment, employing process-based assessment, and cautiously applying AI detection tools in conjunction with human and contextual assessment (Mohale, N , 2025, p. 15).

Accordingly, the results provide a nuanced picture of linguistic justice in light of generative AI. The issue is not reducible to the characteristics of the tool itself but is shaped at the intersection of language, academic specialization, pedagogical practice, and digital training. Generative AI represents a promising avenue for achieving a higher degree of linguistic justice within the university environment, provided that it is integrated into a conscious educational vision that accounts for multilingualism and actively works to transform technology from a potential source of discrimination into a lever for cognitive justice.

Responses regarding the types of generative AI tools used by the sample indicate reliance on platforms such as ChatGPT and Google Gemini, primarily for lesson explanation, idea generation, summarization, paraphrasing, and answering questions. These tools serve simultaneously as cognitive and linguistic support, helping learners overcome difficulties in comprehension and expression, particularly for precise academic language production.

Other tools include Grammarly and QuillBot, used for improving written language quality, correcting errors, and enhancing style—especially beneficial for learners writing in a non-native language, actively reducing disparities in the academic environment. Translation and search tools such as Google Translate, DeepL, and Perplexity AI were used to understand texts, verify meanings, and access diverse cognitive sources, acting as intermediaries between languages, albeit conditional on users' critical evaluation skills.

Tools for content production and organization, such as Canva, Gamma, and Notion AI, were used for presentations, mind maps, and lesson organization, supporting visual learning and diverse learning styles. Educational support tools like Quizizz, Duolingo, Gradescope, and

Magic School were mentioned, but less intensively, indicating a focus on individual learning support rather than integrated digital education.

This diversity of tools and functions demonstrates that generative AI is perceived by users as a means to facilitate understanding, improve linguistic production, and diversify learning methods—not as a replacement for traditional pedagogical practices. It also confirms that linguistic justice through these tools is not automatic but depends on the ways they are employed, considering learners' linguistic backgrounds and institutional context (Asiri, Al-Muhayya, 2011, p. 116).

4. Conclusion

The results of this research have led to highlighting a complex picture of the nature of the relationship between generative artificial intelligence and linguistic educational practices within the Higher School of Teachers in Bouira; where it became evident that these tools do not exert their impact in a vacuum, but rather intersect with overlapping linguistic, cognitive, and pedagogical data. The data analysis showed that the respondents' representations range from considering generative artificial intelligence a supportive lever for equal opportunities in learning, to having reservations regarding its actual ability to achieve comprehensive linguistic justice among different groups.

- The questionnaire results indicated that generative artificial intelligence is viewed, by a considerable portion of the sample members, as an assistive tool capable of supporting language learning.
- Perceptions revealed a variance in the representation of languages within generative artificial intelligence tools, which indicates that linguistic justice is not achieved automatically once the technology is made available. Rather, it is affected by other factors, including the mother tongue and the language of specialization, alongside the disparity in the digital cognitive repository among languages.
- The hypotheses that envisioned a direct reduction of the linguistic gap thanks to generative artificial intelligence were not fully realized; as this role remained conditional on the method of use, the level of training in investing these tools, and the extent to which they accommodate linguistic diversity within the educational environment. This makes these tools represent an educational potential rather than a ready-made solution to the issue of linguistic justice.
- The study revealed the need for policies concerned with training professors and students for the effective use of these tools, and for enriching digital resources for various languages to enhance their presence within artificial intelligence systems.

Accordingly, the study concludes that the relationship between generative artificial intelligence and linguistic justice is a relative and multidimensional relationship, where the mother tongue, the language of specialization, and patterns of pedagogical employment intersect. Based on this, the need emerges to adopt a conscious and framed approach to using these tools within the university environment, to ensure their transformation from a potential factor for reproducing linguistic disparities into a supportive means for equal opportunities and linguistic justice.

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