Università
Ca'Foscari
Venezia

Corso di Laurea Magistrale

in Scienze del Linguaggio

ordinamento ex D.M. 270/2004

Tesi di Laurea Magistrale

Multisensoriality And Linguistic Education

Learning Italian with Football

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Anno Accademico
2015 / 2016

Contents

Abstract

In questa tesi viene affrontata l'importanza della multisensorialità nell'apprendimento linguistico. In particolare come può essere utilizzato il calcio per l'insegnamento della lingua italiana.

Il lavoro è essenzialmente diviso in tre parti.

Nella prima parte vengono gettate le basi neuroscientifiche a sostegno dell'importanza dello sport nell'apprendimento di una lingua.

La seconda sezione serve da unione tra la prima e la terza. Vengono presentate le idee principali della didattica esperienziale di Kolb. Vengono introdotte anche le caratteristiche fondamentali del metodo di allenamento a fasi e del modello di Balboni, che servono per dare indicazioni sul tipo di attività da proporre agli studenti.

Nell'ultima parte vengono proposti alcuni materiali didattici che possono essere usati per l'insegnamento di italiano L2.

Introduzione

Questa tesi tratta di multisensorialità e apprendimento linguistico. Si concentra sull'uso del calcio nell'insegnamento della lingua italiana.

Lo studente è diventato il fulcro di attenzione dell'indagine glottodidattica, per questo hanno iniziato a diffondersi stili di insegnamento diversi. Questi metodi cercano di sfruttare gli interessi degli studenti per mantenere alta la loro motivazione. questo ho scelto di occuparmi di calcio e di come possa essere usato nell'apprendimento in un'ottica multisensoriale.

La scelta di concentrarsi sul calcio è nata da varie motivazioni. Sicuramente l'interesse personale nei confronti di questo sport è stato determinante. Il calcio è, inoltre, uno degli sport più amati e praticati al mondo. Molte life skills possono essere insegnate attraverso il calcio e trasmette valori molto importanti per la crescita personale. Aiutano a capire l'importanza di lavorare in gruppo e aiutare e supportare i propri compagni. È anche un ottimo contesto di interculturalità.

Questa tesi è divisa in tre parti principali.

La prima parte introduce le basi neuroscientifiche dell'apprendimento e l'importanza della componente multisensioriale. Nel primo capitolo vengono descritte le caratteristiche del sistema nervosa che sono principalmente coinvolte nei processi cognitive. Il secondo capitolo ha un peso maggiore all'interno della ricercar. Tratta delle teorie dell'embodiment, che sottolineano il ruolo cruciale giocato dalla componente corporea nei meccanismi cognitivi. Abbiamo cercato di concentrare l'analisi ad articoli e ricerche recenti.

La prima parte si chiude con un capitolo sulla memoria sensoriale. La scelta di introdurre un capitolo sull'argomento è dettata dal fatto che questa ha un ruolo fondamentale nella multisensorialità. L'input infatti viene presentato agli studenti sotto varie forme quindi vengono stimolate contemporaneamente le diverse memorie sensoriali.

Nella seconda parte gli argomenti sono più vari.

Per primo si incontra un capitolo sulle life skills e sull'importanza sempre maggiore che queste hanno all'interno dell'educazione. Vengono presentate brevemente le dieci life skills e poi ne viene data anche una declinazione italiana.

Anche in questo caso, il capitolo centrale è quello più importante. Si occupa dell'apprendimento esperienziale. Questo serve come base solida su cui appoggiare l'idea principale della tesi, cioè che si possa usare uno stile di insegnamento che si basa sul fare e pone il corpo al centro. Dopo aver presentato la teoria che è stata definita da Kolb, vengono presentate ricerche più attuali che si basano sul lavoro dello studioso.

L'ultimo capitolo della sezione invece presenta i metodi su cui si è basata la costruzione del materiale didattico che viene presentato nella parte finale. Per la parte di glottodidattica viene preso a modello Balboni, con le sue unità didattiche e di apprendimento. Queste unità si costruiscono secondo i principi di globalità, analisi, sintesi. Per la parte calcistica invece è stato preso come modello, il metodo a fasi di Stefano Ghisleni, usato nella scuola calcio dell'Associazione Italiana Calciatori (AIC). Questi due modelli hanno molti punti in comune e per questo sono stati scelti come base per i materiali didattici.

La tesi si conclude con una parte che contiene degli esempi di materiali didattici da poter usare in un contesto di apprendimento multisensoriale. Combinano l'insegnamento linguistico con esercizi che vengono fatti durante gli allenamenti di calcio. Viene sottolineata l'importanza di mantenere la continuità tra il lavoro fatto sul campo da calcio e quello fatto in classe. Il materiale didattico è stato scelto per essere utilizzato con dei bambini con un livello di italiano A2, quindi anche gli esercizi fisici sono stati pensati per quella fascia di età e sono stati presi da allenamenti delle categorie piccoli amici e pulcini.

PARTE 1: L'importanza delle neuroscienze nell'apprendimento linguistico

The first part of this dissertation introduces the main links between sensoriality and learning.

The first chapter deals with the very narrow relationship that exists between motion and learning. It begins with a short description of the different phases of learning. This is followed by a paragraph that explains the nervous system and the human brain. Furthermore, the notions of bimodality and directionality are analyzed. The chapter closes with a section about the importance of mirror neuron in the learning process.

The second chapter is about embodiment theories. These underline the essential role that corporeality plays in the stages of learning. The section is divided into two parts: the first one discusses a few theories of embodiment and the second point out the relevance of imitation.

A chapter about emotion and motivation follows. These elements acquired a considerable influence in the field of linguistic education.

The last chapter deals with sensory memory. It is necessary to underline the role of this kind of memory in order to understand its relevance for multisensorial education. It is divided into auditory, iconic and tactile memory. It is decisive to understand the characteristics of each one of them and how they work together.

Capitolo 1: Le basi neuroscientifiche dell'apprendimento linguistico.

This first chapter outlines the main interaction between linguistic education and neuroscience.

It opens with the definition of linguistic education and the description of its relationship with neuroscience. Afterword, we are going to point out the phases of linguistic development.

We shortly refer to the importance of the environment during the learning process.

The final part is about the nervous system and the main features involved in the learning process, such as bimodality, directionality and mirror neurons.

1.1 Glottodidattica e neuroscienze

Le neuroscienze hanno iniziato ad avere un peso sempre maggiore all'interno delle scienze linguistiche e didattiche. La glottodidattica è sempre più interessata ad approfondire questo settore, a investigare i meccanismi neuropsicologici alla base dell'apprendimento linguistico.

> "La glottodidattica non si allaccia ad una singola visione del processo apprenditivo; essa mira invece a portare avanti un discorso "teorico-pratica" in un ambito interdisciplinare, ma ritenendo, allo stesso tempo, un'autonomia epistemologica delle sue discipline scientifiche di riferimento" (Danesi M., 1998: 36).

La glottodidattica, infatti, non applica solamente teorie provenienti da altre aree di ricerca, ma ne elabora di nuove combinando saperi diversi. Questo perché l'educazione linguistica è efficace solo in ottica interdisciplinare.

> "Conoscere il funzionamento del cervello dell'allievo durante l'apprendimento è essenziale per la progettazione di percorsi didattici davvero efficaci e rispettosi delle caratteristiche dell'allievo" (Daloiso M., 2005: 133).

È per questo che le neuroscienze diventano fondamentali per l'apprendimento linguistico. Conoscere il funzionamento del cervello permette di creare percorsi didattici a misura di studente.

Le neuroscienze sono composte da diverse discipline quindi bisogna individuare quelle che possono essere utili alla glottodidattica.

1.2 Sviluppo normale del linguaggio

> "Infants begin life with the capacity to detect phonetic distinctions across all languages, and they develop a language specific phonetic capacity and acquire early words before the end of the first year"[1] (Kuhl P. K., 2009: 837).

Studi comportamentisti hanno dimostrato che i neonati possiedono una capacità universale di identificare le differenze tra contrasti fonetici usati nelle lingue del mondo già alla nascita. Questa fase viene definita Fase 1 dello sviluppo.

> "This universal capacity is dramatically altered by language experience starting as early as 6 months for vowels and by 10 months for consonants: over time, native language phonetic abilities significantly increase (Cheour et al., 1998; Kuhl et al., 2006; Kuhl, Williams, Lacerda, Stevens, & Lindblom, 1992; Rivera-Gaxiola, Silva-Pereyra, & Kuhl, 2005; Sundara, Polka, & Genesee, 2006) while the ability to discriminate phonetic

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Questa traduzione, come quelle che seguono, sono state fatte da chi ha scritto la tesi.

[1] "i neonati iniziano la vita con la capacità di identificare distinzioni fonetiche in tutte le lingue e sviluppano una capacità fonetica di una lingua specifica e di acquisire le parole precoci entro la fine del primo anno"

> contrasts that are not relevant to the language of the culture declines”[2] (Kuhl P. K., 2009: 839-840).

Alla fine del primo anno, il cervello del bambino si è ormai specializzato solo nella lingua a cui è stato esposto (fase 2). Non è quindi più programmato per l’apprendimento di tutte le lingue.

> “The explanation of this transition from Phase 1 to Phase 2 has become the focus of intense study because it illustrates the interaction between biology and culture between infants’ initial state and infants’ abilities to learn. Speech offers the opportunity to study the brain’s ability to be shaped implicitly by experience”[3] (Kuhl P. K., 2009: 840).

Studi recenti hanno evidenziato come i neonati siano soggetti ad apprendimento fonetico a 9 mesi dall’esposizione a una nuova lingua. Questo, però, avviene solo se l’esposizione è diretta e di persona. Non si verifica se l’esposizione avviene, ad esempio, con la televisione o la radio.

> “Social interaction appears to be a critical component for language learning, a finding that ties early communicative learning in speech to examples of communicative learning in neurobiology more generally”[4] (Kuhl P. K., 2009: 842).

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[2] "Questa capacità universale è drammaticamente alterata dall'esperienza linguistica a partire dai 6 mesi per le vocali e entro i 10 mesi per le consonanti; col tempo le abilità fonetiche della lingua nativa aumentano significativamente (Cheour et al., 1998; Kuhl et al., 2006; Kuhl, Williams, Lacerda, Stevens, & Lindblom, 1992; Rivera-Gaxiola, Silva-Pereyra, & Kuhl, 2005; Sundara, Polka, & Genesee, 2006) mentre l'abilità di distinguere contrasti fonetici che non sono rilevanti al linguaggio della cultura diminuisce"

[3] "La spiegazione di questa transizione dalla Fase 1 alla Fase 2 è diventata il focus di un studio intenso perché mostra l'interazione tra biologia e cultura, tra lo stato iniziale dei neonati e l'abilità dei neonati di imparare. Il discorso offre l'opportunità di studiare l'abilità del cervello di essere modellato implicitamente dall'esperienza"

[4] "L'interazione sociale appare essere una componente critica per l'apprendimento linguistico, una scoperta che lega l'apprendimento comunicativo precoce nel linguaggio a esempi di apprendimento comunicativo più generalmente in neurobiologia"

Tra il 18esimo e il 24esimo mese di età, il vocabolario aumenta improvvisamente, L'apprendimento delle parole inizia molto prima.

I neonati dimostrano

> "recognition of their own name at 4.5 months (Mandel, Jusczyk, & Pisoni, 1995). At 6 months, infants use their own names or the word Mommy in an utterance to identify word boundaries (Bortfeld, Morgan, Golinkoff, & Rathbun, 2005) and look appropriately to pictures of their mother or father when hearing Mommy or Daddy (Tincoff & Jusczyk, 1999). By 7 months, infants listen longer to passages containing words they previously heard rather than passages containing words they have not heard (Jusczyk & Hohne, 1997), and by 11 months infants prefer to listen to words that are highly frequent in language input over infrequent words (Halle & de Boysson-Bardies, 1994)"[5] Kuhl P. K., 2009: 843).

> "There is evidence suggesting that young children's word representations are phonetically underspecified. Children's growing lexicons must code words in a way that distinguishes words from one another, and, given that by the end of the first year infants' phonetic skills are language specific (Best & McRoberts, 2003; Kuhl et al., 2006; Werker & Tees, 1984), it was assumed that children's early word representations were phonetically detailed. However, studies suggest that learning new words taxes young children's capacities, and that as a result, new word representations are not phonetically complete"[6] (Kuhl P. K., 2009: 843).

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[5] "Il riconoscimento del proprio nome a 4,5 mesi (Mandel, Jusczyk, e Pisoni, 1995). A 6 mesi, i neonati usano il loro nome o la parola Mamma in frasi per identificare i confini della parola (Bortfeld, Morgan, Golinkoff e Rathbun, 2005) e guardano in modo appropriato a foto della loro madre o padre quando sentono Mamma o Papà (Tincoff e Jusczyk, 1999). Entro i 7 mesi, i neonati ascoltano più a lungo a passaggi che contengono parole che hanno sentito in precedenza piuttosto che a passaggi che contengono parole che non hanno sentito prima (Jusczyk e Hohne, 1997) e entro gli 11 mesi neonati preferiscono ascoltare parole che sono molto frequenti nell'input linguistico piuttosto che parole non frequenti (Halle e de Boysson-Bardies, 1994)

[6] "Ci sono prove che suggeriscono che le rappresentazioni delle parole dei bambini sono *underspecified*. Il crescente lessico dei bambini deve codificare le parole in modo da distinguere una parola dall'altra e, dato che entro la fine del primo anno le abilità fonetiche dei bambini sono specifiche (Best & McRoberts, 2003; Kuhl et al., 2006; Werker & Tees, 1984), si suppone che le

Per capire frasi, un bambino deve avere abilità fonologiche tali che gli permettano la segmentazione del discorso in parole e l'abilità di carpire il significato delle parole.

Inoltre,

> "the relationship among words composing the sentence-between a subject, its verb, and its accompanying object-must be deciphered to arrive at a full understanding of the sentence"[7] (Kuhl P. K., 2009: 844).

Sono state registrate nei bambini componenti elettrofisiologiche per poter scoprire quando e come il cervello decodifichi le informazioni sintattiche e semantiche delle frasi.

1.3 Il sistema nervoso e il cervello

Il cervello umano è costituito da miliardi di cellule nervose interconnesse tra di loro, i neuroni. Questi trasportano, scambiano ed elaborano le informazioni.

I neuroni si organizzano in gruppi cellulari, moduli neuro-funzionali, che si specializzano in una funzione precisa.

> "Affinché i moduli neuro-funzionali possano formarsi e stabilizzarsi, è fondamentale l'interazione con l'ambiente: solo in seguito a specifici input ambientali i canali nervosi possono diventare permanenti, rafforzando le connessioni sinaptiche associate a quell'input, ed eliminando le altre" (Daloiso M., 2009: 27).

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rappresentazioni delle prime parole dei bambini siano foneticamente dettagliate. In ogni caso, studi suggeriscono che l'apprendimento di nuove parole metta alla prova le capacità dei bambini piccoli e che, come risultato, le rappresentazioni delle nuove parole non siano foneticamente complete"

[7] "la relazione tra le parole che compongono la frase-tra il soggetto, il suo verbo e il relativo oggetto-deve poter essere decifrata per poter giungere a una piena comprensione della frase"

L'esperienza, oltre che nell'apprendimento, ha un ruolo essenziale anche nell'organizzazione cerebrale delle funzioni cognitive. L'ambiente sembra essere fondamentale nei cambiamenti cerebrali.

> "Un ambiente di apprendimento ricco di stimolazioni dirette ad una particolare funzione cognitiva incide fortemente sullo sviluppo cerebrale, aumentando le rappresentazioni neuronali nelle aree che processano tale funzione" (Daloiso M., 2009: 27).

Secondo Paradis, esistono quattro moduli neuro-funzionali interdipendenti, ma autonomi che controllano la competenza linguistica, la competenza metalinguistica, la pragmatica e le dinamiche emotive e motivazionali.

La competenza linguistica comprende

> "una serie di sub-sistemi modulari deputati all'elaborazione distinta delle dimensioni morfosintattica, lessicale-semantica e fonologica; le competenze controllate da questo modulo sono in larga misura automatizzate e coinvolgono i magazzini della memoria implicita, che consente l'apprendimento di procedure e sequenze di azioni" (Daloiso M., 2009: 27-28).

La competenza metalinguistica è

> "la conoscenza esplicita delle regole di funzionamento della lingua; in questo modulo risiedono nozioni enciclopediche sulla lingua apprese coscientemente, che dunque in gran parte coinvolgono i magazzini semantici della memoria esplicita, la quale viene attivata per la memorizzazione e la rielaborazione di concetti e nozioni" (Daloiso M., 2009: 28).

La pragmatica si trova nelle aree corticali dell'emisfero destro e

> "opera in sinergia con il modulo della competenza linguistica, in quanto ne influenza le scelte ad ogni livello di elaborazione linguistica" (Daloiso M., 2009: 28).

Il sistema limbico controlla le dinamiche emotive e motivazionali. Il sistema limbico è il

> "centro di controllo e valutazione emotiva dell'input, la cui attivazione positiva rappresenta un prerequisito al buon funzionamento degli altri moduli neuro-funzionali" (Daloiso M., 2009: 28).

Le funzioni principali del sistema nervoso sono tre: sensoriale, integrativa e motoria.

> "Il segnale linguistico è prodotto e percepito a livello di sistema nervoso, che al tempo stesso è la sede del pensiero e provvede al controllo delle funzioni corporee, raccogliendo informazioni di senso da tutto l'organismo e trasmettendole mediante vie nervose (sistema nervoso periferico) al midollo spinale e al cervello" (Danesi M., 1998: 40).

Il sistema nervoso

> "is built up of nerve cells, neurons, and special kinds of supporting cells, glial cells. The nerve cells are responsible for the functions that are unique to the nervous system, whereas the glial cells are non-neuronal cells that primarily support and protect the neurons"[8] (Brodal P., 2010: 5).

Il neurone è composto

> "of a cell body called the soma and several processes. Multiple short dendrites extend the receiving surface of the neuron, while a single axon conducts nerve impulses to other neurons or to muscle cells. Neurons are

[8] "è costruito da cellule nervose, neuroni e un tipo specifico di cellule di supporto, cellule gliali. Le cellule nervose sono responsabili delle funzioni che sono specifiche del sistema nervoso, mentre le cellule gliali sono cellule non neuronali che principalmente supportano e proteggono i neuroni".

> characterized by their ability to respond to stimuli with an electrical discharge, a nerve impulse, and, further, by their fast conduction of the nerve impulse over long distances"[9] (Brodal P., 2010: 5).

In questo modo I segnali possono essere trasmessi in millisecondi.

> "When the nerve impulse reaches the synapse, which is the site of contact between the axon and the nest neuron, a substance called a neurotransmitter is released from the axon terminal that conveys a chemical signal from one neuron to the next"[10] (Brodal P., 2010: 5).

Il talamo

> "consists of many smaller nuclei and is a relay station for almost all information transmitted from the lower parts of the CNS to the cerebral cortex (notably most kinds of sensory information)"[11] (Brodal P., 2010: 87).

Inoltre, ha

> "a decisive influence on the general level of neuronal activity of the cerebral cortex and thus on the level of consciousness and attention"[12] (Brodal P., 2010: 192).

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[9] "di un corpo cellulare detto soma e parecchi processi. Molti dendriti corti espandono la superficie di ricezione del neurone, mentre un singolo assone conduce gli impulsi nervosi a altri neuroni o cellule muscolari. I neuroni sono caratterizzati dalla loro capacità di rispondere agli stimoli con una scarica elettrica, un impulso nervoso e, inoltre, con la loro capacità di trasporto rapido dell'impulso nervoso sulla lunga distanza"

[10] "Quando l'impulso nervosa raggiunge le sinapsi, che sono il luogo di contatto tra l'assone e il nido del neurone, una sostanza detta neurotrasmettitore è rilasciata dalla terminazione dell'assone che invia un segnale chimico da un neurone all'altro"

[11] "consiste di molti nuclei più piccoli ed è la stazione di relazione per quasi tutte le informazioni trasmesse dalle parti inferiori del CNS alla corteccia cerebrale (soprattutto informazioni di tipo sensoriale)"

[12] "un'influenza decisiva sul livello generale di attività neuronale della corteccia cerebrale e quindi a livello di coscienza e attenzione"

Penfield e Roberts sostengono che il talamo riesca ad integrare le aree linguistiche frontali e parietali, mentre Ojemann crede che la parte sinistra del talamo sia coinvolta nei processi della memoria a breve termine.

Un altro elemento costituivo essenziale è il sistema limbico.

Il sistema limbico è

> "a group of interconnected cortical and subcortical structures dedicated to linking visceral states and emotion to cognition and behaviour"[13] (Catalani M., Dell'Acqua F., de Schotten M. T., 2013: 1725).

Due aree cerebrali molto importanti per l'apprendimento sono l'area di Broca e l'area di Wernicke.

L'area di Broca si trova davanti alla corteccia premotoria. L'area di Broca

> "does not relate only to speech; this area also become active during execution of hand and arm movements"[14] (Lian A., 2016: 115).

L'area di Wernicke

> "corresponds to the language auditory processing area in the left hemisphere"[15] (Ardila A., Bernal B., Rosselli M., 2016: 2).

Quest'area riceve e interpreta le informazioni sensoriali provenienti dai lobi.

[13] "un gruppo di strutture corticali e subcorticali interconnesse dedicate al collegamento di stati viscerali ed emozioni all'apprendimento e al comportamento"
[14] "non riguarda solo il discorso; quest'area si attiva anche durante l'esecuzione di movimenti con la mano e il braccio"
[15] "corrisponde all'area di elaborazione del linguaggio uditivo nell'emisfero sinistro"

1.4 Bimodalità

La visione bimodale è stata proposta da Danesi nel 1986 e cerca di coniugare glottodidattica e neuroscienze.

> "Riconoscendo l'importanza che concetti come lateralità, dominanza emisferica, periodo critico e plasticità cerebrale rivestono in funzione dell'apprendimento e dell'acquisizione linguistica, tale visione vuole tutt'oggi chiarire meglio la natura di questi rapporti inquadrandoli nell'ambito della glottodidattica" (Danesi M., 1998: 39).

Secondo Danesi, l'apprendimento linguistico è quindi

> "un processo neurologicamente bilaterale (principio di bimodalità) in cui è coinvolto innanzitutto l'emisfero destro e successivamente quello sinistro (principio di direzionalità" (Caon F., 2008: 62).

Le sue ricerche hanno evidenziato

> "il ruolo fondamentale dell'emisfero destro (motorio, analogico, globale, emozionale) nell'apprendimento e uso del linguaggio accanto a quello sinistro (logico, sequenziale, razionale) ove sono collocati i centri nervosi deputati all'elaborazione linguistica" (Caon F., 2008: 62).

1.5 Neuroni a specchio

Il nostro sistema sensoriale processa le azioni compiute da terzi di fronte ai nostri occhi. Questa informazione viene successivamente rielaborata e confrontata con altri dati simili precedentemente immagazzinati. Al termine di questo processo, sappiamo cosa sta facendo l'altra persona.

> "The actions done by others after being processed in the observer's visual system, are directly mapped on his or her motor representations without

> any need of cognitive mediation."[16] (Rizzolatti G., Fogassi L., Gallese V., 2009: 625).

La scoperta dei neuroni specchio porta

> "strong evidence in favor of the existence of a direct mechanism of understanding others' actions by matching them on the observer's own motor system"[17] (Rizzolatti G., Fogassi L., Gallese V., 2009: 625).

I neuroni specchio

> "are a distinct class of visuomotor neurons that discharge both when individuals perform a specific motor act and when they observe the same motor act done by another individual. Among the motor acts that they code both visually and motorically, the most represented are grasping, holding, manipulating, and tearing."[18] (Rizzolatti G., Fogassi L., Gallese V., 2009: 627-628).

I neuroni specchio evidenziano una relazione molto stretta tra le risposte motorie e quelle visive.

> "Using a classification criterion the congruence between the executed and observed motor acts that are effective in triggering them, mirror neurons have been subdivided into two broad classes: strictly congruent and broadly congruent neurons"[19] (Rizzolatti G., Fogassi L., Gallese V., 2009: 628).

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[16] "Le azioni fatte da terzi dopo essere processate nel sistema visivo dell'osservatore, sono direttamente mappate nelle sue rappresentazioni motorie senza bisogno di nessuna mediazione cognitiva"

[17] "prove forti dell'esistenza di un meccanismo di comprensione diretta delle azioni compiute da altri confrontandole con il proprio sistema motorio"

[18] "I neuroni specchio sono una classe distinta di visoneuroni che scaricano sia quando gli individui fanno uno specifico atto motorio sia quando lo osservano fatto da altri. Tra gli atti che codificano sia visivamente che motoricamente, i più rappresentati sono afferrare, trattenere, manipolare e strappare"

[19] "Utilizzando un criterio di classificazione tra gli atti motori eseguiti e gli atti motori osservati che sono efficaci nel provocarli, si possono distinguere due classi di neuroni specchio: neuroni strettamente e largamente congruenti"

Vengono detti

> "strictly congruent when the observed and executed effective motor acts are identical in terms of goal (e.g., grasping) and in terms of the way in which that goal is achieved (e.g., precision grip)"[20] (Rizzolatti G., Fogassi L., Gallese V., 2009: 628-629).

Sono invece detti,

> "broadly congruent when there is a similarity, but not identity, between the observed and executed effective motor acts."[21] (Rizzolatti G., Fogassi L., Gallese V., 2009: 629).

L'ipotesi maggiormente condivisa sul quale ruolo funzionale ricoprano i neuroni specchio è quella che li vede tra i protagonisti principali della comprensione dell'obbiettivo dell'azione osservata. Viene proposto il seguente meccanismo:

> "individuals know the outcome of their motor acts. Thus, when the mirror neurons of an observing individual, which code a given motor act (e.g., grasping), discharge in response to the observation of that motor act (grasping) done by another individual, the observer understands its goal, because that discharge corresponds to the one that occurs when the observer wants to achieve the same goal."[22] (Rizzolatti G., Fogassi L., Gallese V., 2009: 629).

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[20] "Strettamente congruenti quando gli atti motori osservati e effettivamente eseguiti sono identici in termini di obiettivo (ad es. afferrare) e in termini di modo in cui l'obiettivo è ottenuto (presa di precisione)"

[21] "Largamente congruenti quando c'è una similarietà, ma non un'identità tra l'atto motorio osservato ed eseguito"

[22] "Gli individui conoscono il risultato dei loro atti. Così, quando I neuroni specchio di un individuo che osserva, che codifica un dato atto motorio (afferare), scaricano in risposta all'osservazione di quell'atto motorio (afferrare) fatto da un altro individuo, l'osservatore capisce il suo obiettivo, perché quello scarico corrisponde3 a quello che accade quando l'osservatore vuole raggiungere lo stesso obiettivo."

I ricercatori hanno effettuato numerosi esperimenti su questo tipo di neuroni. Kohler, ad esempio, si è occupato di indagare se questo tipo di neuroni potessero riconoscere degli atti motori solamente attraverso il loro suono.

> "It was found that many mirror neurons that had responded to visual observation of acts accompanied by sounds also responded to the sound alone. These neurons were named "audiovisual" mirror neurons."[23] (Rizzolatti G., Fogassi L., Gallese V., 2009: 630).

Recentemente, Ferraresi, Gallese, Rizzolati e Fogassi hanno approfondito gli studi al riguardo i neuroni specchio. Da questi è emersa l'esistenza di altri due tipi di neuroni specchio: *ingestive* e *communicative mirror neurons*.

> "The response characteristics of mirror neurons appear to show that the observed action of another individual activates the same motor programme that the observer would need to use to perform that action"[24] (Catmur C., 2013: 21).

[23] "È stato compreso che molti neuroni specchio che hanno risposto a osservazioni visive di atti accompagnati da suono rispondevano anche al solo suono. Questi neuroni sono stati chiamati neuroni specchio audiovisivi"

[24] "La risposta caratteristica dei neuroni specchio sembra mostrare che l'azione osservata di un altro individuo attiva lo stesso programma motorio di cui l'osservatore avrebbe bisogno per eseguire quell'azione"

Capitolo 2: *Embodiment*

The second chapter tackles embodiment. In this section, I'm going to point out the main components of the theories of embodiment.

These theories highlight the value of the corporeal component in the learning process.

The chapter is divided in two. The first part describes different approaches to the theory of embodiment and the second draws attention to imitation.

2.1 Teorie dell'embodiment

Il rapporto tra linguaggio e movimento ha iniziato ad essere sottoposto ad un'intensa indagine perché la lingua è ricca di azioni e oggetti. Secondo le teorie dell'*embodiment*

> "there is no separation between the so-called "low" cognitive processes, such as perception and action, and "high" cognitive processes, such as language and thought, embodiment links the individual sensorimotor experiences with higher cognitive functions such as language processing and comprehension "[25] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 711).

La visione *embodied*, applicata al linguaggio,

> "claim that when we understand words, the same sensorimotor areas are recruited as for interacting with the objects and entities the words

[25] "Non c'è nessuna separazione tra i cosiddetti processi cognitivi bassi, come la percezione e l'azione, e i processi cognitivi alti, come il linguaggio e il pensiero. L'embodiment connette le esperienze sensimotorie individuali con funzioni cognitive superiori come il processare il linguaggio e la comprensione"

> refer to."[26] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 711).

Secondo lo stesso ragionamento,

> "when we comprehend sentences, we internally simulate the state of the world the sentences describe"[27] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 711).

Grazie alle ricerche e agli esperimenti di accademici come Gallese, Barsalou, Fischer, Zwaan e Pulvermüller, è stato scoperto che nel processo di comprensione linguistica viene attivata una simulazione motoria ed è coinvolto il sistema motorio.

In un contesto neuroscientifico, questo significa che

> "brain areas related to action and language can no be longer be seen as independent, but rather working in concert."[28] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 712).

Le teorie *embodied* pongono i neuroni a specchio alla base della simulazione attivata durante la comprensione linguistica.

> "Mirror neurons are not only firing during active motion, but they are also triggered by observing a conspecific performing action with objects"[29] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 713).

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[26] "Afferma che quando capiamo le parole, le stesse aree sensimotorie sono reclutate per interagire con gli oggetti e le entità a cui le parole si riferiscono"

[27] "Quando comprendiamo le frasi, internamente simuliamo lo stato del mondo che le frasi descrivono"

[28] Aree del cervello relative all'azione e al linguaggio non possono più essere viste come indipendenti, ma piuttosto lavorano insieme"

[29] "I neuroni specchio non sono solo si attivano durante le azioni motorie, ma sono anche stimolati durante l'osservazione di specifici atti motori con oggetti"

L'area di Broca è

> "is the core region of the MNS and implies an additional link between motor processing and speech, the whole MNS possibly also has an impact on language processing and comprehension"[30] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 713).

Rizzolatti e Arbib sostengono che i neuroni specchio rivestano un ruolo importante nelle fasi immediatamente precedenti allo sviluppo del linguaggio, nonostante non intervengano in modo diretto nella comprensione.

> "This leads to the conclusion that the involvement of motor regions in language processing is closely linked to regions of the mirror neuron system, thus possibly relying on using mirror neurons to integrate sounds and actions or even to simulate in order to understand action words"[31] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 713).

Le teorie dell'*embodiment* si sono occupate anche delle basi del linguaggio astratto. Queste teorie sostengono che

> "abstract concepts, just like concrete ones, are grounded in the sensorimotor system"[32] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 713).

Le posizioni più estreme sostengono che

[30] "la regione principale del sistema dei neuroni specchio e questo implica un'ulteriore connessione tra l'attività motoria e il linguaggio, l'intero sistema probabilmente ha impatto sull'elaborazione e comprensione linguistica"

[31] "Questo porta alla conclusione che il coinvolgimento delle regioni motorie nell'elaborazione del linguaggio è strettamente legata alle regioni del sistema dei neuroni specchio, in modo di fare affidamento sui neuroni a specchio per integrare suoni e azioni o perfino per simulare in modo da capire le parole-azioni"

[32] "I concetti astratti, come quelli concreti hanno le basi nel Sistema sensimotorio"

> “both the literal and the more abstract meaning of language (e.g., ‘‘grasp” in the context of ‘‘grasping an apple” and in the context of ‘‘grasping a notion”) are processed in the same neural units”[33] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 713).

Studi successivi hanno dimostrato che questa posizione però è troppo estrema.

È stato dimostrato che

> “First, verbs and nouns are possibly processed differently regarding their abstractness, and second, that different levels of derivation from a word’s literal meaning might lead to different activations”[34] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 714).

La dimostrazione della base sensimotoria delle parole astratte è limitata a un dominio specifico.

> “One core issue in discussing embodied language lies in the question whether the involvement of sensorimotor areas is auxiliary, concomitant, or necessary for language processing and comprehension”[35] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 714).

La maggior parte degli studi dimostra che

> “that the motor system is activated during words and sentences processing, there is some controversial evidence, and some issues remain

[33] “sia il significato letterale che quello più astratto del linguaggio (per esempio “afferrare” nel contesto di “afferrare una mela” e “afferrare un concetto”) sono elaborati nelle stesse unità neurali”
[34] “In primo luogo, sostantivi e verbi sono verosimilmente processati in modo diverso in base al tipo di astrazione e, in secondo luogo, che differenti livelli di derivazione dal significato letterale di una parola può portare a diverse attivazioni”
[35] “Una questione essenziale nel discutere il linguaggio incarnate sta nel chiedersi se il coinvolgimento nelle aree sensimotorie sia ausiliario, concomitante, o necessario per il processare il linguaggio e la comprensione”

open”[36] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 714).

Le idee principale a supporto di un coinvolgimento essenziale del sistema motorio nella comprensione linguistica sono due.

Esistono forti prove che

> “the integrity of the motor system is necessary for verb processing. It can be claimed that lesions of the motor system selectively impair language processing, and particularly verb comprehension”[37] (Jirak D., Menz M. M., Buccino G., Borghi A. M., Binofski F., 2010: 714).

Questo è in accordo con la teoria che un sistema motorio integro possa essere parte del processo di comprensione. La seconda idea, invece, sarebbe un’attivazione precoce del sistema motorio.

2.2 *Imitazione*

> “Within the EC approach, some authors emphasize the importance of action for cognition and the role played by bodily states, others highlight more generally the role of grounding for cognition and equate embodied cognition with situated cognition”[38] (Borghi A. M., Cimatti F., 2010: 763).

[36] “il sistema motorio si attivi durante l’elaborazione di parole e frasi, ci sono delle prove ambigue e alcune questioni rimangono aperte”

[37] “L’integrità del sistema motoria è necessario per processare I verbi. Si può affermare che le lesioni del Sistema motorio influenzino selettivamente il processamento del linguaggio, in particolare la comprensione verbale”

[38] “Nell’approccio EC, alcuni autori enfatizzano l’importanza delle azioni per l’apprendimento e il ruolo giocato dagli stati corporei, altri sottolineano più in generale il ruolo delle basi cognitive e equivalgono embodied cognition e situated cognition.”

Barsalou afferma che

> "Grounded cognition reflects the assumption that cognition is typically grounded in multiple ways, including simulations, situated action, and, on occasion, bodily states"[39] (Barsalou, 2009: 617).

Da ciò deriva la creazione di due visioni differenti della cognizione e della base del linguaggio, di la prima da un ruolo cruciale all'azione.

Nel contesto della cognizione motoria, alcuni autori, come Decety e Ingvar, considerano l'imitazione

> "as a conscious process, not aimed at understanding others' minds but rather depending on a deliberate reactivation of previously performed actions" [40] (Borghi A. M., Cimatti F., 2010: 763).

Le nozioni di imitazione che vengono utilizzate sono diverse. Una sostiene che la

> "simulation is a form of prediction which is useful to prepare an action and to comprehend it"[41] (Borghi A. M., Cimatti F., 2010: 764).

Nell'altra

> "the role of prediction and anticipation of motor outcome is less relevant and simulation is mainly a form of re-enhancement of past sensorimotor experience".[42] (Borghi A. M., Cimatti F., 2010: 764).

Nonostante esistano alcune prove contrarie,

> "the fast activation, the automaticity and the somatotopic organization of the motor system renders the hypothesis very unlikely, that information is first transduced in an abstract format and then influences

[39] "La cognizione incarnata riflette il presupposto che la cognizione è generalmente incarnata in diversi modi, inclusi l'imitazione, l'azione localizzata e, in certi casi, stati corporei"
[40] "Come un processo conscio, non mirato a capire le menti degli altri ma piuttosto a dipendere su una deliberata riattivazione delle azioni precedentemente svolte"
[41] "L'imitazione è una forma di previsione che è utile a preparare un'azione e a comprenderla"
[42] "Il ruolo della precisione e dell'anticipazione del risultato motorio è meno rilevante e la simulazione è più che altro una forma di rinforzo dell'esperienza sensimotoria passata"

> the motor system. The hypothesis that the motor system is activated in a direct and straightforward way is much more plausible and economical"[43] (Borghi A. M., Cimatti F., 2010: 766).

Le teorie dell'*embodiment* considerano il ruolo del corpo e delle parti del corpo in due modi differenti.

- "Behavioral and brain imaging studies show that simply seeing the body parts of another person (e.g., the hand) might activate a motor resonance performance"[44] (Borghi A. M., Cimatti F., 2010: 766).
- "Studies on language show that, while comprehending action sentences, body parts are automatically activated"[45] (Borghi A. M., Cimatti F., 2010: 766).

Questo indica che l'imitazione

> "is sensitive to proximal aspect, i.e. to our body parts, even if the task does not require explicit activation of them"[46] (Borghi A. M., Cimatti F., 2010: 767).

Ciò non significa che

> "we are conscious of the fact that our body parts are activated during comprehension—it is rather a form of covert, implicit activation"[47] (Borghi A. M., Cimatti F., 2010: 767).

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[43] "La veloce attivazione, l'automaticità e l'organizzazione somatotopica del sistema motorio rendono l'ipotesi molto poco probabile, quell'informazione è prima tradotta in un formato astratto e poi influenza il sistema motorio. L'ipotesi che il sistema motorio sia attivato in un modo diretto è molto più plausibile e economica"

[44] "Gli studi comportamentali e delle immagini cerebrali mostrano che semplicemente vedere le parti di un'altra persona (ad es. una mano) può attivare una performance di risonanza motoria"

[45] "Studi sul linguaggio mostrano che, mentre comprendere le frasi di azione, le parti del corpo sono attivate automaticamente"

[46] "È sensibile all'aspetto prossimale, cioè per le nostre parti del corpo, anche se il compito non richiede un'attivazione esplicita di esse"

[47] "siamo coscienti del fatto che le parti del nostro corpo sono attivate durante la comprensione-si tratta piuttosto di una forma celata e implicita di attivazione"

Capitolo 3: Emozioni

The third chapter emphasises the importance of motivation and emotion in the acquisitional process.

Emotion plays a crucial role when someone is learning. A stressful situation could activate the affective filter and compromise the acquisition.

3.1 Il ruolo delle emozioni

Le emozioni influenzano i processi mnemonici ed è fondamentale capire in che modo. Le esperienze che viviamo tutti i giorni, infatti, sono accompagnate da reazioni emotive, soprattutto quelle che ricordiamo meglio.

> "La decisione di trasferire le esperienze dal compartimento a breve termine a quello a lungo termine viene presa molto spesso su base emozionale. Se un evento della nostra vita ha una forte connotazione emotiva, è più facile che venga fissato nella memoria, mentre eventi emotivamente neutri rimangono indietro." (Bonicelli E., 2000 in Daloiso M., 2009: 41)

Queste parole sottolineano come i meccanismi emozionali giochino un ruolo fondamentale durante il processo di apprendimento. Sono fondamentali non solo nella selezione, ma anche nella fissazione delle informazioni nella memoria. La neuropsicologia, però, fa riferimento anche dinamiche non coscienti, presentando un quadro più complesso. Daloiso coniuga questi due scenari e propone la visione per cui la "volontà di apprendimento" si realizza con il coinvolgimento dell'allievo a livello di emozioni, sentimenti e motivazione.

Le emozioni sono definite come

> "risposte spontanee, inconsce dell'organismo a determinate condizioni ambientali, legate a mutamenti somatici del sistema nervoso; alcune

> emozioni sono da considerarsi innate (emozioni primarie), come ad esempio gioia, tristezza, collera, paura, mentre altre sono determinate dal contesto socio-culturale di appartenenza (emozioni secondarie), come il senso di colpa, la vergogna, l'ansia da prestazione" (Daloiso M., 2009: 42).

I sentimenti, invece, sono

> "una rielaborazione e rappresentazione cosciente delle emozioni – sentirsi felice, triste, arrabbiato, impaurito, a disagio, ecc." (Daloiso M., 2009: 42)

La motivazione,

> "una serie di dinamiche psicologiche coscienti che consentono al soggetto di voler apprendere, compiendo scelte precise– ad esempio, decidere di iscriversi ad un corso di lingua, compiere un viaggio all'estero, ecc. – finalizzate al soddisfacimento dei propri bisogni" (Daloiso M., 2009: 42).

Questi tre elementi sono collegati tra loro e si condizionano a vicenda. Emozioni, sentimenti e motivazione sono

> "regolate dal sistema limbico, sede di controllo sia delle emozioni che di aspetti legati all'apprendimento" (Daloiso M., 2009: 43).

Di questo fanno parte tre elementi fondamentali: l'amigdala, l'ipotalamo e l'ippocampo.

L'amigdala, definita da Le Doux come il computer dell'emozionalità, è in connessione con altre strutture nervose e crea due tipi di circuiti: il circuito subcorticale, che

> "trasmette le informazioni direttamente dal talamo sensoriale, valutando in modo rapido e immediato l'input e predisponendo risposte

> tempestive, soprattutto per difesa in situazioni pericolose" (Daloiso M., 2009: 43).

e il circuito corticale, che

> "connette l'amigdala ai sistemi sensoriali e permette i processi cognitivi superiori di valutazione degli eventi emotigeni e attribuzione di un significato emotivo" (Daloiso M., 2009: 43).

L'ipotalamo organizza

> "il sistema autonomo (simpatico e parasimpatico) e regola i rapporti tra ambiente ed organismo, producendo risposte automatiche rispetto a determinati stimoli e controllando gli istinti naturali (autodifesa, aggressione)" (Daloiso M., 2009: 43).

L'ippocampo è fondamentale per l'apprendimento.

> "È alla base della memoria esplicita e consente l'immagazzinamento delle informazioni nel cervello" (Daloiso M., 2009: 43).

In una situazione di stress

> "si innesca un meccanismo neurochimico che blocca la noradrenalina, un neurotrasmettitore che favorisce la memorizzazione. Le ghiandole surrenali producono l'ormone dello stress, che serve a predisporre il corpo a reagire alla situazione di difficoltà. La produzione di tale ormone è regolata dall'amigdala, la quale in condizione di pericolo ne richiede un'ulteriore produzione, che giunge al cervello interessando l'ippocampo e la corteccia prefrontale" (Daloiso M., 2009: 44).

Anche Cardona sottolinea come durante un'attività che potrebbe minare l'autostima,

> "si crea una relazione di antagonismo tra l'amigdala, che per far fronte alla situazione richiede ulteriore immissione dell'ormone nel sangue e

> l'ippocampo, che invece cerca di regolarne e limitarne la quantità" (Daloiso M., 2009: 44).

Questa situazione di stress prolungato può interferire nel processo di apprendimento: lo studente infatti non è più in grado di fissare le informazioni, memorizzarle o recuperarle dalla memoria.

La *Stimulus Appraisal Theory* di Schumann viene utilizzata per spiegare

> "la trasformazione delle emozioni in sentimenti coscienti e spinte motivazionali" (Daloiso M., 2009: 45).

Secondo questa prospettiva,

> "il cervello dello studente riceve continuamente input provenienti dall'ambiente circostante. L'allievo rapporta l'input alle proprie aspettative, e ai propri bisogni e desideri. Sulla base di questo confronto le informazioni ambientali vengono giudicate in modo positivo o negativo. Nel primo caso esse vengono inviate dalla memoria di lavoro ai centri cerebrali deputati all'elaborazione ed immagazzinamento delle informazioni; nel secondo caso l'input viene bloccato fino a che la relativa traccia mnestica non decade" (Daloiso M., 2009: 45).

Scherer, Ekman e Schumann hanno identificato i criteri usati per valutare le informazioni. Queste vengono giudicate in base alla novità, alla piacevolezza intrinseca, alla pertinenza rispetto ai bisogni e agli obiettivi, alla realizzabilità e alla sicurezza psico-sociale.

L'input viene valutato in base alle emozioni che suscita. Le emozioni non sono incontrollabili, sono

> "interconnesse ai processi cognitivi e sono la conseguenza di un'attività di conoscenza e valutazione della situazione in riferimento alle sue implicazioni per il benessere dell'individuo e per il soddisfacimento dei suoi scopi" (Daloiso M., 2009: 45).

Molte ricerche hanno dimostrato che le esperienze che ci hanno suscitato delle emozioni tendono a essere ricordate meglio, rispetto a quelle in cui non ci sentiamo coinvolti.

> "neuroimaging studies that reveal strong correlations between the amount of activity in the amygdala and in visual processing regions including the fusiform gyrus (e.g., Noesselt, Driver, Heinze, & Dolan, 2005; Vuilleumier, Richardson, Armony, Driver, & Dolan, 2004) and occipital lobe (Tabert et al., 2001; figure 49.2A) during the processing of emotional information"[48] (Kensinger E. A., 2009: 725).

Ciò che provocano le emozioni durante i processi di codificazione mermette di capire perché un'informazione connessa a un'emozione viene ricordata meglio di una neutrale.

> "neuroimaging studies provide strong evidence for interactions between the amygdala and the hippocampus. The amygdala and hippocampus often are coactivated during the successful encoding of emotional information (e.g., Dolcos et al., 2004; Kensinger & Corkin, 2004), and there is a strong correlation between the activity in these regions (Kensinger & Corkin, 2004; Kensinger & Schacter, 2005a; Richardson, Strange, & Dolan, 2004), as well as an increase in functional connectivity between the regions (Kilpatrick & Cahill, 2003), as individuals learn emotional information"[49] (Kensinger E. A., 2009: 729).

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[48] "Studi di neuroimaging che rivelano forti correlazioni tra l'ammontare di attività nell'amigdala e nelle regioni di elaborazione visivo incluso il giro fusiforme (e.g., Noesselt, Driver, Heinze e Dolan, 2005; Vuilleumier, Richardson, Armony, Driver e Dolan, 2004) e il lobo occipitale (Tabert e altri, 2001) durante l'elaborazione dell'informazione emotiva"

[49] "Gli studi di neuroimaging offrono forti prove dell'interazione tra l'amigdala e l'ippocampo. L'amigdala e l'ippocampo spesso sono co-attivati durante la codifica dell'informazione emotiva (e.g., Dolcos e altri, 2004; Kensinger & Corkin, 2004), e c'è una forte correlazione tra l'attività in queste regioni (Kensinger & Corkin, 2004; Kensinger & Schacter, 2005a; Richardson, Strange, & Dolan, 2004), allo stesso modo un incremento nella connettività funzionale tra le regioni (Kilpatrick & Cahill, 2003), mentre gli individui apprendono l'informazione emotiva"

È necessario, quindi, che in fase di insegnamento e apprendimento l'input evochi emozioni positive,

> "facendo leva innanzitutto su quelle primarie (universali) come la gioia e la sorpresa, ed evitando situazioni che generino paura, ansia, collera. Ciò costituirà la base per poter lavorare sulle emozioni secondarie, come l'autostima, il senso di appartenenza e di sicurezza" (Daloiso M., 2009: 45).

Chapter 4: The Role of Sensory Memory

This chapter analyzes sensory memory. It is necessary to underline its relevance for multisensorial learning.

At first, there's a short outline of what sensory memory is.

The description of the three different types of sensory memory follows.

4.1 Sensory Memory

Sensory information is perceived by sensory receptors and processed by the nervous system.

> "When you first receive a particular stimulus, it is held for only a fraction of second in what is known as the sensory memory, or sensory register – a system of memory that holds information briefly, but long enough so that it can be processed further" (Carson-Arenas A., 2004: 242).

This means that the information stays in sensory memory just long enough to be moved to short-term memory.

> "Sensory memory holds impressions briefly, but long enough so that series of perceptions are psychologically continuous. It refers to an initial process that holds environmental information in its raw form for a brief period of time, from an instant to several seconds" (Carson-Arenas A., 2004: 242).

Humans have five senses: sight, hearing, taste, smell, touch. The stimulus is caught through di senses and sensory memory allows to keep the impressions when the stimulus has ended.

Sensory memory is the shortest-term element of memory.

> "It is the ability to retain impressions of sensory information after the original stimuli have ended. It acts as a kind of buffer for stimuli received

> through the five senses of sight, hearing, smell, taste and touch, which are retained accurately, but very briefly"[50]

The feeling captured by the senses can be ignored or perceived. In the first case, the stimulus disappears, while in the second case, it enters the sensory memory.

> "This does not require any conscious attention and, indeed, is usually considered to be totally outside of conscious control"[51]

Sensory memory is considered to be outside of cognitive control and is instead an automatic response.

Researcher identified four main features that distinguish sensory memory from the other categorical memory representations:

> "(1) the formation of sensory memory traces does not depend on attention; 2) the information stored in sensory memory traces is modality-specific; and 3) has a resolution, which is finer than the conventional meaningful categories; but 4) it is lost within a short period of time" (Winkler I., Cowan N., 2004: 1).

Each sense has a different memory store.

The sensory memory stores

> "were assumed to serve as temporary buffers from which information could be accessed for a short time, after which they were lost due to decay or to interference from more recent stimuli. The information selected from the sensory buffers was categorized, or transformed into a common internal code, allowing modality-independent operations. Only

[50] http://www.human-memory.net/types_sensory.html "è l'abilità di trattenere le impressioni delle informazioni sensoriali dopo che lo stimolo originale è terminato. Agisce come una sorta di buffer degli stimoli ricevuti attraverso i cinque sensi della vista, udito, odorato, gusto e tatto, che sono conservati in modo accurato, ma molto brevemente"

[51] http://www.human-memory.net/types_sensory.html "Questo non richiede alcuna attenzione cosciente e, appunto, è solitamente considerato essere totalmente al di fuori del controllo conscio"

> categorized information was assumed to be stored in more durable stores" (Winkler I., Cowan N., 2004: 2).

There are three types of sensory memory:

1. Iconic memory, the first to be investigated. The visual representations are called icons.

   > "Visual stimulation forms a picture in your mind."[52]

2. Echoic memory or auditory memory. It is the sensory memory for the sense of hearing.

   > "Audio memory gives us echoic memories, or mental echoes of stimulation. Auditory information is sound waves that are sensed by the hair cells in your ears and travels to the temporal lobe of the brain."[53]

3. Haptic memory. It represents sensory memory for the tactile sense of touch. All over the body, there are sensors that distinguish different sensations, like pressure and pain.

   > "We have sensory receptors all over our bodies, and any touch sends off signals that travel through different neurons in the spinal cord to the 'post central gyrus' of the parietal lobe in the brain."[54]

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[52] http://memorise.org/brain-articles/function-sensory-memory "la stimolazione visiva forma immagini nella mente"

[53] http://memorise.org/brain-articles/function-sensory-memory "La memoria di ascolto ci dà la memoria uditiva, o echi mentali di stimolazione. L'informazione uditiva è fatta di onde sonore che sono captate da cellule pilifere nelle nostre orecchie e viaggia attraverso il lobo temporale del cervello"

[54] http://memorise.org/brain-articles/function-sensory-memory "Abbiamo recettori sensoriali su tutto il corpo e ogni tocco invia un segnale attraverso diversi neuroni nel midollo osseo fino al 'area somestesica primaria' del lobo parietale nel cervello"

4.2 Iconic Memory

Iconic memory deeply analyzed by Sperling in 1960 and it was named by Neisser in 1967.

> "It is considered to be a stage in the processing of visual input that occurs immediately upon the offset of a visual stimulus"[55] (Mack A., Erol M., Clarke J., 2015: 291).

Many scholars claimed that it is made of two elements.

> "The first, visible persistence, is of very brief duration, is afterimage-like and gives rise to the impression that the physical stimulus is still present. Its duration is thought to be inversely related to the duration of the array (Coltheart, 1980)" (Mack A., Erol M., Clarke J., 2015: 291).

> "The second, informational persistence, has a somewhat longer life and provides the information contained in the no longer visible stimulus in much the same way as the actual image (Coltheart, 1980; Loftus & Irwin, 1998)" (Mack A., Erol M., Clarke J., 2015: 291).

The first is exposed to masking, while the second not.

In Sperling's researches, there is agreement that

> "attention is necessary to transfer the information from transient iconic memory to working memory, a more durable form of memory" (Mack A., Erol M., Clarke J., 2015: 291).

> "Iconic memories were considered to occur as a result of retinal stimulation and accounted for why we frequently have the impression that we see more than we are able to describe or recall" (Mack A., Erol M., Clarke J., 2015: 291).

[55] "è considerato essere un passo nell'elaborazione dell'input visivo che capita immediatamente nel momento della compensazione dello stimolo visivo"

This means that attention seemed not to be considered in the process.

> "Iconic memory is taken to be a large capacity, fleeting and attention-free, while working memory or access awareness, has limited capacity and requires attention" (Mack A., Erol M., Clarke J., 2015: 292).

In 2012, Persuh, Genzer and Melara were the first to suggest that iconic memory needs attention.

> "A fundamental characteristic of iconic memory is that its contents are encoded in retinotopic coordinates (Haber, 1983; Irwin et al., 1983, 1988; Jonides et al., 1983; Rayner and Pollatsek, 1983; van der Heijden et al., 1986; Sun and Irwin, 1987). While a retinotopically encoded memory can serve a useful function when the observer and the objects in the environment are all static, it cannot store any meaningful information when the observer's eyes, head, body and external objects are in motion" (Ögmen H., Herzog M. H., 2016: 2).

The retinotopic coordinates will shift after every motion the observer's retinae and the external environment.

> "These shifts, in turn, will cause blurring and inappropriate integration of information over space and time: A briefly presented stimulus remains visible for about 120ms after its offset under normal viewing conditions (Coltheart, 1980), a phenomenon known as visible persistence" (Ögmen H., Herzog M. H., 2016: 2).

4.3 Auditory Memory

Atkinson and Shiffrin prosed an influential memory model, that described

> "a sensory register, a short-term store, and a long-term store" (Atkinson R. C., Shriffin R. M., 1968: 92).

In 1967, Neisser decided to call echoic memory the auditory sensory memory (ASM).

> “Contemporary research has established that ASM is: (1) auditory modality-specific; (2) high in resolution, which seems to indicate storage of episodic rather than categorical or abstract information; (3) limited in duration; and (4) independent from attentional processes (Näätänen et al., 1989; Winkler and Cowan, 2005)” (NEES M. A., 2016: 1).

Auditory sensory memory does not

> “involve active manipulation or rehearsal and is insensitive to attentional processes, including working memory rehearsal processes. Further, auditory sensory memory is only engaged when a sound is heard” (NEES M. A., 2016: 2).

In 2005, Buchsbaum

> “has corroborated parallel auditory sensory memory and working memory processes and separate neurological markers have been identified for auditory sensory memory and auditory working memory processes. The widely researched mismatch negativity (MMN) component of evoked neural responses to sounds offers a metric of the duration of auditory sensory memory” (NEES M. A., 2016: 3).

In 2007, Schröger reviewed the MMN study. He found out that that auditory sensory memory can last up to 20 seconds or longer.

Recent studies by Lim about auditory working memory showed that

> “processes involving maintenance of sounds are indexed by oscillations that fall within the alpha range of frequencies in electroencephalography (EEG) recordings” (NEES M. A., 2016: 3).

Auditory sensory memory depicts

> “the initial recording of auditory information into the memory system” (Sabri M., Kareken D. A., Dzemidzic M., Lowe M. J., Melara R. D., 2003: 69).

The main properties are: rapid storage, an extremely brief duration (between 2 and 3 seconds and detailed encoding of the physical characteristics of different stimuli.

The ‘‘oddball’’ task is extremely useful in studying sensory memory. In this task

> “a repeating signal (the ‘‘standard’’) is replaced periodically by an infrequent deviant (the ‘‘oddball’’). Auditory event-related potential (ERP) studies indicate that oddballs reliably elicit a negative potential (relative to standards) approximately 100 – 300 ms after stimulus onset, even though subjects are instructed to ignore the auditory stimuli while engaged in a primary task, such as playing a video game or reading a book (Na¨a¨ta¨nen, 1990, 1992). This negative ERP component, called the mismatch negativity (MMN) response, may reflect the output of an automatic change-detection system” (Sabri M., Kareken D. A., Dzemidzic M., Lowe M. J., Melara R. D., 2003: 69).

This serves as a fundamental discovery it shows the ability of the system to monitor the environment

> “for significant events, independent of conscious awareness or directed attention. Operation of the change-detection system, as reflected in the MMN, depends on how efficiently neuronal traces to deviant stimuli are compared with traces to the uniform stream of standard stimuli. In fact, the MMN will not be elicited unless the neuronal representation of the standards still exists at the moment when the deviant occurs (Winkler and Na¨a¨ta¨nen, 1995)” (Sabri M., Kareken D. A., Dzemidzic M., Lowe M. J., Melara R. D., 2003: 69).

Hence,

> “an active sensory memory trace of standards is a prerequisite for activating the change detection mechanism underlying the MMN. Recent electrophysiological research by Sabri and Campbell (2001) revealed that the MMN amplitude increased monotonically with the rate of stimulus

> presentation, even when the probability of a deviant occurring in time was held constant" (Sabri M., Kareken D. A., Dzemidzic M., Lowe M. J., Melara R. D., 2003: 69).

However,

> "the anatomic basis of sensory memory remains largely unknown, as does the degree to which anatomic loci are shared between sensory systems" (Sabri M., Kareken D. A., Dzemidzic M., Lowe M. J., Melara R. D., 2003: 69).

4.4 Haptic Memory

The skill to

> "visually perceive and represent the spatial layout of objects in memory" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 363)

has been deeply investigated.

> "Findings from recent studies on cross-modal spatial cognition suggest that there are sufficient functional similarities across the visual and tactile senses to allow for multisensory information to be integrated into a common spatial representation in memory (see Giudice, Klatzky, & Loomis, 2009; Kelly, Avraamides, & Giudice, 2011; Klatzky, Lippa, Loomis, & Golledge, 2002; Loomis, Klatzky, Avraamides, Lippa, & Golledge, 2007) and to allow for equivalent spatial performance across vision and touch in sighted and blind individuals respectively (Giudice, Betty, & Loomis, 2011)" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 363).

It is still uncertain how this integration happens or how

> "these modalities interact for multisensory spatial cognition and whether multisensory integration affects the representation of spatial locations of

> multiple objects" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 363).

Researches showed

> "that relevant visuo-spatial information can enhance performance when crossmodal events are co-located (Santangelo, Ho, & Spence, 2008) and that visuo-spatial perception and attention can be disrupted when incongruent crossmodal spatial information is provided (see Spence & Driver, 2004 for an overview)" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 363).

It is often argued that vision

> "is likely to affect spatial processing in other modalities since it provides the 'gold standard' in spatial precision to which other modalities may refer" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 364).

Other scholars have added that

> "early visual experience seems to be necessary for both the development of efficient spatial cognition (Byrne & Salter, 1983; Gaunet, Martinez, & Thinus-Blanc, 1997; Herman, Chatman, & Roth, 1983; Pasqualotto & Newell, 2007; Pasqualotto & Proulx, 2012; Postma, Zuidhoek, Noordzij, & Kappers, 2008a; Rieser, Hill, Talor, Bradfield, & Rosen, 1992), and to calibrate spatial precision in other spatial senses (Röder, Kusmierek, Spence, & Schicke, 2007)" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 364).

In 2013 Pasqualotto A., Finucane C. M. and Newell F. N. realized an experiment, in which they found out

> "that viewing one's surroundings during initial task acquisition confers a benefit on haptic spatial cognition. This benefit emerges late in task acquisition, but persists despite the subsequent absence of ambient

> visual information. We argue that ambient or 'noninformative' visual information provides an allocentric reference frame which facilitates the storage of a robust representation of haptic object locations in memory. Moreover, we provide evidence that this reference frame is likely to be based more on an environment-centred rather than object-centred allocentric representation" (Pasqualotto A., Finucane C. M., Newell F. N., 2013: 377).

It was noted that changing the environment during the task disturbs this process. This could prove the existence of

> "an important interplay between context-dependent processes and the adoption of optimal memory representations" (Pasqualotto A., Finucane C. M., Newell F. N., 2013).

Part 2: Life Skills, Linguistic Education and Football

This part serves as a union between the first and the third and final part of this thesis.

In chapter 4, we will describe what life skills are and how they are used in sport education programmes. The importance of life skills is growing nowadays and they are often used not only in education but also in sport programme.

Chapter 5 deals with experiential learning. Experiential learning plays a crucial rule in this dissertation because it highlights the importance of direct experience in learning.

Chapter 6 unifies language learning and football practise. There's an overview of the *Metodo a fasi* in football and an overview of Learning Unit and Teaching Unit.

Chapter 4: Life skills and football

This chapter deals with life skills. They're becoming more relevant in education and researchers are developing new programmes based on them. In this chapter, we are going to define what like skills are and outline some of the skills developed through team sports.

4.1 Life Skills and Sport

Researchers, such as Catalano (2004) and Danish (2004), showed evidence that suggests that many of the skills required to succeed in sport are transferable to other life situations.

> "These skills include problem solving, time management, goal setting, coping with success and failure, and, performing under pressure" (Hardcastle et al., 2015:139).

Thanks to the work of Goudas and Giannoudis (2008) and Tremayne and Tremayne (2004), sport has been identified as a good context for promoting and developing life-skills and as an appropriate way to support positive youth growth.

Like skills are defined as:

> "those internal personal assets, characteristics, and skills such as goal-setting, emotional control, self-esteem, and hard work that may be facilitated or developed in sport and are transferred in non-sport settings" (Gould and Carson, 2008: 60).

Life skills may include several aspects: physical, such as a healthy diet, behavioural, like goal setting, or cognitive, like self-talk.

Sport is an appropriate context for teaching life skills for many different reasons, as the studies by Goudas and Giannoudis (2008) pointed out.

First, Danish, Forneris, & Wallace (2005), proved that

> "there is a resemblance between performance excellence in sport and personal excellence in life and an apparent similarity between the mental skills needed for successful performance in sport and in non-sport domains". (Goudas and Giannoudis, 2008: 528)

It is also true that skills learnt in sport, like being able to perform under pressure, solve problems, meet deadlines, set goals, communicate, handle success and failure, are applicable to the everyday life. These skills may also involve team work, being able to work within a system and being able to benefit from the feedback received.

Third, a lot of young people are familiar with sport and already play some kind of sport because it is very popular in our society.

Moreover, sport is a situation where training and performance are accentuated just as it happens at school and at work.

Orlick & McCaffrey (1991) demonstrated that sport skills and life skills are learnt through the same process: demonstration, modeling and practice.

Sixth, sport is considered a crucial component in the development of self-esteem and perceptions of competence during the teenage years.

Additionally,

> "sport can instill to individuals the value of experiencing success in setting and achieving goals" (Goudas and Giannoudis, 2008: 528).

Lastly,

> "school physical education may benefit from sport's potential for life-skills teaching as it is a setting where sport and physical activity is presented to almost all children. Therefore, it has been proposed that an

> optimal way to promote skill acquisition is to integrate sport and life-skills instruction" (Goudas and Giannoudis, 2008: 528).

The literature on strategies used by trainers to improve the development of life skills is still lacking. On the other hand, the body of research that reviews the individual outcomes of the different life skills is growing. The majority of the existing studies are quantitative in nature. These researches have also all considered sport as one of the many contexts in which young people are involved nowadays and that helps the development of life skills.

> "These studies have identified outcomes such as goal setting, effort/initiative, time management, emotional regulation, and self-esteem (e.g., Hansen, Larson, Dworkin, 2003; Larson et al, 2006; Richman & Shaffer, 2000) as life skills youth have reported being characteristic of their sport experiences" (Carson, 2008: 198-199).

There are also some qualitative studies.

> "One of the few qualitative inquiries into the types of life skills that naturalistic sport produces in its participants was an ethnographic study of a high school soccer team's life skills developmental process over an entire competitive season driven by Holt, Tink, Mandigo and Fox in 2008" (Carson, 2008: 199).

The issue with this experiment is its single-case approach. It suffers from interpretive limitations. It was set that

> "the soccer team gained competencies in the skills of initiative, respect and teamwork/leadership throughout their single-season sport participation." (Carson, 2008: 199).

One interesting observation of this process is that interference by the coach was very limited. He just used strategies like

> "punishing athletes when they were not respectful and allowing players to take part in making team decisions" (Carson, 2010: 200).

After inquiring the participants, it was also clear that they thought that they developed the life skill of leadership only from the interactions with their teammates. It was evident for the researchers that

> "much of the life skill development was carried out by the athletes themselves" (Carson, 2010: 200).

In other studies, however, the athletes

> "referred to direct intervention efforts on the part of the coach that were believed to lead to gains in life skill development" (Carson, 2010: 200).

4.2 Sport Education

It is a popular belief that sport participation is

> "beneficial for youth because it promotes their capacity to deal with life's challenges" (Goudas & Giannoudis, 2008: 528).

However, some study outcomes and youth sport researchers warn that there are several factors that establish whether participating in sport will have positive or negative effects.

As Petitpas, Cornelius, Van Raalte, and Jones note

> ''Sport can provide a wonderful forum for youth to learn about themselves and to acquire skills that can assist them throughout life, or it can create a negative environment that may have a detrimental effect on

> participants' self-esteem confidence and physical self-efficacy'' (Petitpas, Cornelius, Van Raalte and Jones, 2005: 76).

Therefore,

> "it is probably not the mere participation in sport that enhances positive development but the individual's experience in sport that may be the critical factor. For personal growth and development to be realized sport programs must be developed with this goal in mind" (Goudas & Giannoudis, 2008: 528).

Team sports are a crucial and strong element of physical education programme. This is usually the most enjoyed moment by students. That is why a life-skills program delivered through team sports would be extremely practical for physical education teachers. Moreover, team sports offer particular ways to train distinct life skills. When playing team sports, students face situations

> "where they have to produce motor responses to problems related to game strategy and tactics" (Goudas & Giannoudis, 2008: 530).

The importance of sport as a vehicle for personal development is an idea

> "consistent with one of the central objectives of contemporary sport psychology to understand how participation in sport and physical activity influences the psychologic development of the participant" (Gould & Carson, 2008: 287).

Recently, many researchers, like Danish (2004), showed an enlarged interest in using sport as

> "an arena for developing life skills in youth, with life skills being viewed as those internal personal assets characteristics, and skills such as goal setting, emotional control, self-esteem, and hard work ethic that can be facilitated or developed in sport and potentially transferred for use in non-sport settings" (Gould & Carson, 2008: 287).

> "Personal development through sport is a broad area including an array of specific topics ranging from perceived competence to delinquency" (Gould & Carson, 2008: 289).

Nonetheless, many of these peculiar issues can be divided into two general groups:

> "general psychological development through sport and development of "specific" personal and psychologic qualities through sport" (Gould & Carson, 2008: 289).

Recently, the researchers dealing with youth development have started focusing on sport as a source for children psychosocial development. The kids are intensively concentrated during physical activity and this is extremely significant for the kids. They benefit from this concentration because it helps to enhance skills like initiative and the ability to set and achieve goals.

Sport participation can encourage various academic, social, and psychologic results, as past literature can prove

> "including goal setting, effective communication, responsibility, problem solving, dealing with conflict, risk taking, managing emotions, providing and receiving feedback, accepting interdependence, appreciating differences, managing time and stress, persistence, courage, and self-control" (Gould & Carson, 2008: 289).

Sports also appears to be supporting kids build a strong sense of competence. Likewise, this could enhance self-confidence, self-worth and other abilities inside and outside of sport games. According to Fox (2000), 78% of the studies carried out from 1970 to 1999 showed that

> "sport and exercise influenced positive changes in certain aspects of physical self-perceptions" (Gould & Carson, 2008: 289).

This finding is very important because

> "increases in physical selfworth have also been linked to increases in global (general) self-esteem and various positive mental health indicators" (Gould & Carson, 2008: 289).

In an appropriate sporting context, single athletes can develop leading skills. For example, they can improve their communication ability and use it to encourage their peers. They can act like a role model and help planning and taking decision. Not all the athletes seem to have the chance to play a leadership role. In this way, just some of the participants appear to strengthen their skill as a potential leader.

> "The aspects of the sporting environment that aided in the leadership development of these individuals were a focus on skill development, encouragement of a strong work ethic, opportunity to be engaged in the cognitive side of sport and cognitive sport knowledge, and the fostering of positive relationships with others" (Gould & Carson, 2008: 291).

The athletes were guided by inspiring and motivating coaches. These trainers were interested in the experiences of the athletes, in their lives and in what they were feeling.

Apparently, sport participation is linked to academic success.

Researchers argue whether sport is a suitable context where moral character can grow or not. Some of them assert that the sport environment requires

> "the use of skills and qualities such as cooperation, courage, fairness, loyalty, teamwork, responsibility, conformity, and acting for the good of others as well as one's self" (Gould & Carson, 2008: 293).

Other experts claimed that sport

> "is an institution that has overemphasized competition and winning, thus detracting from its ability to build and cultivate moral character (Chandler & Goldberg 1990)" (Gould & Carson, 2008: 293).

Researchers have tried to delineate the connection between sport participation and morals by comparing the moral maturity of athletes with the one of non-athletes. Through the researches of Bredemeier and Shields (1986), Shields and Bredemeier (1994) and Beller and Stoll (1995), it has been proved that

> "nonathletes tend to use significantly higher levels of moral reasoning as assessed by moral dilemmas (both in and outside of sport) than their peers who are involved in sport" (Gould & Carson, 2008: 293).

It was suggested that

> "certain demands and structures might influence the impact a specific sport has on moral functioning" (Gould & Carson, 2008: 293).

This kind of discoveries seem to propose that sport participation does not contribute to moral growth.

> "The prevailing attitude in competitive, organized sport toward morality seems to be one of complacent indifference... acting in a moral sportsmanlike manner seems to be regarded as an expensive luxury when the primary goal is one of winning and beating one's opponent by any means necessary" (Hodge, 1989:24)

is a difficult obstacle to moral development in athletics.

There is also the strong belief that moral behaviour is not logically connected to the goals of sport.

> "For sport to become a better provider for moral growth, a perspective shift must occur in which the need for character development is

> necessary and purposefully fostered by parents, coaches, and other authority figures" (Gould & Carson, 2008: 294).

Sport has also been considered effective to promote the use and the evolution of goal setting skills.

> "Cultivating this life skill is particularly important in helping individuals identify the successes they achieve so that a positive and realistic view of their competence and overall self can be fostered" (Gould & Carson, 2008: 294).

It is extremely convenient to use sport to underline the achievement of personal goals because

> "goals in sport are typically tangible, short-term, and easily measured... giv[ing] the adolescent a better opportunity to see the value in goal setting and to experience success in setting and achieving goals" (Danish, 2003: 99).

Hodge (1988) shows that

> "life skills are taught, not caught through sports participation" (Gould & Carson, 2008: 297).

> "Some benefits may occur through merely participating in sport, personal development through sport will more systematically and consistently be developed when it is taught through caring and competently trained adults" (Gould & Carson, 2008: 297).

> "While sport can be a powerful force for social intervention, its impacts are not automatically or inevitability positive... Thus, sport is better understood as a tool for social outreach, a hook or instrument whose impact depends upon the ends toward which it is directed, how it is implemented, and the context in which it is deployed" (Hartmann, 2003: 134).

Sport alone cannot build up personal development. Sport experience needs to be accompanied by caring and expert coaches who foresee and help social emotional growth.

4.3 Skills for life in Italy

Life skills is a definition that is usually applied to a number of cognitive, emotional and relational skills, that allow people to act with proficiency both on an individual and social level. They are

> "abilità e capacità che ci permettono di acquisire un comportamento versatile e positivo, grazie al quale possiamo affrontare efficacemente le richieste e le sfide della vita quotidiana"[56] (Marmocchi, 2008: 4).

In Italy, educational programmes based on life skills developed only in the latest years. The definition first appeared thanks to the World Health Organization (WHO). This organization started underlining the importance of those skills for life, especially for mental health, and the necessity to develop them through education.

Their importance is growing in educational programmes, and especially in sport education programmes.

According to the WHO, Life Skills are defined as:

> "tutte quelle skills (abilità, competenze) che è necessario apprendere per mettersi in relazione con gli altri e per affrontare i problemi, le pressioni e gli stress della vita quotidiana. La mancanza di tali skills socio-emotive può causare, in particolare nei giovani, l'instaurarsi di comportamenti negativi e a rischio in risposta agli stress: tentativi di suicidio,

[56] "Skills and expertise that allow us to acquire a positive and adaptable attitude, thanks to which we can face effectively the challenge of everyday life".

> tossicodipendenza, fumo di sigaretta, alcolismo, ecc."[57] (Bollettino OMS, 1992, n1).

In the WHO's paper 10 life skills are identified: decision making, problem solving, *pensiero creativo* (creative thinking), *pensiero critico* (critical thinking), *comunucazione efficace* (communication), *capacità di relazioni interpersonali* (interpersonal relationship), *consapevolezza* (self-awareness), *empatia* (empathy), *gestione dello stress* (coping with stress) and *gestire le emozioni* (coping with emotions).

Decision making is the

> "competenza che aiuta ad affrontare in modo costruttivo le decisioni nelle diverse situazioni e contesti di vita. La capacità di elaborare in modo attivo il processo decisionale può avere implicazioni positive sulla salute attraverso una valutazione delle diverse opzioni e delle conseguenze che esse implicano"[58] (P. Marmocchi, C. Dall'Aglio e M. Tannini, 2004: 18).

Problem solving allows to

> "affrontare in modo costruttivo i diversi problemi, i quali, se lasciati irrisolti, possono causare stress mentale e tensioni fisiche"[59] (P. Marmocchi, C. Dall'Aglio e M. Tannini, 2004: 18).

Creative thinking

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[57] "All those skills (ability and competence) that it's necessary to acquire to connect with other people and face the problems, pressure and stress of everyday. The lack of those skills may cause, especially in teenagers, negative and risk behavior in response to stress: suicide attempt, drug addiction, smoking, alcoholism"

[58] "Skill that helps to face decisions in different situations and life context in a productive way. The skill to elaborate actively the decisional process can have positive implications on our health through evaluating several options and their consequences".

[59] "face in a productive way different problems, that can cause mental stress and physical tension, if left unresolved"

> "agisce in modo sinergico rispetto alle due competenze sopracitate, mettendo in grado di esplorare le alternative possibili e le conseguenze che derivano dal fare e dal non fare determinate azioni. Aiuta a guardare oltre le esperienze dirette, può aiutare a rispondere in maniera adattiva e flessibile alle situazioni di vita quotidiana"[60].

Critical thinking is

> "l'abilità di analizzare le informazioni e le esperienze in maniera obiettiva."[61]

Communication means

> "sapersi esprimere, sia verbalmente che non verbalmente, in modo efficace e congruo alla propria cultura e in ogni situazione particolare. Significa esprimere opinioni e desideri, ma anche bisogni e sentimenti; essere in grado di ascoltare in modo accurato, comprendendo l'altro. Significa inoltre essere capaci, in caso di necessità, di chiedere aiuto"[62] (P. Marmocchi, C. Dall'Aglio e M. Tannini, 2004: 18).

This implies being able to express opinions, desires, fears and needs and ask for help and advises.

Interpersonal relationship is the

> "capacità di interagire e relazionarsi con gli altri in modo positivo. Questo vuol dire saper creare e mantenere relazioni significative, fondamentali per il benessere psico-sociale, sia in ambito amicale che familiare. Può

[60] http://www.intelligenzaemotiva.it/Centro_pilota/Life%20skills.pdf "operates in a synergic way, allowing to explore alternative options and the consequences deriving from doing something or not. It helps to look over direct experiences, can help to answer in a flexible and adaptive way to situations".

[61] http://www.intelligenzaemotiva.it/Centro_pilota/Life%20skills.pdf "The skill to examine information and experience in an objective way"

[62] "Being able to communicate, both verbally and non-verbally, in a suitable way according to our culture and in every situation. It means expressing opinions and wishes, but also needs and feeling; being able to listen carefully, understanding the other. It means also being able to ask for help, if needed"

> inoltre significare essere in grado di interrompere le relazioni in modo costruttivo"[63] (P. Marmocchi, C. Dall'Aglio e M. Tannini, 2004: 18).

Self-awareness is the

> "riconoscimento di sé, del proprio carattere, delle proprie forze e debolezze, dei propri desideri e delle proprie insofferenze."[64]

Developing self-awareness can help to recognize when we are stressed or under pressure.

Empathy is the

> "capacità di comprendere gli altri, di "mettersi nei loro panni", anche in situazioni che non ci sono familiari. L'empatia permette di migliorare le relazioni sociali, soprattutto nei confronti di diversità etniche e culturali; facilita l'accettazione e la comprensione verso persone che hanno bisogno di aiuto e di assistenza"[65] (P. Marmocchi, C. Dall'Aglio e M. Tannini, 2004: 19).

Empathy allows to improve interpersonal relationships and to help people in need.

Coping with emotion implies:

> "riconoscere le emozioni in sé e negli altri, essere consapevoli di come le emozioni influenzano il comportamento e riuscire a gestirle in modo appropriato. Emozioni intense, come la rabbia e il dolore, se non

[63] "skill to interact and relate with others in a positive way. This means being able to create and maintain significant relations, fundamental for psychosocial health, both with friends and family. It could also mean being able to break up relationships in a productive way"

[64] http://www.ipermind.com/crescita-personale-life-skills/ "Self-recognition, of our attitude, our strength and weakness, our desires and intolerance".

[65] "The skill to understand the others, to be in their shoes, also in situations that we are not familiar with. Empathy allows to improve social relationships, especially with cultural and ethnical differences; it makes easy to accept and comprehend people that needs help and support."

> riconosciute e gestite, possono avere effetti negativi sulla salute”[66] (P. Marmocchi, C. Dall’Aglio e M. Tannini, 2004: 19).

Coping with stress means:

> “consiste nel riconoscere le fonti di stress nella vita quotidiana, nel comprendere come queste ci "tocchino" e nell'agire in modo da controllare i diversi livelli di stress”[67]

Those skills are divided into three groups: emotional, relational and cognitive skills.

[66] “Recognising our and others’ emotion, being aware of how emotions influence our behavior and being able to handle them properly. Intense emotions, like rage and sorrow, if they’re not recognized and handled, can have negative effects on our health”

[67] http://www.intelligenzaemotiva.it/Centro_pilota/Life%20skills.pdf “Consist of recognizing the cause of stress, understanding how this affect us and operating in order to control the different stress levels”.

Chapter 5: Experiential Learning

This chapter outline the main features of experiential learning.

After the description of the experiential learning model, we'll explain how Kolb's ELC works. In the last part, we'll highlight the importance of different learning styles.

5.1 Experiential Learning Model

There is a misconception about what experiential learning really is. It is often reduced to

> "a set of tools and techniques to provide learners with experiences from which they can learn" (Kolb A. Y., Kolb D. A., 2005: 193).

It is much more than this.

> "Experiential learning is above all a philosophy of education based on what Dewey (1938) called a "theory of experience." He argued that while traditional education had little need for theory since practice was determined by tradition, the new experiential approach to education needed a sound theory of experience to guide its conduct." (Kolb A. Y., Kolb D. A., 2005: 193)

Scholars from the 20th century, such as John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire and Carl Rogers, were crucial for the origin of the experiential learning theory (ELT). They

> "gave experience a central role in their theories of human learning and development—notably and others—to develop a holistic model of the experiential learning process and a multilinear model of adult development" (Kolb A. Y., Kolb D. A., 2005: 194).

One of the most important contributor to the development of ELT was Lewin. Especially its

> “plan for the creation of scientific knowledge by conceptualizing phenomena through formal, explicit, testable theory” (Kolb A. Y., Kolb D. A., 2005: 195).

In Lewin’s approach,

> “before a system can be fully useful the concepts in it have to be defined in a way that (1) permits the treatment of both the qualitative and quantitative aspects of phenomena in a single system, (2) adequately represents the conditional-genetic (or causal) attributes of phenomena, (3) facilitates the measurement (or operational definition) of these attributes, and (4) allows both generalization to universal laws and concrete treatment of the individual case” (Cartwright, 1951: IX).

In 1976, Kolb proposed the Experiential Learning Model

> “to conceptualize experiential learning as a means to better understand the different ways that individuals learn experientially” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 44).

One of the most engaging aspect of Kolb's Experiential Learning Model is

> “its focus on the experiential learning process rather than on fixed learning traits (Turesky & Gallagher, 2011), providing for an acknowledgement and incorporation of personal change and development in the model (Healey & Jenkins, 2000)” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 44).

Holman, Pavlica and Thorpe (1997) suggested that

> “the model lends itself to a number of theoretical perspectives, including cognitivism, phenomenology, and adult learning” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 44).

The model was also supported by empirical experiments. This means that it is widely used in a variety of different educational environment and processes.

The work of Kolb has also been criticized, as it happens to all the researches that becomes this popular. The main negative appraisals refer to low reliability and predictive powers and to its validity that is considered questionable.

Personal experience and self-efficacy are one of the main features of experiential learning.

> "Individuals can possess an unlimited amount of information, but may be unwilling to engage in tasks, where that information can be employed productively when they have no experience in doing so. Experiential learning provides students the opportunity to directly apply the information they possess in order to build self-efficacy and learn from the experiential undertakings" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

Therefore, experiential learning is not a simple transmission of information.

> "Learning is the process whereby knowledge is created through the transformation of experience." (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

This definition identifies some crucial aspects of the learning process when it is considered from the experiential point of view.

> "First is the emphasis on the process of adaptation and learning as opposed to content or outcomes. Second is that knowledge is a transformation process, being continuously created and recreated, not an independent entity to be acquired or transmitted. Third, learning transforms experience in both its objective and subjective forms. Finally, to understand learning, we must understand the nature of knowledge, and vice versa" (Kolb D. A., 1984: 38).

Experiential education is

> “education that occurs as a direct participation in the events of life” (Houle C., 1980, p. 221).

Clearly personal experiences play a primary role in experiential education.

> “An educator's role, therefore, changes from transmitter of information to organizer and facilitator of meaningful experiences oriented around students' individual needs” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

The most prominent approach to experiential learning is Kolb's Experiential Learning Model.

It defines learning as

> “the process whereby knowledge is created through the transformation of experience”. (Deryakulu D., Büyüköztürk S., Özçınar H., 2009: 703)

Kolb’s theory is built on six propositions.

1. Learning

> “is best conceived as a process, not in terms of outcomes” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

> “To improve learning in higher education, the primary focus should be on engaging students in a process that best enhances their learning—a process that includes feedback on the effectiveness of their learning efforts”. (Kolb A. Y., Kolb D. A., 2005: 194)

Dewey states that

> “[E]ducation must be conceived as a continuing reconstruction of experience: . . . the process and goal of education are one and the same thing” (Dewey, 1897: 79).

2. Learning

"is a continuous process grounded in experience" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

"All learning is relearning. Learning is best facilitated by a process that draws out the students' beliefs and ideas about a topic so that they can be examined, tested, and integrated with new, more refined ideas" (Kolb A. Y., Kolb D. A., 2005: 194)

3. Learning

"requires the resolution of conflicts between dialectically opposed modes of adaptation to the world" (Kolb A. Y., Kolb D. A., 2005: 194).

Conflict, differences, and disagreement drive the learning process.

"In the process of learning one is called upon to move back and forth between opposing modes of reflection and action and feeling and thinking" (Kolb A. Y., Kolb D. A., 2005: 194).

4. Learning is

"a holistic process of adaptation to the world. Not just the result of cognition, learning involves the integrated functioning of the total person— thinking, feeling, perceiving, and behaving" (Kolb A. Y., Kolb D. A., 2005: 194).

5. Learning results from

"synergetic transactions between the person and the environment. In Piaget's terms, learning occurs through equilibration of the dialectic processes of assimilating new experiences into existing concepts and accommodating existing concepts to new experience." (Kolb A. Y., Kolb D. A., 2005: 194)

6. Learning

> "is the process of creating knowledge" (Kolb A. Y., Kolb D. A., 2006: 47).

> "ELT proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner" (Kolb A. Y., Kolb D. A., 2005: 194).

5.2 Kolb's Experiencial Learning Cycle

> "Taking experience seriously means honouring and valuing people's subjective, 'unreal' sense-making of their life-world even where this does not seem to match the objective facts of the 'real'. It is perhaps easier to define EL by what it is not" (Tomkins L., Ulus E., 2016: 159).

Hence, learning from experience

> "means not merely memorising a pre-defined set of abstract facts and figures, which are subsequently regurgitated in exams" (Tomkins L., Ulus E., 2016: 159).

ELT suggests

> "a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner" (Kolb A. Y., Kolb D. A., 2005: 194).

ELT describes learning as

> "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984: 41).

> "The ELT model portrays two dialectically related modes of grasping experience— Concrete Experience (CE) and Abstract Conceptualization (AC)—and two dialectically related modes of transforming experience— Reflective Observation (RO) and Active Experimentation (AE)" (Kolb A. Y., Kolb D. A., 2005: 194).

In fact, education progress depends also on individual learning style. Learning style can be defined as

> "the consistent way in which a learner responds to or interacts with stimuli in the learning context" (Loo R., 2002: 252).

Kolb created the Learning Style Inventory (LSI)

> "in order to measure and validate empirically the various learning styles involved in experiential learning" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

The LSI classifies four types of learning styles: diverging, assimilating, converging, and accommodating.

> "There are two forms of experience, concrete and abstract, and two ways of transforming that experience into knowledge, reflective observation and active experimentation" (Tomkins L., Ulus E., 2016: 160)

The LSI links all these aspects, engaging the

> "integrated functioning of the total person – thinking, feeling, perceiving and behaving" (Kolb A. Y., Kolb D. A., 2005: 194).

Kolb states that

> "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb D. A., 1984: 41).

The union of theory and experience is what creates knowledge in this perspective.

> “This direct experiential encounter with a learning event requires active engagement of the student as opposed to passive engagement commonly associated with teacher directed instruction that generally results in minimal student interaction in the learning process” (Clark R. W., Threeton M. D., Ewing J. C., 2010: 48).

Experiential learning is a process of building knowledge that

> “involves a creative tension among the four learning modes that is responsive to contextual demands” (Eickman P., Kolb A. Y., Kolb D. A., 2002: 4).

Researchers picture this process as a perfect cycle or spiral

> “where the learner “touches all the bases”— experiencing, reflecting, thinking, and acting—in a recursive process that is responsive to the learning situation and what is being learned. Immediate or concrete experiences are the basis for observations and reflections. These reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn” (Kolb A. Y., Kolb D. A., 2005: 194).

These implications can be tested and be used as guidelines to create new experiences.

Zull claims a direct link between neuroscience and experiential learning.

> “Concrete experiences come through the sensory cortex, reflective observation involves the integrative cortex at the back, creating new abstract concepts occurs in the frontal integrative cortex, and active testing involves the motor brain” (Kolb A. Y., Kolb D. A., 2005: 194)

This means that

> “the learning cycle arises from the structure of the brain” (Zull J., 2002: 18 –19).

The different learning style identifies

> "individual differences in learning based on the learner's preference for employing different phases of the learning cycle. Because of our hereditary equipment, our life experiences, and the demands of our present environment, we develop a preferred way of choosing among the four learning modes. We resolve the conflict between being concrete or abstract and between being active or reflective in characteristic ways" (Kolb A. Y., Kolb D. A., 2005: 195).

Kolb's ELT definition implies that learning

> "is the major determinant of human development, and how individuals learn shapes the course of their personal development" (Kolb A. Y., Kolb D. A., 2005: 195).

As shown by Kolb's research, learning styles

"are influenced by personality type, educational specialization, career choice, and current job role and tasks"

The ELT model defines three stages:

1. acquisition,

> "from birth to adolescence, where basic abilities and cognitive structures develop" (Kolb A. Y., Kolb D. A., 2005: 195).

2. specialization,

> *"from formal schooling through the early work and personal experiences of adulthood, where social, educational, and organizational socialization forces shape the development of a particular, specialized learning style" (Kolb A. Y., Kolb D. A., 2005: 195)*.

3. integration

> "in midcareer and later life, where nondominant modes of learning are expressed in work and personal life" (Kolb A. Y., Kolb D. A., 2005: 195).

The development through these stages is outlined by

> "increasing complexity and relativism in adapting to the world and by increased integration of the dialectic conflicts between AC and CE and AE and RO. Development is conceived as multilinear, based on an individual's particular learning style and life path—development of CE increases affective complexity, of RO increases perceptual complexity, of AC increases symbolic complexity, and of AE increases behavioral complexity." (Kolb A. Y., Kolb D. A., 2005: 195)

Kolb's Experiential Learning Cycle (ELC) is divided into four steps: concrete experience, reflective observation, abstract conceptualization and active experimentation.

1. Concrete experience means

> "direct practical experience by performing a new task". (Konak A., Clark T. K., Naseredden M., 2014: 14)

2. Reflective observation consists of

> "activities such as discussion and reflective questions that require students to reflect on their hands-on experiences. […] Reflective observation activities should foster student-to-student interaction in order to achieve a higher level of reflection. […] Group work is a particularly effective strategy to promote meaningful reflection in short classroom activities" (Konak A., Clark T. K., Naseredden M., 2014: 14).

3. Throughout abstract conceptualization

> "learners are expected to create a theoretical model and a generalization of what was performed. Generally, this stage could be difficult to achieve in short hands-on activities. Class or peer-to-peer discussions are helpful to connect the learning experience to the overall theory. At this stage, instructor intervention is important." (Konak A., Clark T. K., Naseredden M., 2014: 14).

4. At the stage of active experimentation,

> "the learner is ready to plan and try out another concrete experience. Students can be given a new task that is similar to what was performed before or few related topics in the same activity" (Konak A., Clark T. K., Naseredden M., 2014: 14).

As Kolb affirms, a student must experience all four stages of the learning cycle to complete the learning process.

> "Not only do these four stages allow students to comprehensively investigate a topic through different activities and views, they also allow for the accommodation of different learning styles" (Konak A., Clark T. K., Naseredden M., 2014: 13)

Kolb claims that the different

> "learning styles are a product of two pairs of variables, doing vs. watching, and thinking vs. feeling. Each stage of Kolb's ELC can be mapped to these variables" (Konak A., Clark T. K., Naseredden M., 2014: 13).

Every person needs to experience all different kind of learning styles, even if everyone has a preferred one.

Kolb's ELC provides

> “the opportunity to complete activities for each learning style, with one particular stage perhaps matching a person's learning style preferences” (Konak A., Clark T. K., Naseredden M., 2014: 13).

5.3 Importance of learning style

The Experiential Learning Model is

> “based on the existence of four learning modes: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE)” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

Koob and Funk suggest that each individual maturates a preference towards a particular learning style, even if they are all involved in the learning process.

These styles can be portrayed

> “along two continuums or dimensions — perceiving, the extent to which an individual emphasizes abstractness over concreteness (AC–CE continuum), and processing, the extent to which an individual emphasizes action over reflection (AE–RO continuum)” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

Each different learning style is

> “a combination of the two independent dimensions. The four resulting learning styles are divergers (CE/RO), assimilators (AC/RO), convergers (AC/AE), and accommodators (CE/AE)” (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

The diverging learning style identifies

> "individuals who learn by way of concrete experience and reflective observation (Sugarman, 1985). Individuals with a diverging learning style experience a situation and then later look at the situation through many perspectives, learning from each" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

The strengths of this individuals

> "lie in their imaginative and creative abilities and their ability to relate with others. For Kolb and Kolb (2005), these individuals are more inclined to work in groups, have strong communication skills, and are open to personal feedback" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

The assimilating learning style is built

> "on learning abilities that use abstract conceptualization and reflective observation (Sugarman, 1985). Individuals who learn via this style take in a wide variety of information and arrange it in the most logical for" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45).

These learners prefer an input

> "that is logical, valid, and well thought through. The strengths of individuals with this learning style lie in their ability to systematically plan, organize, analyze and engage in inductive reasoning. As Kolb and Kolb (2005), they tend to prefer reading, lectures, and time to analyze different aspects of the information they have received" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 45-46).

The converging learning style includes

> "using abstract conceptualization and active experimentation (Sugarman, 1985). These individuals find practical uses for the ideas and theories that

> they have learned" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

They are good at

> "solving new problems with the solutions to past problems. The strengths of individuals with this learning style lie in their ability to set goals, solve problems and make decisions. According Kolb and Kolb (2005), they prefer to learn by "first hand" techniques such as experimenting, simulating, and using practical applications for what they have learned" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

The accommodating learning style employs

> "both concrete experience and active experimentation to learn and process information (DiMuro & Terry, 2007). They prefer active involvement in concrete situations (Sugarman, 1985)" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

Someone that prefers this style learns

> "from experiencing something new and carrying out plans that involve new experiences and challenges by which they learn. Turecky and Gallagher (2011) state that the strengths of these individuals lie in their ability to implement plans and tasks and become involved in new activities. For Kolb and Kolb (2005), these individuals make decisions more on intuition than logic and prefer setting goals and working in teams in order to accomplish tasks" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

Learning styles one of the main concern of teachers because pedagogy is

> "the study of how learning takes place" (Fletcher S., Potts J., Ballinger R., 2008: 378).

Fletcher, Potts and Ballinger declare that

> "an understanding of the preferred learning style of an individual provides an insight into the teaching methods that are likely to be most effective for that individual" (Fletcher S., Potts J., Ballinger R., 2008: 383).

This agrees with Kolb, who states that

> "to understand knowledge, one must understand the psychology of the learning process, and to understand learning, we must understand epistemology — the origins, nature, methods, and limits of knowledge" (Kolb D. A., 1984: 37).

Furthermore, Gyeong and Myung affirm that

> "If students' learning styles are assessed, learning activities that further reinforce strengths or that develop weaker phases can be systematically planned to maximize thinking and problem-solving abilities" (Gyeong J. A., Myung S. Y., 2008: 101).

Additionally, Kolb underlined that students

> "must understand each of the learning modes and resulting learning styles" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

On the same note, Gyeong and Yoo state

> "that students need to be made aware of their primary learning styles so that they can be encouraged to use and develop the other learning styles" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

Finally, Ju An and Sook Yoo state that the learning styles of students "must be identified" (An J., Yoo S., 2008: 102).

5.3.1 LSI scale

Educators need to be able to identify the different learning styles of their students to structure appropriate experiential activities. The Learning Style Inventory (LSI) was invented for this reason.

The original scale was simple: a nine-item self-description questionnaire.

There are other versions of the LSI. In one of these

> "respondents are instructed to rank order four words in a way that best describes his/her learning style. One word in each item corresponds to one of four learning modes — concrete experience (CE: sample word, feeling), reflective observation (RO: watching), abstract conceptualization (AC: thinking), and active experimentation (AE: doing)." (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

This scale has been thoroughly examined. Researchers, such as Merritt and Marshall, stated that the original scale was reliable. Those two scholars discovered that the

> "results of this study indicated that the alternate (normative)version was as reliable as the original version, was equivalent in measuring characteristics defined in the original learning style scales, and demonstrated construct validity that was at least comparable to that for the ipsative instrument" (Merritt S. L., Marshall J. C., 1984: 463).

This work was extremely relevant because

> "it not only suggests that Kolb's early work and theories about experience and learning styles appear to be valid and reliable, but it also encouraged others to build on and improve Kolb's work" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 46).

On the contrary, scholars like Sugarman thought that the LSI needed an improvement. For example, Honey and Mumford invented the Learning Styles Questionnaire (LSQ), that was employed in the business community. This

questionnaire focuses on observable behavior and not preferences. Allinson and Hayes, supported by others, also considered it to be a better way of interpreting learning behavior

> "on account of the distribution of its scores, its temporal stability, and its construct and face validity" (Allinson C. W., Hayes J., 1988: 269).

They thought that

> "it is more capable of measuring an individual learning style since it has the ability to distinguish similar dimensions in two independent samples" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 47).

In the end, the scholars stated that the questionnaire was inadequate and lacked of prediction.

Henson and Hwang assered that

> "the lack of reliability in LSI scores is substantial enough to warrant either (a) discontinuation of use or (b) considerable revision of the instrument" (Henson R. K., Hwang D. Y., 2002: 720).

Even if it's not considered completely reliable, the 1985 LSI is still

> "widely used since it is regarded as appreciating diversity and acknowledging differences in learning" (Manolis C., Burns D. J., Assudani R., Chinta R., 2013: 47).

Chapter 6: Football Practice and Language Learning

This chapter offers an overview over the Metodo a fasi training used by Associazione Italiana Calciatori (AIC) during internship and Learning Units and Teaching Unit proposed by P. E. Balboni.

6.1 Metodo a fasi training

The *Associazione Italiana Calciatori* (AIC) organizes AIC Camp, an internship for young boys and girls from age 6 to 13. AIC Camp main objective is the spread of ethical values of sport, such as fair play, discipline, respect of the rules and the opponents. Another important aim is making the participants have fun and in the meantime trying to make them better human beings and football players.

The technical programme is the same for every location of the camp and it's drafted by the technical manager, dr. Stefano Ghisleni.

The kids are divided by age and technical skills, so that the groups are as uniform as possible.

The kind of training that is applied during the camp is *Allenamento con metodo per fasi*, developed by Ghisleni.

The main objectives of the practices are some technical fundamental, like dribbling, defense, passing and controlling of the ball. For each one of these aims, the trainings are made of a starting game, drills, game solutions and a game based on the objective.

Training are useful to link the technical skill to the values taught during the educational workshops. These workshops contribute to develop life skills, such as: decision making, problem solving, critical thought, creativity, effective communication, interpersonal skills, self-consciousness, empathy, stress management and emotion management.

During the workshops, the kids are actively involved in activities that revolves around themes like fair play, rules, respect of other people, rights and duties. Kids are invited to reflect on the importance of becoming good citizens in order to become good athletes.

At the end of every day at the camp, every participant write on his own "personal diary". The kids write down their emotions, sensations, thoughts, situations lived, the things they have learned and the relationship with their mates and their coach.

The *Allenamento con metodo per fasi* is better described in the POF (course offered) by AIC School.

In the paper, it is underlined that the school

> "deve perseguire il "successo formativo" di ogni singolo giovane calciatore"[68] (POF SCUOLA AIC, 2016: 4)

regardless of his technical skills.

This kind of training allows to:

> "Mettere il giovane calciatore al centro del progetto formative
>
> Seguire un percorso logico nella proposta di allenamento dei gesti tecnici
>
> Privilegiare l'aspetto ludico
>
> Favorire la relazione allenatore-giovane calciatore
>
> Passare "dal facile al difficile"
>
> Promuovere la crescita tecnica

[68] "Has to pursue the educational success of every young football player."

> Dare attenzione a tutti I giovani calciatori che si presentano con differenti caratteristiche coordinative, fisiche e caratteriali"[69]

The first step is to define the technical objective of the training. Afterword, contents of every activities can be set.

The training is made of different parts: a starting game, drills, game situations, a game based on the objective and a match.

The starting game

> "non è una partita, ma un vero e proprio gioco aspecifico che avvicina l'allenamento all'obbiettivo tecnico e che, inoltre, consente di iniziare in un clima positive, divertente"[70] (POF SCUOLA AIC, 2016: 4).

The drills are built around an analytical phase and an individual phase:

> "le esercitazioni consentono l'allenamento del gesto tecnico obbiettivo dell'allenamento"[71] (POF SCUOLA AIC, 2016: 4).

Game situation allows the application of the technical skills to a match situation.

Afterward, the kids play a *gioco a tema*, a real match that has a theme linked to the objective of the training.

Finally, they have a proper match.

The coach decides how long the different activities have to be carried out. It depends on the feed-back from the players.

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[69] http://www.assocalciatori.it/categorie/junior/scuola-aic/metodologia "put the young footballer in the center of the formative project; follow a logical path proposing technical training; privilege the playful aspect; support the coach-young footballer relationship; go from "easy to difficult"; promote technical development; give attention to all the young players that has different cordinating, physical and behavioural characteristics"

[70] "It's not a match, but a proper nonspecific game that links the training to the technical objective and that also consents to begin in a positive and fun mood"

[71] "Drills allow the training of the technical skill that is the aim of the practice"

The *Metodo a Fasi* could also plan a *loop tecnico o di verifica tecnica*.

> "Dopo l'esercitazione, si passa alla situazione che consente di verificare la capacità del giovane di applicare il gesto tecnico alla situazione presentato. Nel caso in cui l'allenatore verificasse che si presentino carenze, si ritorna all'esercitazione per poi ritornare nella situazione"[72] (POF SCUOLA AIC, 2016: 4).

The coach uses both inductive and deductive methods.

The player has an active role when he has to solve the practical, technical, emotional and cognitive problems set by the coach (deductive method). The coach help the footballers to carry out the different activities and to find a solution. The language has a deep educational impact in

> "momento della conversazione, con la tipica disposizione a cerchio, si pongono domande, si richiedono riflessioni, commenti, proposte, critiche, pareri e si chiede di esprimere le emozioni provate"[73] (POF SCUOLA AIC, 2016:5).

This way both the coach and the players learn something new. The players also develop their life skills and emotional intelligence.

During the deductive phase, the coach

> "esegue, dimostra un gesto e chiede ai giovani calciatori, dopo l'osservazione, di ripeterlo"[74] (POF SCUOLA AIC, 2016: 5).

Another important aspect is the organization of the field. It is organised in square because

[72] "After the drill, they moved to the situation that allow to verify the ability of the young player to apply the technical skill to the situation. If the coach see some lack in the footballers, the kids go back to the drills and then they go back to the situation"
[73] "Conversational moment, with the typical circular formation, questions are asked, considerations, suggestions, comments, thoughts are requested and the kids are asked to express their emotions"
[74] "Perform, demonstrate a skill and ask the young footballers to repeat it after the observation"

> "favorisce la relazione allenatore-giovane calciatore, reduce I tempi morti, ottimizza il lavoro, consente di passare "dal facile al difficile" attraverso l'aumento o la diminuzione delle dimensioni"[75] (POF SCUOLA AIC, 2016: 5).

6.2 Teaching Unit and Learning Unit

> "The didactic model described in the pedagogical literature is made of a three pole "space" defined by the roles of student, teacher and the subject to be taught" (Balboni P. E., 2007: 3).

> "The teacher is responsible for the balance of the didactic context" (Balboni P.E., 2014: 69).

The teacher is a learning facilitator, a counselor and a guardian, that help the students and let them make mistakes, and a director, that act behind the scenes and guides the students.

The teacher interacts with the students and communication is the key for quality teaching.

Another important element in the teachers' work is the class and activities planning. Different linguistic teaching materials are chosen based on the concept of language and on the educational needs of different students. Teachers create a module, that is divided in units that are presented to the students.

In this modular planning, each section is self-sufficient and can be certified.

> "Modularization, in the sense of identifying "self-sufficient" sections of knowledge and competence, becomes possible in some aspects of

[75] "Promote the relation between coach-young player, it reduces downtime, optimizes the work, allow to go from "easy to difficult" through the increase o the decrease of the size"

> language education once a high enough level of mastery is reached, high enough to be able to work on particular language varieties or on the metalanguage description" (Balboni P. E., 2007: 5-6).

A modular organization is possible for languages for a specific purpose, in the language of literature and in language analysis.

From the 60s, linguistic education introduced the term Teaching Unit (TU). In 2000s Balboni dismembered the TU in into a series of Learning Units (LUs), each one lasting only a single lesson or period. A teaching unit is

> "a more complex linguistic-communicative tranche realized by bringing together cultural models, communicative acts, language expressions and language structures, all linked by a situational context (TUs in language textbooks usually have situational titles: "At the station", "At the restaurant", and so on) or by a grammatical context (manuals for an extensive study of the mother tongue have such TUs as "The subject", "The predicate", "The gender", etc.)" (Balboni P. E., 2007: 2).

The structure of the TUs is articulated in three phases.

During the introductory phase the basic motivation of the students is revived.

> "This phase introduces the contents of the TU that is about to commence, and they are partly negotiated with the students: on the one hand, the teacher explains the logic of the TU that he or she is proposing (usually supported by a manual), on the other hand, the students themselves propose possible changes or request integrations" (Balboni P. E., 2007: 3).

The teacher can suggest to the students that they search for materials with which to construct and integrate the LUs they have previously proposed.

> "This is also the moment to give specific instructions for activities that need to be programmed in advance: finding authentic documents,

establishing contacts with a foreign school for future chatline sessions, etc" (Balboni P. E., 2007: 3).

The second phase is composed of the net of LUs.

The LU is

> "quello che lo studente percepisce come blocco unitario e che viene svolto in una sessione di lavoro"[76] (Balboni P. E., 2013:14).

It originates from the interaction of a neurolinguistic and psychological consideration. The neurolinguistic consideration is grounded in two functional principles:

- bimodality:

> "la divisione funzionale dei due emisferi cerebrali, quello destro preposto alle attività globali, olistiche, analogiche e quello sinistro alle attività razionali, sequenziali, logiche; le ricerche attuali hanno dimostrato un'integrazione più forte di quanto si immaginasse tra i due emisferi e le due modalità di interpretazione-rappresentazione della realtà, ma non hanno intaccato il principio che i due emisferi sono funzionalmente differenziati, uno orientato verso la globalità e l'altro verso l'analisi"[77] (Balboni P. E., 2013: 14)

- directionality:

> "pur nella cooperazione continua tra le due modalità del cervello, quelle emozionali e globali dell'emisfero destro precedono l'azione di quelle razionali ed analitiche dell'emisfero sinistro: nel nostro ambito il contesto precede il testo, la comprensione globale precede quella analitica, la

[76] "What the student perceives as a unitary lot and is done in one work session"
[77] "The functional division of the two brain hemispheres, the right one assigned general, holistic and analogical activities, and the left one assigned rational, sequential and logical activities; recent researches demonstrated a stronger integration than anybody would have thought between the two hemispheres and the two modalities of interpretation-representation of reality, but they didn't undermine the principle that the hemispheres are functionally differentiated, one is prone to globality and the other to analysis"

> soddisfazione di bisogni pragmatici precede il bisogno di accuratezza formale"[78] (Balboni P. E., 2013: 14)

The psychological consideration derives from the Gestalt psychology, that defines perception as a sequential process of globalising → analysing → synthesising.

As mentioned before, the TU can be thought of as a "net" of LUs. In this way, it has a more flexible structure and can be expand with supplementary LUs created by the teacher or the students.

Each LU follows the Gestalt path. First, the subject (a literary text, a dialogue, authentic material, a communicative event, a song) is tackled globally,

> "with comprehension tasks, graded from the simplest to the most complex, that involve the right hemisphere of the brain and are mainly based on strategies such as the maximum exploitation of text redundancy and the formation of socio-pragmatic hypotheses that are based on the person's own knowledge of the world" (Balboni P. E., 2007: 4).

Then it is analytically analised:

> "in terms of both a profound comprehension of the input and by creating linguistic, socio-cultural, pragmatic hypotheses: this can include some phases of explanation by the teacher, however constructive and cooperative teamwork is what leads the students toward discovering the mechanisms of the language" (Balboni P. E., 2007: 4).

This way students turn into protagonist and teachers are there to help them and support them.

[78] "Although there is a continuous cooperation between the two brain modalities, the emotional and holistic activities of the right hemisphere precede the rational and analytical ones of the left hemisphere: in our field the context precede the text, global comprehension precede the analytical, the satisfaction of practical needs precede the need of formal cure".

Next the text is tackled by a synthesis,

> "by a consolidation of what has been discovered (globally) and analysed (analitically), and which is now applied in exercises and creative activities of problem solving, simulation, creation of texts, etc." (Balboni P. E., 2007: 4).

Finally, it is tackled by a metalinguistic and metacognitive (learning to learn) reflection:

> "a reflection on what has been done, on how the discovery of the meaning of an unknown word, or a grammatical mechanism, or an implicit cultural item, has been achieved; a reflection on the interactions within the class, on why a certain group performed well or badly, on why an activity has required too long a time to be organized, and so on" (Balboni P. E., 2007: 4).

This phase can also be used at different moments in the LU.

The conclusive part is made of language testing and evaluation.

> "La verifica è riferita al raggiungimento degli obbiettivi, è il classico test; la valutazione è il giudizio che l'insegnante dà sulla performance di ogni singolo allievo sulla base di considerazioni quali il percorso di miglioramento. […] La verifica riguarda specificatamente gli obbiettivi linguistici, pragmatici, culturali dell'unità appena conclusa, ma rileva e valuta anche quegli elementi che, a quel punto del percorso di acquisizione della lingua straniera, dovrebbero essere stati acquisiti in unità precedenti"[79] (Balboni P. E., 2013: 21-22).

[79] "Language testing refers to reaching objectives, it's the typical test; evaluation is the judgement that the teacher gives to the performance of every pupil based on consideration like the improvement. […] Testing concerns linguistic, pragmatic and cultural objectives of the unit just ended, but it measures and evaluates also those elements that, at that point of the linguistic acquisition, should be have been already acquired."

At the end of the conclusive part two paths emerge:

- "the group of students with medium-low results can lift their respective levels through "stratified and differentiated" LUs. […] One of the characteristics of the "stratified and differentiated" LU *activities are collocated in degrees of difficulty and therefore each student carries out activities autonomously up to a certain point, and from that point on he/she then works together with whomever can reach the higher levels*" (Balboni P. E., 2007: 4-5).
- "the group of students with medium-high results can improve its excellence with activities of further study: language games, webquests, research of materials that can eventually be proposed to the class" (Balboni P. E., 2007: 5).

In this work phase the class is divided into two parts.

There is also an interlude phase

> "the just concluded TU and the one starting in the succeeding session is actually an hour without (an explicit) teaching purpose, is one whose sole purpose is taking pleasure in using the language: the pleasure of observing oneself learning, the pleasure in playing with the language, in listening to a song or watching a scene in a film, in chatting with foreign classes, and so on" (Balboni P. E., 2007: 5).

Part 3: Teaching Material

This final part is made of teaching material that can be used to teach Italian L2. The previous parts set the neuroscientific and the linguistic bases necessary to support the final chapter.

These materials are for children with a level A2 of proficiency. The exercises focus on the work in the football field, but there are also some suggestions on how to carry out activities in class.

Chapter 8: Material

8.1 Objective

This part of our dissertation includes teaching materials that can be used for teaching Italian L2.

The exercises are thought for children of elementary school with level A2 of proficiency.

The material is based on the principles described in the previous parts.

The training exercises are taken from programmes for children from age 6 to 10, from *Piccoli Amici* and *Pulcini*. It is crucial that the drills are suitable for the age and the skills of the children.

The teaching objective that the pupils try to achieve is learning the body parts. Children are taught the lexicon related to the body parts, the present tense of some motion verb and also how to express hurt after an accident.

It is relevant to underline the importance of the working environment. The lessons are meant to take place both in the football field (or gym) and in class. These two environments need to be integrated. It is necessary that the children feel the continuity and the connection between what they learn in the different settings. It is the only way to reach a meaningful learning.

The role of the teachers is also relevant. They have not only to carry out the activities but also show how to do the exercise. It is crucial that the input comes from different form and involves the different types of sensory memory.

8.2 Teaching Materials

FOOTBALL FIELD

The first exercise helps the children to rise the perception of their body regarding the environment[80].

Activity no 1:

The teacher says the verb that describes the action and show the action to the children, that they have to perform with the teacher.

They start could start lying to the ground. The teacher says *strisciate* and he/she start crawling.

Other actions could be:

Rotolate (roll)

Camminate sulle punte (walk on your tiptoe)

Camminate sui talloni (walk on your heels)

Correte (run)

The following activities are thought to present the term related to body parts and help them learn them. Those exercises are meant to be done in team or in pairs. This encourages the development of the relationship between the classmates. It also develops the skills of working in a team and of cooperation.

During the team games, the team jersey has to have different colours or one of the team has to wear sport vests.

[80] https://www.youtube.com/watch?v=lUygJSq4vCg, from 0:00 to 2:52

Activity no 2

This is a workout that is often done during the warm up.

It's called the 10-5 touches. The technical objectives are reception and pass[81].

The children are divided into two team and the teacher is the referee.

In the first round, the aim of the game is to realize 10 passes in a row between the member of the same team using their hands. In order to get a point, the last children to get the ball has to say out loud the part of the body that the teacher is pointing at. The first team to reach 5 points, win.

In the second round, the aim of the game is to realize 5 passes in a row between the member of the same team using their feet, instead of their hands. The game carries out as the one before.

Activity no 3

This task is carried out in pairs.

Taking turns, one child throw the ball to his/her mate and tells him/her with which part of the body he/she has to hit the ball with.

For example, kid A throws the ball to kid B and says "*BRACCIO*" and B has to hit the ball with his/her arm

Activity no 4

This is another game often used during football training, it is called "*11 cantoni*"[82]

Only a short part of the field is used. Some cones (as many as the children) are placed in the field.

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[81] https://www.youtube.com/watch?v=4Uft1VxMIhw&index=1&list=PLlKYfpcSDRQds_5BjuFCjOBwlhj_tj18c

[82] https://www.youtube.com/watch?v=MKH9PzYnt2w

When the teacher whistles, the kids start running around kicking the ball. After few seconds, the teacher whistles a second time and names a body part. As soon as they hear the sound, the kids have to run towards one of the cone and lay the body part mentioned over the ball.

For example,

When the teacher says: "*PANCIA*", they have to stop the ball, go near a cone and lay over the ball on their stomach.

When the teacher says: "*SCHIENA*", they have to lay down and put the ball under their back.

This exercise also help to improve the control of the ball because they have to stop the ball with their foot.

Activity no 5

This is another team activity. It is proposed during trainings to enhance the ball control[83]

Each team member has a cloth. The aim of the game is to steal the cloth of the members of the opposing team. Everybody has to run around trying to get the cloths and to escape the rivals. To get the cloth, a kid has to touch a body part of the opponent and say out loud which part is.

Once the child gets the cloth, he/she start to look for another one.

The one without the cloth has to stop and can continue the game only if one of his team mate brings him/her a stolen cloth.

When the time runs out, the teacher ends the game and the winning team is the one that has more cloths.

[83] https://www.youtube.com/watch?v=f88nbBub0SY It often has different names and there are several varieties.

Activity no 6

This activity is carried out in teams. It is a variation of an exercise often used to train the category of *Pulcini*[84].

The children are divided in two teams. Each team forms a line.

They have to challenge each other in pair. The teacher point at a body part and the first of the two kids to say it becomes the forward and starts running towards the goal to score. The other child becomes a defender and has to get the ball form the opponent.

The team that scores the most, wins.

The tasks that we are proposing here are meant to enhance the use of the simple present and the imperative of motion verbs, such as *correre*, *andare*, *saltare*, *camminare*.

Activity no 7

This exercise helps training coordination. Often kids cannot run and move their arms at the same time[85]

The teacher explains out loud and shows the drill they are doing. The drills combine different strides (walking, running, jumping) and motions with hands and arms.

The kids have to repeat what the teacher is doing.

[84] https://www.youtube.com/watch?v=IkAVlpe48to
[85] https://www.youtube.com/watch?v=zPYIj0kht3U

Activity no 8

This activity requires the use of different obstacles.

The teacher lays down different obstacle paths with little cone, sticks and low obstacles.

The children are divided in pairs. Taking turns, one kids tells the other how he has to faces the different obstacles.

For example,

"*Salta!*", "*corri attorno*"

This exercise allows the student to be more responsible and make decisions. They have to use the imperative of new verbs that they have learn.

This training is often use to…

Activity no 9

For this task, every kid has the ball. The teacher gives instructions to the children and they have to perform the task told by the teacher.

This is usually used during the warm up and it helps the players learning to control the ball[86].

For example,

They have to stop, if the teacher says "*Fermi!*"

They have to run, if the teacher say "*Correte!*"

They have to pass the ball, if the teacher say "*Passate la palla!*"

[86] https://www.youtube.com/watch?v=bWmQt5qVEzU&list=PLlKYfpcSDRQcO2I96m8vu7BRGbIRJ-PRA&index=1

The two last tasks that I'm going to offer deals with wellness. In LU about body parts, there is always a section related to doctors and getting hurt.

Activity no 10

This first activity is often used to introduce the kids to feints.

The kids have to run around with the ball, avoiding each other and changing direction abruptly.

This drill can be used to introduce the children to the next activity because it helps them to understand the concept of pretending.

Activity no 11

This one is about simulation.

The activity could start by asking the kids if they have ever heard this word, if they know what they mean and if someone can explain it to their peers.

This help the kids to take more responsibility and show what they already know.

It's important to underline that simulation is only used for linguistic purposes and it's not correct behavior.

The children work in pairs. Taking turn, one is a defender and one is a forward. They pretend to perform an action and the forward simulate a foul. After going down, he has to describes what happened, focusing on which part of his body was hurt by what.

CLASSROOM

It is crucial that the concepts learnt by the kids in the football field are developed in class as well.

The work done in class is relevant because the teachers can focus on the linguistic aspect that cannot be analyzed playing football, such as writing proficiency.

The teachers should offer a reflection on the grammatical use, on the use of the verb and the different words.

They should also present different exercises. It is important that the input is presented in different forms. They should pay attention to the recreational dimension in order to keep a high level of motivation.

The kids need to understand a continuity between the work done in the football field and what they do in class. The teachers have to bring what they did with football in class so the kids can link the different activities. It is essential that they feel this connection to get a meaningful learning.

The following tasks can be used in this sense.

Activity no 12

This exercise refers to the activity no 11, the one about simulation.

The teachers can recall the experience by asking the children some question.

"Chi ricorda cos'è la simulazione?"

"Qualcuno può spiegarla?"

After the kids answer questions like these orally the teacher give them a task.

Consegna: Scrivi delle frasi per descrivere cosa ti fa male.

Example, "*Mi fa male il ginocchio"*.

Conclusione

L'intento di questa tesi è quello di offrire un approccio multisensoriale all'educazione linguistica e di fornire delle prove a favore dell'uso del calcio nel processo di apprendimento.

Nonostante vengano utilizzati metodi sempre più vari nell'insegnamento, abbiamo ritenuto necessario occupare gran parte della tesi alla base neuroscientifica. È, infatti, necessario fornire forti prove a supporto dell'uso di uno sport come il calcio come mezzo educativo.

Gran parte della ricerca è concentrata sulle teorie dell'*embodiment* e nell'apprendimento esperienziale di Kolb perché forniscono gli strumenti teorici necessari per poter supportare l'idea di un apprendimento basato sulla corporeità e sul saper fare. Per questo è stato cruciale sottolineare anche l'importanza della memoria sensoriale che assume un ruolo centrale nella multisensorialità.

Le fonti utilizzate sono abbastanza recenti perché i cambiamenti in campo scientifico sono molto rapidi. Il modello di Kolb, comunque, rimane quello principale per la didattica esperienziale.

Il materiale didattico presentato è stato pensato in base alle ricerche esposte nella tesi. Questo materiale si basa solo su supposizioni teoriche e non è stato testato su una classe quindi non è detto che sia efficace. Un altro limite di queste proposte è di tipo logistico e di spazi. È necessario avere a disposizione un campo da gioco, o una palestra, con le attrezzature adatte per poter effettuare gli esercizi.

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