Building multilingual learning environments in early years education

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Abstract

Questo articolo esamina lo sviluppo linguistico del bambino nei primi anni di vita con particolare riferimento all'importanza del plurilinguismo e i motivi per cui esso dovrebbe essere promosso nei servizi educativi 0-6. Si sostiene che tale obiettivo sia raggiunto al meglio attraverso la costruzione di ambienti di apprendimento multilingui a livello di nidi d'infanzia e scuole dell'infanzia. Si descrivono le caratteristiche di tali ambienti e si presentano modalità di valutazione di progetti che mirano a costruirli.

This paper examines the early language development of children with particular reference to the importance of personal multilingualism and the reasons why this should be promoted in early years education. It is argued that such an objective is best achieved by building multilingual learning environments at the level of nursery and infant schools. The characteristics of such environments are described and ways of evaluating projects designed to build them are presented.

Parole chiave: linguaggio, apprendimento, servizi educativi 0-6, multilinguismo e plurilinguismo.

Keywords: language, learning, early years education, environmental and personal multilingualism.

Introduction

In recent years educational policy has emphasized the importance of learning languages in early years education, both in terms of the ease with which infants acquire language and the many advantages that derive from being multilingual. However, initiatives for promoting such objectives have tended to continue seeing them within the perspective of *teaching languages to very young learners* (European Commission, 2006). What this paper proposes is a change of approach. The focus is not on teaching and learning other languages within the theoretical and practical framework proposed by second language learning research and literature. Rather than the periodic introduction of a given number of language learning activities in a second or third language by a teacher whose purpose is to teach that language, the perspective is that of gradually introducing other languages during all the activities that constitute the daily life of the learning environment. In this way, the overall aim becomes that of promoting the development of personal multilingualism in children who become used to operating within a multilingual environment.

The paper introduces and discusses the creation of early years multilingual learning environments in nursery and infant schools. Particular reference is made to projects designed to promote such environments within the Ravenna area in Italy during the period 2013-2015. The aim is to illustrate the theoretical framework of reference, the characteristics of the multilingual learning environments created and the procedures employed for monitoring and evaluating the outcomes of such projects. The

projects referred to are coordinated by the local education authorities *Servizi educativi 0-6, Coordinamento pedagogico* both for the *Comune di Ravenna* (a project thus far involving infant schools with children from 24 months to five years of age, but with the intention to extend it to nursery schools) and the *Unione dei Comuni della Bassa Romagna* (a project involving principally nursery schools with children from 6 months to 3 years of age). In each of the school years 2013-2014 and 2014-2015, the project organized by the *Comune di Ravenna* involved an average of 80 teachers, 25 infant schools and 1550 children, while in the same period the project organized by the *Unione dei Comuni della Bassa Romagna* involved an average of 45 teachers, 16 nursery schools, 3 infant schools and 560 children.

Languaging as being

Within the fields of cognitive linguistics and neural science an increasing body of research and theorising has emerged in recent years related to questions concerning language evolution, cognitive development and early language learning (Evans, 2012; Pleyer, 2012; Kuhl, 2010, 2011, Sinha, 2009; Tomasello, 2008). From this perspective, like all forms of language, natural, or human, language can be considered from the point of view of what it *is* - its essence, or its characteristics as a biophysical phenomenon based on sound and light waves - and of what it *does* - its uses, or its functions as a cognitive tool. Within the ongoing process of the evolution of language, both characteristics and functions are *interdependent* – in that they define each other - and *dynamic* – in that they are constantly subject to change (Pagel, 2009, Evans and Levinson, 2009a). This process takes place at three levels: the phylogenetic, the ontogenetic and the microgenetic.

The phylogenetic level involves the evolution of different types of language and the technologies used for their production and transmission. This includes the growth and spread of language families and systems and the technologies of speaking and writing. The ontogenetic level concerns the language development of individuals: the emergence of various types of language and their technologies, the passage from proto-language to fully-formed language, from one to a number of language systems, the encounter with spoken and written texts and their functions in thinking and interacting (Kirby, 2012). The microgenetic level is that at which occur the single events and specific actions that contribute to both the ontogenetic and the phylogenetic levels of evolution. For example, exchanges between adults and children, caretakers or teachers and learners, children and other children can be analysed as samples of microgenetic acts that are a part of language acquisition and learning processes (Halliday, 1975, Kuhl, 2010, 2011, Wells, 2009).

Natural language is not the only kind of language that human beings use. In this sense, all human beings are multilingual, and personal multilingualism, the various ways in which people use a multiplicity of types of language, is a feature of daily life. Body language (physical contact, distance and proximity, posture, movements, gestures, facial expressions), visual language (lines, shapes, sizes, colours, symbols, pictograms, images), sound language (noises, sounds, timbres, rhythms, melodies) and natural language (phonemes, graphemes, words, speech and writing, texts of various kinds) interact and feed into and out of each other continuously, interweaving and merging in multimodal compositions that are by no means only a recent phenomenon, but which have witnessed a considerable acceleration through technological developments in the past few decades.

Natural language is in fact not a type of language that is biophysically distinct from the others, but rather only a particular combination of specific elements of sound language (based on a range of sounds that make up the phonemes used to form the words in speech) and visual language (based on a range of symbols that represent the graphemes used to form the same words in writing). Moreover, sign languages, formed by particular combinations of elements of body language, are also natural languages in the full sense of the term while also being visual languages, since the gestures that are

the signifiers of sign language would be of no significance if they could not be seen. The same is obviously true for all the components of the body language that inevitably accompanies speech and listening. In child language acquisition elements of sound, visual and body language are always inextricably interwoven and interdependent (Bellugi et. al, 2010).

Language is not something that exists outside the newborn child, a phenomenon that is in the surrounding world, to be learned through experience or through study. Nor is it a kind of blueprint or expression of a set of innate and universal cognitive structures waiting to be activated and declined on the basis of the accident of birth in one part of the world as opposed to another (Christiansen & Chater, 2008, Evans & Levinson, 2009a, 2009b). Language develops naturally as a constituent element of human experience and consequent learning, on the basis of many contextual variables. Learning is a process of adapting to experience, a lasting change that is the outcome of that experience, and language plays a dual role in this process, because it mediates both the experience and the subsequent adaptation. Language permits the flow and the sharing of information between individuals and their environments together with the dialogue and communication between individuals and within individuals that are the very essence of life. Language is thus above all a way of being in the world, a human semiosis that enables us to make sense of the world, a means with which to build an idea of a reality in which we live and act according to that idea (Halliday, 1975, Wells, 2009). In other words, the self of each one of us is born and constructed linguistically and early years education plays a vital role in this process. "We human beings exist and operate as human beings as we operate in language: languaging is our manner of living as human beings" (Maturana 2002, p. 27).

The child's early language development

Children are born predisposed, or pre-adapted through a long evolutionary process, to language (Kuhl & Rivera-Gaxiola, 2008) and, in propitious circumstances, are capable of learning any type and number of languages. Universally children learn sets of linguistic conventions that are highly abstract and immensely complex. At the same time, as opposed to adult ideas about the relative "difficulty" of given language systems, for a child no language is more or less difficult to learn than another.

The child's language development is based on a dynamic computational capacity of the brain that allows statistical analysis conducted on data gathered through social interaction (Kuhl, 2010, 2011). The brain uses algorithms to process incoming auditory stimuli and to build a language system based on the distributional properties of the input received. It is capable of discriminating modal values and calculating transitional probabilities both between sounds and between sounds and syllables. It builds a cultural soundscape in which social interactions allow the processing of certain phonotaxes, or phonotactic patterns, the typical sound relationships of the languages that make up the inhabited soundscape.

This development of human language is thus based on biological and neurological systems dedicated to particular functions that correspond to the physical characteristics of language itself and adapt and change through experience and the sensory stimulation this provides, creating highly complex, dynamic and interactive auditory–articulatory cortical connections for processing and producing speech (Bruder *et al*, 2015). The ear translates sound waves received into electrical impulses, which are transmitted to the brain through the fibres of the auditory nerve. In the same way, the light waves captured by photoreceptors in the retina are translated into impulses sent to the brain by the optic nerve and the mechanical waves captured by the receptors of the skin during the physical contact that may be involved in body language travel along the nervous system to the brain. A neural architecture is built through the information furnished by experience and social interaction as both the basis of *developing* and *using* language (Krasnegor *et al*, 2014).

Gradually, experience leads to a functional specialization within the brain systems that are activated to process the sensory stimuli received. A neural architecture is formed through the combination of neural networks developed on the basis of input received through exposure to a particular language, its auditory or visual characteristics and its statistical properties. The auditory apparatus that allows us to hear one or more languages evolves according to the physics of sound and is formed in an acoustic space defined by phonic realizations that depend on differences in frequency, amplitude and duration and changes that occur in milliseconds, gradually becoming able to grasp distinctions and variations typical of the linguistic systems that it is accustomed to (Beckner *et al.*, 2009, Tomasello, 2003, 2008).

At birth children demonstrate an ability to detect and discriminate between the differences between the phonetic contrasts used in all the languages of the world. Within 6 to 8 months, depending on the languages to which they have been exposed during social interaction, they have already developed complex linguistic-perceptual systems that permit them to identify and analyse the sensory stimuli received and simultaneously use them to gather information about the language systems they are acquiring and about the surrounding and internal realities they are building through language itself. They learn implicitly and informally through experience, developing a phonetic ability specific to the sound characteristics of human languages and elaborating a relationship between the phonology and the morphology of the words they become used to. They develop neural substrata that allow them to move from the perception of phonemes to the codification of their first words and the ability to process syntactic structures and semantic information within the phrases they hear. At each of these levels neural circuits of learning are created which demonstrate continuity of development in the building of a statistical profile of the lexical and morpho-syntactic characteristics of the language systems they meet and the grammars that emerge (Sandler et. al. 2009).

Children begin to speak quickly and without effort, following a path that demonstrates the same kind of continuity regardless of the language they use or the culture to which they belong, passing from the lallation of the first months to protolanguage and completely formed phrases within two or three years of age. The structure and the organization of language and the brain are reciprocally defined, creating textures that reflect each other (Kuhl, 1992, 2010, 2011). The neural architecture created through the exposition to language in the first year of life enables linguistic and cognitive development to feed into and out of each other and renders a child of three years able to participate in a complex conversation.

Social interaction is a vital factor in this development. Even if there is a genetic predisposition to language, a child is not born already able to understand or produce elements of a given language without receiving input. The neurobiological mechanisms that underlie the development of language depend on interactive stimuli available only in social settings in which there is exchange of the physical signals (sound waves) that are the constituent elements of language. In this sense, it is important to recognize that in any context the interlocutors do not exchange meanings or contents but rather sensory stimuli that activate perceptions and cognitions which depend on the repertoire of concepts and conceptual structures that each of the participants in the communication has built during experience of social interactions.

Infants appear predisposed to learning through integrating linguistic and social information and developing cognitive structures (Meltzoff *et al* 2009). The speech acts that take place during the daily routines typical of early years education are particularly important in this respect and can be conducted and consolidated in a number of different languages. Meaning does not reside in sounds or words, but within the cultural practices of their users (Vygotsky, 1978, Bruner, 1996, Edwards, 1997). Communication cannot be explained by reference to transmission or linear models but rather as a process of co-construction of meaning and of ourselves as co-constructors of the meanings of the

world we inhabit. The principal aim of early years education is to enrich the social interaction and the consequent building of meaning to the maximum extent possible.

What children do with language

Natural language plays a fundamental role in the process of children's learning through adapting to experience, since it mediates both the experience and the subsequent adaptation. In this sense, learning is always using language to build an idea of the world in which we live, a reality based on data gathered during experience and then reprocessed through the interaction between the signifiers and signifieds that constitute the signs which permit us to make sense of what we perceive. Children create a sense of reality in their brains that they use, develop, test and validate on the basis of new experience. Their mental life is the artifact of the sign systems into which they are born and, in turn, the same systems are renewed by their mental life as it interacts with the activities that constitute their experience.

The structures of children's sensations, perceptions and cognitions derive from the system of signs in which they move, primarily from the habitual forms of speech typical of the public spaces that they frequent and the social interaction in which they participate. Ways of thinking, ways of speaking and ways of acting are interwoven in human processes of signification, of which our signs - and therefore the meanings we give to the world - are the product. The limits imposed by our signs are the limits of our world. But they are also the result of limits imposed by our interactions with other people, interactions in which signifiers and signifieds come into contact in the minds and actions of participants and in which language is both the instrument and the product of thought and speech.

Thus the meaning children give to life is constructed through a dialogue with the world around them and within them and with the people who inhabit it. Natural language is a social semiotic, a resource for the creation of meaning that mediates the processes through which they can negotiate, build and change the nature of social experience and produce learning. Children learn language and learn about language by using it to learn (Halliday, 1975, Wells, 2009).

Like any type of learning, language learning is not the result of mere imitation and repetition of existing knowledge transmitted from generation to generation. It is a process of construction of a linguistic system based on the relationship between input and stimuli received and the needs or uses that natural language satisfies and enables. Children learn by gathering data, creating connections between the elements collected, experimenting and testing hypotheses, constructing mental models. By participating in situations, be they routines, structured activities or free play typical of nursery and infants schools, they grasp and internalize how the signifiers of language systems permit understanding, interpreting, organizing and expressing of experiences. By experimenting with language, they build connections between words and experiences, between words and between experiences. The motivation for language learning is always linked to the available opportunities for building knowledge about the world, for exploration and discovery, growth and expansion of horizons of meaning through interaction. Languages are vehicles of learning based on the needs created and the opportunities provided by the environments in which children live. Language is reflection on the world and action in the world and reflection and action continuously feed into and out of each other, thereby creating learning processes that develop cyclically in a potentially endless spiral.

While learning is a process of adaptation to our experiential world, building knowledge means developing a conceptual framework that is functional to that adaptation. The construction of concepts is a process for which natural language is an extraordinarily powerful and indispensable tool. Language develops because it helps us to think and act. Its signifiers are enriched in order to enhance thinking and its syntax develops as a function of neural networks that create relationships between the objects

of our thought and produce the meaning we give to the world according to the neurobiological architecture of our brains, a process involving the construction of mental schemata (Bartlett, 1932, Rumelhart, 1980) and participation within the scripts that are typical of all forms of human activity (Schenk & Abelson, 1977).

The majority of the categories of children's mental schemata are formed between the age of 18 months and 5 years. During this process new language is not *grafted* onto existing concepts. It evolves in order to mediate the development of concepts by which the children live and the knowledge they build. In the same way as signifiers and signifieds interact to form the signs that give meaning to the world, *knowers* and *knowns* form structural couplings in order to construct *knowledge*. Through social interaction a shared world is built together (*con-scire*) through the scripts that characterize the difference spheres of human experience. As language mediates that experience, children think and express themselves, act and narrate, explore, experiment and discover, play, invent, create, build, make contact with their feelings and manifest their emotions within scripts that may be typical of all kinds of routines, structured activities and free play or of any other situation in life which constitutes a natural learning environment.

While constantly interacting with other types of language – body, visual, sound – natural language assumes an increasingly important role, enabling the gradual achievement of four basic aims of all learning and which can be considered as four lifelong and lifewide competences: building knowledge about the world around and within us (knowledge-building competence), participating in a multiplicity of forms of communication (communicative competence), experimenting with different ways of doing and acting in order to achieve objectives and thereby creating methodologies and ways of operating typical of all forms of human activity (methodological and operational competence), developing relationships with oneself and with others (personal and social competence).

Environmental and personal multilingualism

Multilingualism - the existence and use of a multiplicity of types and variants of language - can be considered as an *environmental* or as a *personal* phenomenon. Environmental multilingualism occurs when, at the level of territories, societies or groups, different languages coexist and are used for reasons of work, study, bureaucratic procedures, tourism, social interaction, recreational, cultural, political and many other types of activities. Worldwide the majority of children grow up in environments that demonstrate these characteristics in infinitely variable ways. Personal multilingualism occurs when single individuals use and alternate different languages in their everyday lives for a range of purposes. Humans' natural predisposition to language acquisition means that children develop spontaneously and inevitably a multilingual competence in contexts that are propitious in this respect.

Personal multilingualism is in the first place an enrichment of the relationship between language user(s) and the language(s) used, between the signifiers and the signifieds employed in processes of meaning making, between developing mental schemata and the knowledge building they permit (Mechelli et. al., 2004). Every language demonstrates particular characteristics of the linguistic codificability (its potential and its limits in terms of meaning making) that is at one and the same time both the facilitator of cognitive structures and the bottleneck that constrains mental representations within the modes of input-output that are typical of natural language as both biophysical process and biocultural product. Moreover, the frames of reference of single language systems profoundly condition our mental activity, influencing, for example, the construction of spatial, temporal or agency relationships and the way in which we reason about them and employ them in our action (Boroditsky, 2009). Different frames of reference possess diverse logical properties and determine the development of our cognitive maps. Being multilingual means being able to use alternative ways of thinking,

organising thought, of perceiving and representing the world, of reflecting on and acting in that world (Nisbett, *et al*., 2001, Fausey & Boroditsky, 2010).

In recent years many questions have been posed about the cerebral organization and the neural representation of different languages in multilingual people (Kovelman *et al*. 2008). One hypothesis posits the existence of a single extended system that is the sum of the constitutive elements of the different languages comprised. Another hypothesis posits a multilingual competence based on an organization of different and separate systems and of different phonological, morphological and syntactic representations. Some hypotheses posit systems that are in part overlapping with common features and in part separate or the existence of sub-systems underlying one overall system with different but connected neural circuits. It would seem, however, that processing different languages involves the same areas and the same cerebral tissues, but that in the multilingual brain there is more activity in the right hemisphere and in particular in the prefrontal dorso-lateral cortex, responsible for the functions of control and attention.

It is hypothesized that the presence in the brain of different systems of representation contained by different languages, constantly active and potentially available at any moment, gives rise to a mechanism used to resolve the potential conflict between systems and manage appropriately the relationship between signifiers and signifieds within the system(s) in use. This mechanism is linked to a general capacity for executive control. In this way, personal multilingualism creates advantages at the level of attention capacity and operations involving selection, on which depend the ability to evaluate options and make choices as well as the processes of inhibition of stimuli or connections that could interfere with concentration and procedural realization of choices. These are all fundamental characteristics of the cerebral system of executive functions localized in the prefrontal cortex (Bialystock *et. al*, 2009, Kroll & Rossi, 2013). .

The need to constantly employ the conflict management strategies typical of the multilingual brain strengthens its functioning and promotes a functional neural architecture which stimulates global cognitive growth. Managing on a daily basis two or more language systems requires constant attention to what it is important to concentrate on, what to eliminate, what to put on stand-by, exercising an inhibiting control, ignoring distractions and misleading pathways. A multilingual brain is more secure in facing and dealing with complexity, more able in managing simultaneous tasks, carrying out rapidly operations, activating and processing multiple categories, adopting and maintaining alternative points of view and perspectives, focusing on specific aspects without losing sight of overall issues (Carlson & Meltzoff, 2008, Conboy *et al*, 2008, Conboy *et al*, 2011).

A further related aspect of the potential benefits of personal multilingualism is that the same executive functions it enhances are also the cognitive processes that deteriorate in old age and there is a growing literature that demonstrates a positive effect of multilingualism on executive control processes throughout life. Various studies show how multilingualism can have a positive impact on the aging process through a strengthening of executive functions and working memory, extend many cognitive functions that support both activity and creativity, inhibit degenerative processes and the onset dementia (Craik et. al. 2010). In this sense, promoting personal multilingualism in early years education is increasingly seen as an important investment in the level of health and well-being of populations and consequently in the sustainability of expenditure on social and health systems.

Building a multilingual learning environment

A multilingual environment can be characterized in terms of four intersecting variables: space, time, people and activities. Each internal or external space (rooms, corridors, bathrooms, gardens, etc.) can manifest the spoken and/or written presence and use of two or more languages. In a multilingual

learning environment, all the signs, information panels, graphic works, furniture, technologies, instruments, resources and materials available may be stimuli or indicators of multilingualism and multilingual people. The languages present can be used for varying lengths of time. The development of personal multilingualism in children, teachers and caretakers depends on the quantitative and qualitative distribution of exposure to and use of the languages present. While quantity is an important variable, quality is an even more important factor and is achieved only when children and adults are truly engaged in activities where *languaging is being*.

Each one of the people in the environment can use the languages present for different purposes and in different ways. The activities can be conducted on the basis of different forms of alternating these languages: programmed and spontaneous alternation, macro and micro alternation. Programmed alternation can involve the use of a given language for an activity followed by the use of a different language for the succeeding activity. The programming can provide a constant alternation of languages from one activity to the next or a prevalent use of one language in a given day with a use of another language for one or two activities. A whole day can be conducted in one language and the following day in another, or a whole morning in one language and the afternoon in another.

Spontaneous alternation occurs when people decide to change language without having programmed doing so. This may be as a result of any one of a number of reasons for which people move from one language to another within phenomena known as *code-switching* or *code-mixing* (Auer, 1998), each of which are natural forms of communication and learning strategies and an essential part of the language games played by children during their linguistic development and shared by teachers and caretakers.

Macro-alternation occurs when the use of one language is maintained for at least a certain length of time, which can be highly variable but is generally from around 30 minutes upwards, according to the age of the children, and is generally associated with a programmed distribution of languages during the daily activities. Micro-alternation occurs when there is a change within brief periods of time, either within a given activity, as with code-switching, or even within single utterances, as with code-mixing. This is generally associated with spontaneous alternation based on choices made at the moment of languaging, but can also be programmed within activities.

As regards the people who are part of the multilingual environment, it is necessary to clarify certain features of the profile of multilingual teachers, caretakers and learners, what types and levels of competence they should possess and/or develop. In both cases, the profiles are dynamic and can include different combinations of competence - balanced, asymmetric or receptive - in two or more languages. Especially important is the need to define the characteristics of multilingual communication and the way in which the environment requires and/or authorizes specific forms of communicative competence on the part of its members.

Within the profile of teachers and caretakers, it is by no means necessary to be a balanced multilingual, with the same level of competence in different languages, in order to work in multilingual environments. Asymmetric and even receptive competences can be widely used within the strategic management of the alternation of two or more languages in the daily activities that constitute the curriculum. It is important to see the adult's role not just as a provider of input in terms of a given activity and language but rather as a facilitator and a participant in the processes of learning, a person involved in the co-construction of competences, including their own as professionals in early learning contexts.

The profile of children as multilingual learners should be defined in terms of learning objectives related to competences to be developed using two or more languages and will necessarily change constantly in building various types of competence and developing them at increasing levels of com-

petence. These levels will be determined by the quantity and quality of exposure to and use of different languages in the progressive realization of a functional multilingualism, by the relationship between interlocutors, the situations in which they interact, the contents worked on, the intended learning objectives and the outcomes achieved.

Fundamental for the enhancement of the role of environmental and personal multilingualism is that all languages learned are perceived by teachers, caretakers and children not only as something to learn but as something with which to learn, that all languages are learned because they can play a cross-curricular role in learning at school and provide the basis for lifelong and lifewide learning in all formal, non-formal and informal contexts. All the activities proposed and the experiences offered should provide situations capable of stimulating multilingual learning through interactions that promote the development of all types of competences, enabling learners to participate in the activities proposed, understand and produce the forms of languaging involved and gradually more consciously process and re-elaborate the experiences in which they are engaged and to manage eventual difficulties through the use of communication and learning strategies in interaction within a multilingual peer group.

The planning and the management of the activities should permit in a systematic way what is naturally characteristic of multilingual environments and people: the fact that different languages come into contact both in the minds of the people who participate and in the interactions they conduct within the scripts that are typical of each activity. For example, through the daily routines (welcoming assembly, bathroom, snack, lunch, sleep) which provide the basis for linking and consolidating the behavioural and cognitive activity of babies, toddlers and infants, at the same time neural circuits are created which enable codification of the words and processing of syntactic structures and semantic information contained within the scripts which accompany the activity.

A single routine can alternate different languages as the activity proceeds. When children go to the bathroom, teachers and caretakers can switch languages during each step ("apri il rubinetto", "pull up your sleeves", "lavas tus manos", "essuie les mains"…) using different combinations and sequences of languages. At the same time, the routine can be conducted in one language on a given day, a different language on the day after, and so on, according to the number of languages that make up the multilingual environment. In all cases, it is essential to accompany the human language script based on words with other forms of body, visual and sound language in order to facilitate comprehension and the construction of corresponding neural circuits.

All other daily routines, together with all the structured activities typical of early years learning environments, such painting or manipulation, story telling or singing, provide opportunities for alternating languages within flexible scripts as children experiment, discover and learn about their bodies (parts, actions, movements, hygiene, nutrition, etc.), the various environments in which they conduct their activities (indoors/outdoors, spatial and temporal orientation, organization and use, etc.), the relationships they develop with peers and adults (reflection, independence, respect, collaboration, cooperation, etc.). Alternating languages enriches the development of the entire range of competences related to ways of knowing, communicating, doing, acting and relating, together with the underlying sensorial, perceptual, motor, manual, emotional, behavioural, linguistic and cognitive skills.

In all situations, the emphasis is on promoting receptive competence based on listening and doing before the gradual emergence of production on the part of the children as they develop their personal *interlanguages* (Seliker, 1975) through highly individual processes of interiorizing the characteristics of the different language systems to which they are exposed. Every child must necessarily pass through a silent period, which may be highly variable from child to child, in which to process input in order to create neural circuits before being ready to re-elaborate and produce single words or chunks of words within personal utterances.

Evaluating multilingual learning environments

Teachers and caretakers develop observation of early years learners in order to understand the complex processes underlying the children's development and their achievements as learners, as well as to inform their own interaction with them and reflect on their ability to build and operate in learning environments with certain characteristics (Broadhead, 2006). In the projects described in this paper, the evaluation process conducted thus far is in no way concerned with the assessment of children's development against a measurable set of learning outcomes. The aim has been to document the building of multilingual learning environments as an ongoing enterprise from the perspective of two principal questions: *are the adults and children who inhabit such an environment at ease operating within it*? and *in what ways do their emerging personal multilingual profiles develop*?

The methodology used for evaluating processes and products of the projects conducted has been based on mixed-methods data gathering using teacher and caretaker observation, participatory observation (Bogdewic, 1992, Kawulich, 2005) on the part of a researcher (amounting to around 200 hours over the two-year period considered), discussion sessions involving the researcher and groups of teachers and questionnaires administered both to teachers and parents. The evaluation procedures have been designed in order to provide monitoring of the overall experience from the point of view of observing and reflecting on the children's behavior, examining the development of multilingual scripts within the teaching and learning activities involved and considering the extent to which the participating teachers feel prepared for and at ease within such an environment.

At the same time, attempts at involving the children themselves in expressing their feelings about their own experiences been incorporated. Educational research has at times been accused of being more concerned with validity and reliability of data rather than with children themselves (Greene, 2007, 2008) and of not adequately considering children as active agents within their environments (Hood, Kelley, & Mayall, 1996). The participant observation has endeavoured to take account of this perspective.

Both the observation conducted during a wide range of activities and the data collected through the questionnaires provide elements that show a widespread and continually increasing use of a number of different languages within the entire range of daily routines and structured activities proposed. Although English is the second language used alongside Italian in all the schools involved, and the examples which follow are all in that language, French and Spanish are used in almost 20% and *Romagnolo* dialect in 25%. Data collected at the end of the school year 2014-15 for the project organized by the *Comune di Ravenna* showed a use of one or more languages other than Italian on the part of 93% of the teachers during daily routines and 71% during daily structured activities, while 43% reported a spontaneous use of these languages by the children during free play. The data also shows how the use of these languages involves multiple aspects of the various patterns of interaction between teachers and children as well as between children. 95% of teachers/caretakers report using different languages while interacting with children in programmed activities and a spontaneous use of these languages on the part of 25% of children while interacting with teachers or caretakers and 48% of children while interacting with other children. In particular, the data collecting has been designed to gather examples of observable child behaviours that provide indicators of ways of participating in activities that involve the use of two or more languages and the related development of types and levels of competence. The indicators belong to two types of categories: *action* and *languaging*. The first category is based on the actions typical of children's participation in the daily activities, such as moving (themselves or objects), combining, grouping, ordering or choosing things on the basis of criteria such as shape, size, colour, succession, etc. The second category concerns the gradual

emergence of the different forms of language that accompany their activities: body language (postures, gestures, facial expressions, eye movements), sound language (sounds, babbling, singsong), visual language (doodles, drawings) and human language (proto-words, words, phrases).

Within the category of action, a wide range of different types of actions provides indicators of receptive competence during activities conducted in a language other than Italian. Within daily routines an increasing number of children show confidence in carrying out activities that require coordination of movements or use of instruments when different languages are used to organize and conduct or simply to accompany activities. The following extracts are taken from the mid-morning activity "Time for a snack" (T = teacher/caretaker C = child) with children of 2-3 years of age.

T: *Sit down at the table*,

(The majority of the children sit down spontaneously, since the repeated nature of the daily routine makes the language as much an accompaniment as an order to obey. A few children don't move immediately.)

T: *Giada, where's your chair*?

(The teacher accompanies the question with a gesture pointing to a vacant chair and Giada goes to it.)

…

T: *Who wants apple … pear … kiwi*?

(Some children raise hands, other indicate preferences by nodding or shaking heads or through facial expressions. Some do not immediately react.)

T: *Marco, some apple?*

(Marco takes a slice of apple)

T: *Eat your fruit. Yum yum!*

(The children eat and the teacher goes around counting the slices of fruit they gradually eat, indicating each one with a finger.)

T: *One piece … two pieces … three pieces … yum yum*!

(Some children follow the counting with their fingers. Some begin to say out loud *One … two … three*. Two and then gradually others begin to say *piece*.)

T: *Who wants more?*

(Some children indicate spontaneously their desire to eat more, other remain silent. The teacher offers them some fruit).

T: *Beatrice, some more*?

(Beatrice shakes her head.)

T: *Kevin, enough? No more?*

(Kevin thinks and then shakes his head.)

T: Mandy, want some more?

(Mandy shyly nods her head.)

T: *Take it!*

(Mandy slowly moves her hand and takes a slice of kiwi. It slips from her hand.)

T: *Never mind! Pick it up!*

(The teacher accompanies her words with gestures and Mandy picks up the slice and eats it.)

T: *Well done!*

Activities such the daily welcoming assembly often involve choosing and putting in order cards related to days of the week, colours, the weather, etc. The vast majority of children manifest enthusiasm for spontaneous games that develop from these activities, involving physical responses to input such as carrying out actions or movements as in the following example with children of 3-4 years of age. The children are sitting in a circle. The teacher is part of the circle.

T: *If you're wearing something red, touch it.*

(The teacher emphasizes the word red and touches the colour on her t-shirt. Some children spontaneously react and touch some part of their clothes, some watch the others and then react, others remain motionless.)

T: *Misha, you've got something red! Look at your socks!*

(The teacher touches her socks and Misha does the same.)

T: *Let's count how many people are wearing something red. One, two … fourteen! Fourteen people are wearing something red! Let's remember fourteen.*

…

T: *If you're wearing something blue, touch it.*

(This time more children react spontaneously, some say *blue* and some begin to help others by pointing to their clothes. With gestures the teacher suggests looking also at underwear to see if the colour is there.)

T: *Here it is! Look, Michael, your vest is blue!*

T: *Let's count. One, two, … sixteen! Sixteen people are wearing something blue! Let's remember sixteen.*

…

T: *If you're wearing something yellow, touch it Look at your shoes!.*

(A number of children discover they have a yellow stripe on the edge of the shoe or the sole is yellow. They gradually begin to observe themselves and each other with increasing attention. The counting for each colour continues in the same way.)

…

T: *Now, how many are there for each colour? There are fourteen red. Let's build a line with fourteen pieces of lego. Anna, can you get the box of lego?*

(Anna goes to get a box of lego.)

T: *Let's take out fourteen red pieces. One, two ….*

(This time all the children repeat the numbers together.)

T*: Let's put them in a line this way.*

(The teacher points to the direction on the floor in which to place the pieces.)

T: *One child at a time. Marco, you take a piece and put it there. Now Jessica, you take a piece and put it there ….*

…

(The activity continues until a histogram has been created on the floor representing the relative distribution of colours.)

T: *Which colour has the most pieces*?

(The teacher gestures to the longest line and the vast majority of the children answer spontaneously)

C: *White*!

T: *How many pieces?*

(More than half of the children reply immediately)

C: *Eighteen!*

T: *And the next colour?*

C: *Blue!*

(The activity continues until all the columns of the histogram have been completed.)

Stories, rhymes and songs are clearly activities that provide language rich input in other languages, just as in Italian, and create conditions for a productive use of language, principally by repetition of key words and phrases. Activities such as bingo or memory games also show a clear link between listening, understanding and acting and subsequently beginning to produce key words related to lexical sets such as animals, means of transport or geometrical shapes. At the same time, other types of structured activities based on manipulating and painting, such as creating a collage, show interesting examples of how using other languages can create situations whereby children become used to input given in a language other than Italian ("fold", "tear", "cut", "draw", "paint", "put", "spread", "stick"…). As such activities progress, some children begin to spontaneously produce some examples, principally by giving instructions or help to other children. Although the emphasis is constantly on developing receptive competence, observation shows a gradual extension of the spontaneous use of, for example, colours, shapes and numbers in free play activities. In general, data collected shows that 62% of the teachers involved report how indicators related to languaging with proto-words, words and phrases occur in these types of activities. At times, participant observation has shown how children can move from receptive competence (demonstrated by indicators whereby they act through choosing, moving, matching, etc.) to a productive use of words. For example, by participating in an activity such as building a jigsaw puzzle, an adult can gradually make brief interventions ("We need a piece with some yellow/a piece with a straight edge/a corner piece…"), in each case accompanying the words by corresponding actions that are the principal carriers of meaning and thereby facilitators of comprehension. As children become used to this they are able to understand single words not necessarily accompanied by actions and, for example, spontaneously look for a piece that is yellow/straight/a corner. Moreover, as the activity progresses, some children begin to produce the same key words that render explicit the mental operations underlying their engagement.

A parallel kind of development is clearly manifest in the following activity where children build patterns based on identifying and manipulating shape, size and colour.

(The teacher is sitting together with a group of four children at a table. The children are 4-5 years old. They have a box with wooden geometrical shapes of different sizes and colours. The box contains a sheet with plans of some patterns to build using the shapes.)

T: *Let's look at the first plan*.

(The teacher begins looking closely at the sheet with the plans and indicates number 1 with a finger. Two of the children look at the plan and two look at the teacher. The teacher engages them with eye contact and moves a finger.)

T: *Look, here's number one! This is the top piece. What colour is it*?

(Two children answer.)

C: *Green*!

T: *What shape is it*?

(The teacher moves a finger and touches various wooden shapes in the box.)

T: *A circle? … A square? … A rectangle? … A triangle*?

(The children listen and observe, without saying anything. The teacher looks again at the plan, points to the shape and speaks with a very concentrated facial expression.)

T: *We need a triangle. A green triangle*.

(One child takes a green circle from the box and gives it to the teacher.)

T: *Well done! A green circle. Let's put it on the table. You found it, Gary, so you put it*.

(Gary puts it on the table. The teacher moves it up a little and uses gesture.)

T: *Let's put it up a bit because it's the top!*

(Two children look at the position on the table and the position on the plan and nod their heads. The teacher looks hard at the plan.)

T: *Now what do we need next? What colour is it?*

(All four children reply)

C: *Brown!*

(One child immediately takes the correct shape and colour from the box.)

T: *Well done, Miriam! What shape is it?*

(The teacher moves a finger along the sides of the shape.)

T: *One long side, two long sides, one short side, two short sides. It's a rectangle!*

(The children observe in silence and then one child slowly speaks.)

C: *Rectangle*.

T: *Well done, Gary! It's a rectangle.*

(The teacher indicates a place under the green triangle.)

T: *Giulia, can you put the brown rectangle under the green triangle?*

(Giulia places the shape in the correct place. The teacher speaks using a lot of gesture.)

T: Well done! Now let's look. There's a green triangle. It's big. There's a brown rectangle. It's big, too. Now we need … what colour?

(All the children answer.)

C: *Yellow!*

T: *Yes! Look. One, two, three, four short sides. It's a square!*

(The teacher makes a gesture to indicate the size of the square compared to the other shapes.)

T: *It's a small square.*

(All the children nod their heads vigorously. One quickly takes the appropriate shape from the box and puts it under the brown rectangle.)

T: *Yes, that's right!*

(Again the teacher uses emphatic gestures.)

T: *There's a big green triangle at the top… A big brown rectangle under the triangle … And a small yellow square under the rectangle.*

(One child points to the shape and slowly speaks.)

C: *Square.*

T: *Well done, Miriam! It's a square.*

(The other three child spontaneously repeat.)

C: *Square!*

…

(The activity continues until the pattern has been completed. Gradually other children join the group, observe and begin to participate. At a certain point the children spontaneously take the pieces they need and put them in place. The teacher merely accompanies the activity with words to describe what they are doing. Gradually all the children name the colours they are using and an increasing number pronounces or mouths the names of some shapes and sizes.)

The participant observation, discussion sessions and the teachers' answers to questionnaires demonstrate a high level of enthusiasm and involvement and desire to experiment and take on the challenge posed by developing one's own personal multilingualism within a multilingual environment (95% of all teachers reported gradually extended their use of at least language other than Italian either individually or in tandem with other colleagues). From the data collected emerges an appreciable efficacy of both the linguistic and methodological preparation of the teachers, particularly in terms of building simple and easy-to-handle scripts for given activities. Of particular importance is the building, consolidating and diversifying of the individual teachers' multilingual profiles, together with collecting resources from early years materials used in learning environments where English, French or Spanish are present, creating new materials and exchanging of good practices. Cycles of planning, acting, observation and reflection, typical of an action research-based approach, are clearly leading to consolidation and extension of types and uses of scripts that accompany routines and activities. At the same time, there is clear evidence of a gradual move from staying within the confines of limited, programmed scripts to more spontaneous ways of alternating languages which progressively spread throughout the entire day.

98% of the teachers involved report that the children involved show a positive attitude to being in a multilingual learning environment and are curious, collaborative and participatory in all aspects of

the alternating of languages. During the participant observation, whenever asked about their enjoyment of the activities or their desire to continue or do others, the children's response was almost uniquely affirmative. At the same time, 98% of parents consulted considered a multilingual learning environment to be an important aspect of their children's development and 90% of them have noticed indicators of positive attitudes manifested at home, in particular curiosity towards different languages and spontaneous use of words or phrases in the languages they encounter at school.

Conclusion

Migratory flows are rendering all societies and all the environments that constitute them increasingly multilingual in terms of the number and range of languages present. Personal multilingualism is seen both as an important factor in creating social cohesion based on mutual respect and comprehension as well as a source of cognitive and affective enrichment for all. At the same time, learning environments need to be conceived and created in order to promote these objectives.

The aim of the projects described in this paper is to create multilingual learning environments in which children (as well as teachers and caretakers) become used to alternating languages as a natural part of each daily activity. The languages used are not being formally taught, although they are gradually being learned by the children as an indirect consequence of being a part of such an environment and participating in its daily activities. There is no need to develop specific activities for the teaching/learning of other languages. All the daily activities typical of early years learning can potentially be conducted in different languages with the sole need to develop initially simple scripts that are able to sustain comprehension and participation and therefore are necessarily based on the constant use of a range of body, visual and sound languages that accompany and facilitate the carrying out of the activities.

The experience conducted so far would suggest that it is possible to give decidedly affirmative answers to the two principal questions posed in evaluating the projects. The adults and children who inhabit such an environment are clearly at ease operating within it. Moreover, their emerging personal multilingual profiles are developing in such a way as to permit an increasing level of participation at both receptive and productive levels in activities in which the alternating of different languages is a common and natural characteristic.

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