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Introductory Chapter: Relevance of Bilingualism and Multilingualism in a Multilingual World

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1. Introduction

What is a logically possible answer to the logically possible question: “what is the relevance of multilingualism in a multilingual world?” This is an existentialist question and the first logical reaction will be to question whether the question is logical because it is not logically possible for multilingualism to be absent (and irrelevant) in a multilingual world (that is, in its own world). Indeed, multilingualism is at home in a multilingual world and cannot be challenged with respect to relevance. Ultimately, the real question is: what is the logic of asking multilingualism, what it is doing in a multilingual world or what “business” it has in a multilingual world? However, with such a question, we end up with a *logical “argumentum ad absurdum,” a question whose answer leads to a logical conclusion of absurdity* for, indeed, it is self-evident that multilingualism owns the multilingual world, and its relevance is therefore equally self-evident. The apparently interesting question is, therefore, (on further examination) as foolish as asking a man what he is doing in his own home. Indeed, in our world of the twenty-first century, *multilingualism is the norm and monolingualism the exception* [1]. Besides, inherent *bilingualism* and *multilingualism*, over the years, language contact resulting from conquest, colonization, mass migration of populations due to disasters, and the impact of globalization has made all countries of the world multilingual in varying degrees. Given the symbiotic relationship between language, culture, and identity, multilingualism ipso facto implies multiculturalism and ethnolinguistic and ethnocultural identity have become inalienable rights. This imposes challenges for nation building, driven by ideals of ideological pluralism, social cohesion, and living together in diversity and so on, which have been the object and subject of various studies of bilingualism and multilingualism.

This chapter focuses on the compendium of aspects of recent original research contributions to more and new knowledge on *bilingualism*, and its societal corollary, *multilingualism* in the context of the knowledge economy and national development.

2. Advantages of bilingualism and multilingualism

The issue of advantages or benefits of bilingualism to the individual and the community is very topical; yet, it does not often benefit from a comprehensive presentation of knowledge-based information that is informed by research findings; findings that make such information authentic. The challenge is undertaken in this work, which ensures that the compendium of claims of benefits of bilingualism and multilingualism articulated are logical conclusions drawn from well-resourced research findings and not merely the fruit of a fertile imagination or wishful thinking. Presentation of the benefits of bilingualism to the individual below precedes benefits of bilingualism to the society (community, nation, or state). Assertions of benefit and advantages are followed by verifiable and verified sources.

2.1. Advantages of individual bilingualism

2.1.1. Bilingualism and cognition

Research on bilingualism and cognition leads to the empirical findings that on the whole, bilinguals (as individuals), *have more improved cognitive abilities than monolinguals*. Bilinguals “**exercise ... superiority in cognitive, metalinguistic awareness, linguistic, and academic performances**” over monolinguals [2].

Bilinguals are cognitively more creative with respect to flexible thinking ability and more proactive in nature [3, 4]; bilinguals have **executive control advantage**, which stimulates the memory giving them a better capacity for recollection.

2.1.2. Bilingualism and communicative competence

Bilingualism enhances the communicative ability and communicative competence [4, 5]. The bilingual experience fosters linguistic competences in varied verbal tasks, resulting in having increased competence or **multi-competence**; that is, **added capacity**. *Thus, a bilingual that is seeking to solve a problem in one language is thought to be able to draw on the other language and related frames of mind to bring extra cognitive capacity to bear in solving a problem* [6, 7].

Besides, there is evidence that bilinguals with a multilingual competence have high self-confidence, and stronger willingness to communicate without fear of constructing non-well-formed utterances [6, 7].

2.1.3. Bilingualism and language learning

Bilingualism has significant advantages for language learning in particular and knowledge appropriation in general in that bilinguals in using more than one language, *tend to develop better language proficiency, sensitivity, and definitely more in-depth understanding and control of their mother tongue* [6]. In learning another language, bilinguals have more opportunities to *transfer knowledge and language governing rules from one language to the other*, making it easier for them to learn overlapping cognates in form and meaning across languages [8].

Bilinguals have *the potentials to attain high academic standards with less effort than monolinguals* (Curtain and Dahlberg [9]), *because those who speak multiple languages tend to have a stereoscopic vision of the world from two or more perspectives, enabling them to learn reading more easily, develop better critical thinking abilities, and be more flexible in their thinking.*

2.1.4. Bilingualism and dementia

Bilingualism delays aging mental disorders, dementia, or Alzheimer's disease. Studies show that there is a *significant delay of the symptoms of old age dementia recorded in bilinguals*, which on the other hand manifests faster in monolinguals. The onset of dementia in some studies is at least 5–10 years earlier in monolinguals than bilinguals [10].

2.1.5. Bilingualism and aphasia

Aphasia can be better managed in bilinguals than monolinguals because in post-stroke aphasia, for instance, therapy will involve a “transfer effect,” whereby *“the second, less dominant language can be used to transfer knowledge to the primary one, helping with rehabilitation”* [11].

2.1.6. Bilingualism and information processing

Bilinguals are better equipped for information processing as a result of the constant code-switching between languages, which provides bilinguals with potentials to switch the functionality strategies of one language to the other as the need demands. *“When the brain is constantly so exercised, it doesn't have to work as hard as the monolingual's to perform most cognitive tasks effectively”* [12].

2.1.7. Sociocultural benefits of bilingualism

There are sociocultural advantages to bilingualism and multilingualism in that multilinguals are more obviously multicultural (since language and culture are related). Bilinguals, therefore, have more **intercultural competence**. **Multilinguals are more open and can better** appreciate and accommodate a foreign culture than monolinguals. Such a predisposition is a factor in lessening racism, xenophobia, intolerance and enabling intercultural dialog, and social cohesion [9, 13].

2.1.8. Economic advantages of bilingualism

Bilingualism has economic advantages in that multilingualism is an investment in human capital; for knowledge of several languages can afford one the opportunity of earning the higher income and obtaining aspiring employment status in any influential knowledge society. The use of a second or third language in the workplace is associated with positive earning differentials, ranging from 3 to 8% in different Western European countries [14, 15].

2.2. Advantages of societal bilingualism

A survey of empirical findings leads to the conclusion that the opportunities and privileges of multilingual societies outnumber those of monolingual societies for many reasons. State

multilingualism governed by a policy of ethno-linguistic pluralism that consecrates societal bilingualism has a plethora of advantages for individuals that benefit the society or state as well.

2.2.1. Advantages of multilingualism and multiculturalism

Multilingualism implies multiculturalism, which as indicated above helps in strengthening social cohesion, intercultural dialog, and so on. This is possible provided, there are policies on state pluralism that provide guarantees for recognition of ethno-linguistic communities. When ethno-linguistic communities are guaranteed recognition of their identity, they tend to feel a sense of security and a sense inclusion and belonging to the nation or state [13, 16].

2.2.2. Academic advantages of multilingualism in the area of education

These are quite obvious in that, inter alia, multilingual skills, and competence open up access to a huge store of knowledge through access to a wider scope of sources and resources in the educational institutions and beyond. Thus, the lack of multilingual language skills limits researchers in their ability to engage internationally in or with their research, and in their career opportunities [10, 17].

2.2.3. Benefits of multilingualism for national security

Multilingualism has benefits for national security and conflict resolution. Garamone [18] extolls the power of multilingualism for national security and Samire [19] advises a *multilingual approach to solving conflicts in a multilingual setting*.

2.2.4. Multilingualism, governance, and policy implementation

The implementation of government policies, for instance, in health care delivery, agriculture, environmental action, and so on in multilingual societies is best carried out in the various mother tongues or “languages of the heart,” for dissemination of information and knowledge in the mother tongue (or better known language) leads to a greater level of comprehension and appropriation of knowledge and innovations [20].

2.3. Sample case studies of bilingualism and multilingualism

Societal multilingualism has gained acceptance as a desirable objective in the implementation of a paradigm of national development predicated on ideals of ethno-linguistic unity in diversity. **Case studies** are quite illuminating with respect to efforts to face challenges of pluralism.

2.3.1. Bilingualism and multilingualism in the European Union

The European Union’s language policy seeks to consecrate and consolidate multilingualism and multiculturalism in the Union as a new-found ideological paradigm for nation building congruent with ideals of pluralism. It is known that *the European framework of reference, regulates*

and demands multilingual language competence in Europe, and to this effect, each European citizen should understand at least two languages other than the mother tongue [21–23]. Such requirements at the level of the Union impose national language policies in favor of societal multilingualism and *ipso facto*, encourage individual bilingualism in the European community of nations. **Language contact within the nation-state** may require the acquisition of a majority language by minorities and migrants who come in with a minority language. This leads to issues of **polarization** of *minority or heritage languages versus majority or official languages, inclusions versus exclusion, insiders versus outsiders, and so on*. Language policy and planning has a duty to mediate and diffuse tension by **devising and** implementing policies that ensure revitalization, revalorization, and use of minority and heritage languages along with the major languages for development, to ensure an inclusive society. Multilingualism as a national objective, occasion's intensive foreign language learning in Europe, the rise of English as a dominant lingua franca and the advent of a thriving translation industry for building bridges of intercultural and **cross-cultural understanding**.

2.3.2. Evaluation of national bilingual policy in Columbia

The **Colombian** constitution recognizes the **promotion of** indigenous languages and the development of Spanish-English bilingualism (or bilingualism in Spanish and another foreign language) in the school system, where Spanish is the official language, legacy of **the colonial past**. English is adopted as a language necessary **for knowledge appropriation** and interaction with the global community for national development. The main objectives of the evaluation process are to determine to what extent the Colombian Bilingual Program is effective, efficient, and successful and ultimately, to what extent the Ministry of Education's overall goal of achieving 40% success in English (and *ipso facto*, Spanish-English bilingualism) by 2014 was attained. Detailed results show that despite the efforts conceded, the overall success rate falls below the expected target. Significant observations follow from the case study and make recommendations on challenges to be faced on the way forward to the 2025 phase of the program. The case study is quite instructive and patently useful with lessons to be learned in the enterprise of nation building in developing countries, especially in the face of challenges of multilingualism and socio-economic development, not only for what is achieved in the Colombian experience, but perhaps more importantly, for what is not achieved and why.

3. Psycholinguistic perspectives on bilingualism

Psycholinguistics perspectives of bilingualism have been an important aspect of studies in bilingualism recently, two of which are elucidated here below.

3.1. Phonetic category formation in bilingual children

How do bilingual children come to distinguish phonetic details of the two linguistic systems they are internalizing in the language acquisition process? The central issue in this respect is,

since bilingual children may acquire (learn) the two languages sequentially (L1 first then L2) or simultaneously (L1... L2 concurrently, at the same time), do these two modes of bilingualism exhibit similar or different characteristic features with respect to phonetic category formation? This preoccupation embodies the concern with whether bilingual children develop and speak the two languages from two separate systems (*ab initio*) or from one system that gets differentiated subsequently, into two identifiable systems? If the later, when do the systems differentiate and do the languages interact in the process of acquiring the characteristic features? If so, is the direction of interaction predictable, and so on? (This problematic may also involve issues of psychological reality). The research is driven by a summary of key empirical studies with evidence of the observed facts of the development of phonetic categories by bilingual children (both sequential and simultaneous cases of bilingualism). It is undertaken within the theoretical framework of phonetic categories of bilinguals; that is, the speech learning model (SML) for adult bilinguals [24] and the linguistic system model (LSM) for bilingual children [25]. The results lead to the proposal of “*The Development Model of Phonetic Category Formation*,” which is an integrated explanatory model of the findings of current research in the discipline. The model is to the effect that *detailed phonetic categories do not form across-the-board and bilingual children may invoke multi-dimensional representations of phonetic categories*. It goes further than the SML and the LSM to state that *phonetic category formation continues to evolve during the developmental process rather than emerge all at once in both simultaneous and sequential bilingual children*.

3.2. Bilingualism and self-perception

Linguists, anthropologist, and sociolinguists have long known that language is inextricably linked to culture and is indeed an element of culture *par excellence*. Every language encodes culture and cultural values. Thus, in the process of language acquisition, bilinguals internalize the values, norms, and concepts, including role expectations and attitudes of the culture expressed by each of the languages, they are mastering. Consequently, there is a symbiosis of language, identity and culture in the temple of the mind. How do the various cultural norms and values coexist in the bilingual, who has internalized several languages and their cultures and how can these cultures be retrieved? It is now axiomatic that *language can prime a culture*, meaning that language can activate culture in the mind, the culture with which the language is associated in the symbiosis within the mind [26]. What is the relationship between language, as the vehicle of a person’s culture, and self-assessment of one’s capabilities (i.e., self-efficacy) via conventional self-report measures? This is revealed in the study of bilingualism and culture in the Kingdom of Saudi Arabia (KSA), where the key languages used to prime culture (Arabic and English) pertain to cultural orientations, whose key dimensions stand in opposition to one another. Arabic represents a vertical-collectivistic culture (with high uncertainty avoidance), which places premium on such values as modesty, humility, community spirit, interdependent member of the collectivity, and so on. In contrast, English represents a vertical-individualistic culture with low uncertainty avoidance (e.g., USA), which places premium on individual values of assertiveness, independence, individual achievements, and so on. The results show that bilinguals (or multilinguals) possess two (or more) culturally

construed identities, two or more “selves”; the use of one language (Arabic) “primes,” and conjures the “self” corresponding to the Arabic language, which then responds psychologically, behaviorally, and culturally in an appropriate acceptable manner for the Arabic culture and heritage. The use of English primes behavior appropriate and acceptable to the American culture (to some extent). It is thus established that not only does bilingualism imply biculturalism the different cultures of bilingualism can be primed from the individual and seen through the use of each of the languages [26, 27].

4. Bilingualism, access to and retrieval of information

In this age of knowledge economy, driven by information and communication technology, bilingualism in issues of **information retrieval (IR)** and **access to information (AI)** is crucial, especially with respect to storage and retrieval of information from databases.

4.1. Cross-language information retrieval (CLIR)

Research in the area of CLIR has focused on issues, methods, and technologies of how to retrieve information on one subject from two or more languages and databases with a query in one language. The issue studied here involves the examination and evaluation of the efficiency and effectiveness of a system of retrieval of bilingual information in English and Spanish based on semi-discrete decomposition (SDD), when the query is made in Spanish. To do so effectively, four case studies that exhibit the performance of the use of the latent semantic indexing (LSI) via SDD method for CLIR are undertaken, and the results are compared with those obtained by applying the LSI via singular value decomposition (SVD) method. This is undertaken thanks to a solid database built using the *fusion strategy* in combining documents from the Bible (Gospels) in Spanish and English. The evaluation of the innovative SDD method (LSI via SDD) shows a significantly higher performance with respect to the SVD Method. It evidences the true impact of the SDD, the ability to obtain good results, with the advantages of a higher speed and very low cost **in terms of storage space**.

4.2. Cross-lingual and cross-chronological access to information

This deals with the challenge of accessing and retrieving information from several languages with a focus on diachronic access and retrieval (retrieving information from different chronological stages of the same language (e.g., Old English, Middle English, and Modern English). Using Mongolian as an example, an experiment is set up to devise mechanisms of access to information from various stages of Mongolian; mechanisms that can be generalized. This is based on a series of measured and ordered actions: Computerized analysis of historical documents, extraction of key markers of periods and geographical information such as personal and place names with the support of a vector machine, creation of digital bases on the various stages of the language with the extracted material, encoding process of relevant information, and development of a web-based prototype system for utilizing digital editions of

historical manuscripts as scholarly tools. This approach to diachronic IR is applicable to both synchronic bilingual and multilingual IR. There are indications on how it can be applied to English diachronic data and to English and Japanese IR.

4.3. Innovative multilingual CAPTCHA

Completely automated public turing test to tell computers and humans apart (CAPTCHA) is a test used by different websites on the Internet to differentiate between humans and automated bots. Cyber-crimes and cyber insecurity are quite rampant. Consequently, IT security is a crucial aspect of information management today and is the object of research and patents. CAPTCHAs are possible because humans have abilities that machines do not have and therefore, by exploiting these abilities and capacities, tests are made to exclude interference from robots on websites. The work discussed here is a CAPTCHA realized by putting together handwriting characteristics from several human scripts in four languages (English French Arabic and Spanish). The research goes through the normative engineering stages for the production of this innovative CAPTCHA such as data gathering, algorithm technique to generate the four CAPTCHA, followed by elicitation of potential User Responses, validation of responses, experimentation, and so on. The ultimate test in the series of validation experiments is the investigation of the reaction of six bots to five hundred characters CAPTCHA in the four languages. In the English CAPTCHA images, the six OCRs (robots) failed to recognize the full text in 99% of the cases, where humans recognized them at above 80%. The 1% recognition by the bots is insignificant and is attributable to chance. This is essentially the same situation for the CAPTCHA for the other languages. These results consolidate the validation of the new multilingual CAPTCHA.

5. Conclusion

The introductory chapter speaks to the issues contained in the book in a manner as to be informative and less technical in order to ensure a rapid appraisal and perception of the originality of new dimensions to the problematic of bilingualism and multilingualism. However, it is not a substitute for the rich, valuable, and insightful information to be gained by reading the full chapters of the book. Rather, it is intended to be what it is supposed to be: A *mere introduction* to the book. The finality of an introduction is to whet the appetite sufficiently enough to say "*the best is yet to come*" and "*the taste of the pudding is in the eating.*"

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