

# MULTI-SENSORY, HANDS-ON MANIPULATIVES AND ADULT ESL

by Timothy J. Stapleton

*Timothy Stapleton describes the use of multi-sensory manipulative Montessori materials as tools to increase involvement and interaction in the teaching of adult ESL students. He describes Montessori's rationale for hands-on materials and the challenge of traditional ESL instruction that is often "too abstract for foreign-born students to comprehend." His research project, involving Farsi speakers ages 18-60, demonstrated how enthusiastically these adults learned when using materials adapted from primary and elementary Montessori environments.*

## ABSTRACT

The researcher in this study utilized the Montessori concepts and materials that emphasize the use of hands-on manipulatives in the classroom with 10 adult English language learners ranging from ages 18-60. The purpose was to investigate whether or not hands-on manipulatives were effective in aiding adult English language learners to acquire English. The term *English Language Learner* (ELL) is used for any student learning English in the United States. For confidentiality purposes, this study uses abbreviated versions of the students' names. Reference to an ELL's home country may be alluded to merely for the sake of providing background information to the reader. The researcher facilitated all the English language

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lessons as well as observed the participants' reactions to the material. Some of the observation notes will be provided when needed in order to provide reports on the effectiveness of the materials used with ELLs.

### THE CHALLENGE TO LEARNING ENGLISH

Research shows that English as a Second Language (ESL) teachers often give lessons in formats that are too abstract for their foreign-born students to comprehend (Collier, Combs, and Ovando C., 2006; De Luca, 1976; Freeman et. al., 2004; Macbeth, 1974;). The "use of hands-on and visual math and science pedagogy can result in both the acquisition of content area and the development of academic language use" (Collier et al., 2006, p. 243). Since many adult ELLs in this study were limited to textbook exercises, such as grammar worksheets and traditional pedagogical methods, the researcher implemented the use of multiple modalities that included the use of hands-on materials. Recent research indicates that learning is enhanced when multiple modalities are utilized (Barsalou et.al., 2003; Lillard, 2005). Multiple modalities refer to strategies that allow instructors to teach in ways that help students to develop cognitive skills in subject areas as well as receive instruction in the second language (Collier et al., 2006). "Students like to smell, touch, see, hear, taste, connect, disconnect, heat, cool and quantify things" (Collier et al., 2006, p. 243). Therefore, the "use of materials that students can touch, push, pull...takes on even greater importance in a classroom in which more than one language is represented" (Collier et al., 2006, p. 244).

### WHAT ARE MULTI-SENSORY, HANDS-ON MANIPULATIVES?

At the turn of the twentieth century, a young Italian physician named Maria Montessori was asked by the Ministry of Health to care for children with cognitive disabilities. Montessori, with the use of hands-on manipulatives, helped increase the cognitive skills of these "mental defectives" to such a degree that they were able to exceed the national expectations set by the Italian Ministry of Education. After Montessori's success with these children, the Ministry of Education asked her to help educate a number of children in San Lorenzo, a working class district in Rome. In 1907, Montessori established her first "Casa dei Bambini," literally "Children's House," where she



observed the children and developed what has become known to Montessori educators as the *prepared environment* (Lillard, 2013). In this environment, she was able to utilize concrete, hands-on manipulatives that allowed the children to develop motor movements, functional independence, language, and mathematical skills.

#### RESEARCH QUESTION

The research in this study sought to establish the effectiveness of concrete aids in the ESL classroom. Effectiveness refers to developments in vocabulary, oral proficiency, and overall grasp of English as the second language. With this in mind, the research question proposed for this study is as follows:

Does the use of multi-sensory, hands-on manipulatives help the adult ELL, aged 18-60, acquire the second language (English) more effectively?

## SUMMARY OF RELATED LITERATURE REVIEW

The pedagogical approach Montessori used followed the developmental stages of the human being. In *The Absorbent Mind* Montessori states, "Ours was a house for children, rather than a real school. We had prepared a place for children where a diffused culture could be assimilated from the environment, without any need for direct instruction" (p. 7). The teacher gives lessons to the children, observes and allows them to act on the environment with the use of hands-on manipulatives. The child is therefore able to acquire knowledge independently. Montessori writes, "If visitors asked them, 'Who taught you to write?' they [children] often answered with astonishment: 'Taught me? No one has taught me!' " (1995, p. 7).

Much of the curriculum designed for adult ESL classrooms is utilized at the elementary levels in traditional public schools. Therefore, the researcher chose to examine the use of language curriculum designed for the elementary Montessori environment in an adult ESL classroom. Reflecting on the educational conventions of her time, Montessori (1991) argues that "in school, good conduct means inertia and bad conduct means activity" (p. 235). In contrast to her approach, Montessori (1965) describes the following:

According to the method used in ordinary schools a child is called upon to read aloud, and the teacher herself continually interrupts, either to correct the pronunciation, or to assist by explanations and suggestions in the interpretation of meaning. This is all useless for experimental purposes. We have not certain means of determining whether the pupil has understood either what he has read or the explanations of the teacher. Furthermore the corrections of pronunciation have centred the child's attention on this detail, which is entirely without relation to the meaning of the text he is interpreting. (p. 179)

In a Montessori environment, activity, which includes interaction with the environment, with the Montessori materials, and with other children in the environment, is the means by which children build knowledge. Furthermore, in this ESL environment, activity refers to the interaction of materials, students, teachers, and their environment where a constant interaction is part of the learning process much like the Montessori environment, which was previously described.

Therefore, children in Montessori environments are able to acquire knowledge by interacting with their surroundings and the prepared materials therein. By increasing the opportunity for adult English language learners to interact in comparable ways with manipulatives in the classroom, the researcher hopes they will be able to acquire English more effectively. The reader might inquire how Montessori's work in the field of early childhood education relates to adult ESL. Dr. Montessori explicitly states, "These exercises can be of interest also to the illiterate adult and it has been proved in fact that they do interest him" (1989, p. 89). Although child development differs from adult learning, Montessori's discoveries about the nature of learning in early childhood led her to understand that materials designed to be handled allow children to comprehend abstract concepts, but only if the materials are designed to embody the precise relationships that underpin the abstract knowledge to be learnt (Beilock and Goldin-Meadow, 2010; Lagnado and Sloman, 2002; Sobel and Kushnir, 2006; Wagner Cook, Kuangyi Yip, and Goldin-Meadow, 2010). Working with visuals and concrete materials allows the learner to gain experience in order to make the connection to abstract concepts. Echevarria, Vogt, and Short (2013) state "manipulating learning materials is important for English language learners because it helps them connect abstract concepts with concrete experiences. Furthermore, manipulatives and other hands-on materials reduce the language load for students" (p. 175). The use of visual aids and hands-on manipulatives reveals such relationships, thus interacting with the materials allows the children to build knowledge. The

Most grammar materials designed for adult English language learners are limited to textbooks that offer the language learner repetitive exercises and textual explanations that present concepts in an abstract form. The researcher used the Montessori materials to observe whether or not the participants were increasing their vocabulary, understanding more English terminology, and making connections with the materials.

essential principle of Montessori education is "to teach details is to bring confusion; to establish the relationship between things is to bring knowledge" (Montessori, 1994, p. 58). Investigating the process through which children independently acquire knowledge by work-

ing with concrete manipulatives to understand abstract concepts might be a starting point for considering how adult ESL students might benefit from a comparable use of manipulatives.

## Child Development

The development of knowledge through activity is explained by Dr. Montessori (2007, p. 9) in the following way:

Children show a great attachment to the abstract subjects when they arrive at them through manual activity. They proceed to fields of knowledge hitherto held inaccessible to them, such as grammar and mathematics. I wonder how the theory arose that in order to work with the hand one must have an uncultivated mind, or that a cultivated mind consorted with manual helplessness! Must a man be classified either as a worker with his head or with his hands, instead of being allowed to function with his whole personality? Where is the logic in the view that one-sided development can be beneficial to the whole?

Montessori's development of hands-on materials was merely a result of her discoveries of the human potentials that are latent in the mind. She stated, "this sub-conscious memory has marvelous mobility, and everything is there on record though we are not consciously aware of it" (Montessori, 2007, p. 13). This sub-conscious memory also called the *mneme*<sup>1</sup> by psychologists in the early twentieth century was considered to be the part of the psyche "by which a child unconsciously recognizes the sounds of human speech, and retains those sounds for imitation" (Montessori, 2007, p. 13). In this view, small portions of the *mneme* penetrate into conscious thoughts to generate memory, with the result that "an educated man may have no memory of things that he was taught at school, but he has intelligence, a power of quick apprehension on those subjects, which has been retained by the *mneme*" (Montessori, 2007, p. 13); the traces of what an educated person retains in their memory, Montessori called *engrams*.<sup>2</sup>

By our use of this fact it follows that in our schools the child's intellectual powers become much augmented, whereas in ordinary schools the only object is to store

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<sup>1</sup>Mneme: This antiquated term was used by Dr. Montessori and may be defined in modern terms that does not contain the intended meaning according to Dr. Montessori.

<sup>2</sup>Engrams: This antiquated term was used by Dr. Montessori and may be defined in modern terms that does not contain the intended meaning according to Dr. Montessori.

knowledge in the conscious memory, and no opportunity is given to the child, by continuous and varied experiences to increase his engrams. (Montessori, 2007, p. 14)

Following her explanation of the *mneme* and *engrams*, Montessori (2007) writes, “another vital factor of the mind is the urge to carry an action to completion, and it is part of what has been called” (p. 14) the *vital urge*, as illustrated by Montessori (p. 15) in the following way:

This association of engrams is spontaneous, and far more actively powerful and lasting than any induced chain of related ideas. It is well known that a mathematical student may ponder for hours over some problem without success, till he decides “to sleep on it”, and on waking finds the solution easy. Is it because he has rested, and so can understand and think better? No, for immediately on waking he is conscious of the problem being already solved in his mind, as if the solution itself had forced him to wake up and register it. It could only happen because the engrams did not sleep, but in association had done the work and forced it into the consciousness.

On the basis of this understanding, Montessori claimed “every human being does his most intelligent work in the sub-conscious, where psychic complexes are the construction of engrams” (2007, p. 15). The conclusion Montessori reached was that children must have the freedom to act or work in a prepared environment in order to be intelligently active.

## **The Language Materials**

In *The Advanced Montessori Method-II* (1965), Montessori provides numerous examples illustrating the importance and function of the language, arithmetic, geometry, art, and music materials. Regarding grammar, Montessori states the following:

Our grammar is not a book. The nouns (names), which the child was to place on the objects they referred to as soon as he understood their meaning, were written on cards. Similarly the words, belonging to all the other parts of speech, are written on cards. These cards are all of the same dimensions: oblongs (5 x 3 and a half cm.) of different colours: black for the nouns; tan for the article; brown for the adjective; red for the verb; pink for the adverb; violet for the preposition; yellow for the conjunction; blue for the interjection. (1965, p. 11)

The words are placed on color-coded cards in order to make it possible for the child to manipulate the cards as concrete objects. The color-coding, which corresponds to a particular part of grammatical speech, allows the child to learn about the grammar patterns of their language that relates to abstract knowledge. After the introduction to nouns, the instructor continues introducing the other parts of speech. For example, Montessori, in a presentation of nouns, picks up a card with the word “sweet” written on it. She then asks a group of students to get her sweet (1965). If the students give her candy, Montessori responds by stating that she did not ask for candy. The students quickly realize that sweet is not a noun and thus gain a better understanding for identifying nouns as well as other parts of speech. The verb exercises allow the students to physically interpret the actions from a set of verb command cards that allow the student to comprehend the verbs by executing the actions. Printed cards are provided to the students for them to act out or interpret (Montessori, 1965). The examples provided here illustrating language lessons led Montessori to discover that the children acquire knowledge of the parts of speech through the use of hands-on materials. She states, “he [the student] must be given the instrument and the strength to use it, and then left free to find things out for himself” (Montessori, 1965, p. 201).

#### SUMMARY OF RESULTS

Based on the literature review, Montessori methods provide the necessary support for the English language learner to connect abstract concepts to a term that is presented to him or her. One of the gaps I found in the literature review is that Montessori does not address second language learners. Moreover, Dr. Montessori does not directly address the adult learning process. The demographics of my research consist of 10 participants, all of whom are Farsi speakers. The age ranged from 18- to-60-year-olds. The researcher utilized an action research approach in order to collect observational notes and modify lessons over the course of the research. All of the materials that the researcher used were adopted from the elementary and primary Montessori environment. For example, the movable alphabets, one set of blue letters and the other set of red letters were used. The elementary grammar cards as explained in the “language materials” section were used as well. The Montessori materials in



Composition with a moveable alphabet, The Montessori School, Laren, around 1938

the study were used to observe the participants using them in order to identify whether or not they were making connections between the concepts and the actions they were performing. For example, if a participant read an instruction, “raise your hand,” the researcher sought to observe whether or not the participant connected the action verb *raise* and the act of raising one’s hand. Most grammar materials designed for adult English language learners are limited to textbooks that offer the language learner repetitive exercises and textual explanations that present concepts in an abstract form. Moreover, the researcher used the Montessori materials to observe whether or not the participants were increasing their vocabulary, understanding more English terminology, and making connections with the materials. The materials were also used to allow the ELL the opportunity to experience how certain parts of speech were used. For example, the preposition materials required the ELLs to place objects in certain positions in order to articulate the function for prepositions. Moreover, the ELL’s comprehension increased because they had to interpret a directive with an action, thus making a connection between a term and an act thereby resulting in his or her understanding of new vocabulary. Based on several of my

observational findings, support is found for the research question: *Does the use of multi-sensory, hands-on manipulatives help the adult ELL aged 18 to 60 acquire the second language of English?*

The students showed improvements in vocabulary development, oral proficiency, comprehension, and displayed enthusiasm to continue using the materials. For example, the research spanned eight weeks; however, the students asked to extend the English class until an undetermined date. One of the participants even offered to host the English class in her home. These findings are consistent with the following results from Dr. Montessori's (1989) work: "These exercises [hands-on manipulatives] can be of interest also to the illiterate adult and it has been proved in fact that they do interest him" (p. 89). All of the students who participated in this study are literate; however, not all of the participants read and write in English. The observations included focus on the effects that the use of multi-sensory, hands-on manipulatives had on the participants.

I learned that ELL students enjoy working with hands-on manipulatives. Montessori materials increase the opportunity for student involvement and interaction. Students who use the materials do not sit passively while the instructor attempts to verbally explain a concept. On the contrary, the students are encouraged to participate with other students, make connections with new concepts, and draw conclusions based on their understanding.

The participants consisted of 10 Iranian Baha'i refugees who were granted asylum due to faith-based persecution; therefore, all the participants speak Farsi as their primary language. This researcher offered a free English class in the home of one of the refugees. The researcher relied on observational data to record any phenomenon and, due to the brevity of the study, only the most germane observations are included. The observations focus on the participants' reactions to the materials. For the reader to gain an insight into the research, an account of the use of the materials is provided in the following example:

Today we completed exercises for adjectives. First, I placed a stack of coloured pencils and pens on a table

nearby. Then the participants were asked to get a pencil. They walked over and picked a coloured pencil and after a minute we gathered back at the table. I whispered to Veg that I was going to use him as an example. I asked Veg, "Can you get me a pencil?" Veg walked over, and brought a pencil. When he sat down the researcher looked at the pencil and said, "I'm sorry, that's not the pencil I want. Can you bring me the pencil?" Veg went to get another pencil. When he sat down, I again said, "Sorry, that's not the pencil I wanted." Veg was not asked to get another pencil. I explained to the class that Veg did not know what kind of pencil to bring. Then I asked Veg, "Will you bring me the *gold* pencil?" After he returned, I held up the pencil and said "Veg knew which pencil to bring this time because I described it." I discussed how gold described our noun—the pencil—and then defined the adjective as "the word that describes other words." Then we stated a few examples of adjectives by defining the colours of the pencils. Again, I reemphasized that adjectives are words that *describe*. Next, we began using the adjective card material. The first card read, "the red crayons/the yellow crayons." On smaller cards was written each individual word in the phrase: *the*, *red*, *yellow* and *crayons*. The participants were asked, Which words describe the noun? A few replied, "Red and yellow." I confirmed this and placed the individual cards on the table below the phrase card. Both the phrase card and the word cards read "the red crayons" and "the yellow crayons." Each individual card was color-coded to represent the parts of speech in the noun family: the article, adjective, and noun. We repeated this activity as a large group with a few more cards. Afterward, they split into two small groups and completed more adjective cards on their own.

During week four, the participants demonstrated improvements in the English language when compared to week one in terms of an increase in English vocabulary and the connections the students were making to the vocabulary from the materials and the concepts they conveyed. For example, I began to notice greater interaction between the students in English as opposed to conversations in their mother tongue: Farsi. Moreover, students were not translating as much from Farsi to English while completing the activities. I noticed that the use for translation was replaced by the fact that the students were able to recognize relationships between the vocabulary and

the actions being performed, as illustrated in the following activity, which is to learn and practise the use and function of verbs:

First, I placed one of the red verb command cards on the table. The first sentence on the card read, "Raise your hand." The participants were asked, "Which word told us what to do?" A few replied, "Raise." I confirmed and said, *Raise* told us what to do. It told us what *action* to perform. So tonight we will look at action words. Words that tell us the *actions*. The next sentence on the card read, "Lower your hand." I demonstrated by lowering my hand. I asked the participants to act out the sentences with me; everyone raised his or her hand when the first sentence was read. Then everyone lowered his or her hand as the second sentence was read. The color-coding followed the same pattern as before, with the inclusion of red to denote verbs. Al was asked to read the next card slowly. She proceeded to read the first sentence "Crinkle the tissue paper" and paused in order to allow the participants to perform the action. I took the tissue paper from the table, crinkled it into a ball, and repeated what Al read while simultaneously performing the action. Al read the next sentence on the card: "Smooth the tissue paper." The tissue paper was laid on the table and smoothed out by hand. As this action was performed, I stated, "Smooth the tissue paper." We repeated performing these verb exercises as a group and acted them out. For example, the next sentences were "Open the envelope" and "Seal the envelope." I asked another participant to demonstrate the action with the envelope and the students continued working with the materials in their own small groups.

During a lesson on nouns with definite and indefinite articles, Al made a connection while using the materials. As we were placing articles next to singular and plural nouns, Al noticed that we were placing *the* for plural nouns, *a* for singular nouns and *an* for nouns beginning with a vowel. Al noticed the relationships between certain articles and the nouns by commenting as we completed the activity.

As a final example, one of the command noun cards prompted the students to identify a counter or abacus. None of the participants knew what this object was or for what purpose the object was used. However, as I looked around the room, there happened to be



Courtesy of Maitri Learning, [www.maitrilearning.com](http://www.maitrilearning.com)

an abacus mounted on the wall. When I brought the abacus to the table, the participants knew exactly what the noun command card was identifying. Therefore, the former observation shows how a word in its abstract form was identified by the aid of a concrete object—in this case an abacus. Over the course of the eight weeks the students with limited English speaking abilities learned enough vocabulary in order to begin code-switching, a term meaning that they would converse in their native language while simultaneously adding English terminology. The students showed enthusiasm by the end of the eight weeks by asking if we could extend the classes. Also, during the last week, one of the participants asked if we could meet more than twice a week. Moreover, this same participant asked if they could add textbooks as homework to study with outside of class and use the materials to reinforce what they were attempting to understand from the texts. Most important, I observed the students growth by how they worked collaboratively, discussed English terms, executed the actions independently and presented the materials to one another in order to develop a deeper understanding of English vocabulary and grammar.

## RECOMMENDATIONS AND ACTION PLANNING

Based on this small-scale study, I learned that ELL students enjoy working with hands-on manipulatives. Also, Montessori materials increase the opportunity for student involvement and interaction. For example, students who use the materials do not sit passively while the instructor attempts to verbally explain a concept. On the contrary, the students are encouraged to participate with other students, make connections with new concepts, and draw conclusions based on their understanding. This active learning style is associated with better learning (Glenberg et al. 2004). Therefore, I recommend that educators from all grade levels further investigate the use of hands-on, multi-sensory manipulatives as an alternative approach to help their students learn. Moreover, students who are learning the mechanics of their native language benefit from the use of hands-on materials. Similarly, students who are learning a new language can equally benefit from the use of hands-on materials. Replicating this study may prove to be beneficial to those who wish to investigate the effects that hands-on, multi-sensory manipulatives might have on students' academic progress compared to students who are learning in a traditional classroom.

This study, whilst limited in scope, has affected my work by reinforcing the fact that people, irrespective of their native language, learn most effectively by using concrete aids to understand abstract concepts (Lindquist, 1995; Short, 1994). Furthermore, I hope that all educators will further investigate the benefits of utilizing Montessori's discoveries of human development as well as her pedagogical approach, which has enhanced my role as a teacher by facilitating the learning process as opposed to direct instruction. For example, I made every attempt to maintain humility as I facilitated the lessons and talked less as well as encouraged student involvement and interaction.

This study encouraged me to reflect on the process of learning made possible by scientific observation. Jacob Bronowski (1973) defines the process of scientific observation as, "Science is a very human form of knowledge. We are always at the brink of the known, we always feel forward for what is to be hoped. Every judgment in science stands on the edge of error and is *personal*. Science is a

tribute to what we can know *although* we are fallible” (p. 374). I have found myself standing on the edge of error many times throughout the duration of this study, yet I believe that with the aid of Dr. Montessori’s curriculum and pedagogical approach, I have made small steps toward providing an environment that will enable adult English language learners to acquire a new language.

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