The Importance of Interest-Based Learning in Patients Diagnosed with

Autism Spectrum Disorder: An Interdisciplinary Analysis

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 The world of research involving autism is of massive quantities. Consistent with the DSM-IV-TR (2000), autism is described as a pervasive developmental disorder with delays in social interaction, behavioral functioning, and communication. Autism spectrum disorder does not only encompass autism, but also includes Asperger’s disorder, pervasive developmental disorder, Rett’s disorder, and childhood disintegrative disorder. For specifics of this research analysis, autism will be the focus. According to recent investigations, there is a significant deprivation of knowledge when it comes to interest-based learning, including but not limited to, the function and benefit of this type of education. Interest-based learning is a different approach to the customary functioning educational system. It requires the teacher, parent, or therapist to incorporate the child’s interests in the learning environment. A hypothetical problem with excluding interest-based learning, such as music, during cognitive therapies rests in the fact that patients could produce negative behavioral consequences or progress cognitively at a slower pace compared to other educational tools or therapies for autistic conditions. “Studies of young children with and without disabilities and delays have found interest-based child learning is associated with positive child behavioral consequences” (Dunst, Trivette, & Masiello, 2011, p. 295). The disciplines of ***genetics***, ***psychology***, and ***music*** will be used to effectively address the prominence of interest-based learning.

Genetics

 Genetics is a recently emerged discipline that examines the structure and function of life through the human genome and experimental procedures of control. By investigating the perspective of genetics, sanctions for thorough research in the heritability of the susceptible autism spectrum disorder (ASD) genes. With the discovery of specific genes, experts can recognize an individualized approach for risk recognition and learn a more profound understanding of the biological mechanisms essential to the disorder, allowing for core therapeutics to be established (Lajonchere, 2010). By examining the human genome, one can discover the functions of biologically grounded methodologies to diagnose and cultivate the appropriate treatments for ASD individuals.

Psychology

 Psychology is the study of the mind and how it functions in accordance with the body. Human behavior plays a significant role in the realm of psychology pertaining to mental characteristics, actions, and attitudes of an individual or group. Circumscribed interests are the obsessions of individuals with ASD who develop unusual concentration and/or emphasis for particular objects, skills, or ideas (Boyd et al., 2006). As research will discover, the circumscribed interests are motivational factors to promote a positive cognitive and psychological advancement of people living with ASD through experimental and clinical psychological constructs.

Music

 The discipline of music will be examined as one of the circumscribed interests used in interest-based therapy for autism spectrum disorders. Music is analyzed by countless methods of interpretation through examination of significance and structure via criteria of aesthetics and knowledge (Reschke-Hernandez, 2011). Since some consider music to be a universal language, people with ASD are able to confide in the structure of rhythm, providing an alternative avenue of cognitive processing for those who are disabled by autism.

Purpose

 Many therapists (such as occupational therapists) who incorporate music as a part of interest-based learning, are doing so despite the lack of research, compelling rationales, and assumptions to support the validity of the claims. Instead, many are practicing a type of clinical wisdom during therapy sessions. Medical professionals are only operating on what is presently effective for a specific individual. Even though it may work, the assertions have no extensive research or any type of theory or model to support the treatment being implemented. The three disciplines chosen will stipulate the development needed to effectively construct awareness to the interdisciplinary problem of interest-based learning (Biox Mansilla, 2005).

Disciplinary Perspectives and Insights with

 Interest-Based Learning for Autism Spectrum Disorders

 According to this interdisciplinary analysis, with the purpose to elucidate and reconnoiter the derivation and conclusions of interest-based learning therapies with autistic patients, the Comprehensive Perspective Model will be utilized (Repko, 2008). The peer-reviewed investigation will provide history, ideas, insight, and perspectives to instruct and inform individuals and their families affected by autism. Medical officials, educators, and parents can see how the disciplines selected will stipulate an inclusive comprehensive perspective to substantiate the criteria of a new interest-based learning model, principally for people with an ASD disorder, but will also be advantageous if amalgamated in the educational system altogether.

 In order to copiously comprehend the significance of the obstacle at stake, the logic of order according to the disciplines used is tremendously essential (Atha-Weldon, personal communication, June, 2012). ***Genetics*** is the first discipline presented in order to understand the human genome, the phenotype and genotype of genes, and the impact of environmental and heritable factors correlated with autism. The second discipline in this investigation will introduce ***psychology.*** The magnitude of psychological dynamics permits scientists to examine the exclusive behaviors, thought processes, and the way circumscribed interests stimulate cognitive administering of ASD. ***Music*** will be sourced as an illustration of how imperative circumscribed interests are as a fundamental characteristic of the new Interest-Based Learning Model (Campbell, 2012).

Genetic and Epigenetic Factors

 The human genome is a fascinating, multifarious and intricate array of the human cellular composition. According to research performed by Dhillon, Hellings, & Butler (2011), the genetic contributions to autism not only encompass the human genome, but the cellular mitochondria and epigenetics (environmental factors causing mutations or changes within genetics). Mitochondria are considered the *powerhouse* of living cells. It functions as the cellular metabolism providing energy, known as adenosine 5’triphosphate (ATP), through a process called oxidative phosphorylation (OXPHOS) (Dhillon et al., 2011). Found within the mitochondria is mitochondrial DNA (known as mtDNA). Through epigenetics and production of cellular formation, Dhillon et al. (2011) has unearthed connections to autism through mutations and abnormalities in the production process of the mitochondrial DNA. The process pinpoints certain mutated genes that not only produce the phenotype, but also the genotype of ASD. Specifically, microdeletions and even duplications in the chromosomal regions of “1p24.2, 3p26.2, 6q24.3 and 7q35” (Dhillon et al., 2011, p. 322) are shown to have the greatest prevalence of children with ASD. Further research is obligatory in order to accurately unearth errors in the human genome causing ASD in order to facilitate a prevention plan for expecting families. Once researchers can isolate the malfunctioning genes, they can provide information on chemicals and environmental factors initiating these genes to mutate or duplicate, facilitating shrinkage in the pervasiveness of autism spectrum disorders.

 In another area of research, King (2011) singles out brain morphology in autistic patients. King (2011) still provides information on genetics and possible causations due to the cellular structure of cells, but takes it further by integrating evident risk influences possibly caused by augmented toxicity of twelve different chemicals introduced during the development of the fetal brain. Retinoic acid, human alpha-fetoprotein (HAFP), thalidomide, estradiol, ethanol, ToRCH diseases, cytokines, and histamine are some of the twelve King (2011) mentions as additional risk factors of ASD. To further clarify the significance of two of the risk factors mentioned above:

 Human alpha-fetoprotein is a pregnancy-associated protein that binds to retinoids and inhibits estrogen-dependent cancer cell proliferation, and because retinoic acid (a retinal metabolite) and estradiol (an estrogen) can both initiate cellular gene transcription, it is hypothesized here that alpha-fetoprotein functions during critical gestational periods to prevent retinoic acid and maternal estradiol from inappropriately stimulating gene expression in developing brain regions which are sensitive to these chemicals.

 (King, 2011, p. 653)

Other factors linked to the risk of autism include, “valproic acid, thalidomide, alcohol, rubella, cytomegalovirus, depression, schizophrenia, obsessive-compulsive disorder, autoimmune disease, stress, allergic reactions and hypothyroidism” (King, 2011, p. 653). The research goes on to parallel the possibilities of the aspects mentioned above by initiating manifestations of genes susceptible to levels retinoic acid and estradiol. Persistent examination of the retinoic acid and estradiol theory is crucial to achieve auxiliary understanding of the explanations of the autistic brain morphology.

 Additional investigations have associated autism to the mercury (Hg) factor. Mercury is a toxic element to the human body when found at certain levels. According to Owens et al. (2011), four genes have been connected in the conveyance and reaction to mercury generating an augmented vulnerability in gene variation. Scientists are uncovering a correlation between mercury and ASD. Recent published studies involving vaccinations associating autism provide a significant fervor to this study to prove the accusations and supposed findings wrong. “Ethylmercury (EtHg) was discovered at high concentrations in the preservative thimerosal used in multidose vials of childhood vaccines to prevent bacterial and fungal contamination” (Owens et al., 2011, p. 770). The theory stating the mercury content of vaccinations is a significant consideration in the cause of autism was discredited. Due to the research of increased and decreased levels of the mercury amounts reported in autistic children, stipulated inconclusive results (Owens et al., 2011). What is noteworthy is, even though vaccinations are not the cause; there are still numerous questions about mercury and how it affects genes. One hypothesis proposed by Owens et al. (2011) is an autistic child may not have an increased concentration of mercury, but their genetic makeup might handle ‘safe’ levels of Hg differently.

 The material postulated by the three articles mentioned above contributes insight to how multifaceted the human body is. Further research involving genes and epigenetics, focusing on their manipulations, in autism spectrum disorders is in high demand. Even though there is not an identifiable cure or better yet a known prevention, scientist in neurobiology, biology, and genetics are devoting their entire careers to discovery of the causation behind the disorders of ASD. As experts make great strides in the field of genetics, providing more and more understanding and education for, psychology will remain an essential aspect of the disorder to provide exceptional care and education to those who live their life with ASD.

Psychology, Exclusive Behaviors and Circumscribed Interests of Autism

 Psychological factors are imperative to the development and education of patients with ASD. Children affected by autism tend to manifest complications in communicational skills, interpersonal relationships plus obsessive behaviors. Many exemplify compulsions and circumscribed interests that tend to be ritualistic and perseverative (Dunst, Trivette, & Hamby, 2012, p. 1) actions. Due to the autistic comportment type manifestations, by looking in to a child’s certain obsessive interests, therapist, educators and parents can use the fascinations or circumscribed interests in cognitive and social development and advancement. One of the main goals of Dunst et al. (2012) is to ascertain the conditions where interest-based learning has encouraging and discouraging effects. Through extensive investigations, Dunst et al. (2012) found therapies concentrating on target or restricted actions were not quite as effective as using an interest-based therapy. The concentration of interest-based education have uncovered improvement in manners and actions in different capacities (Dunst et al., 2012). Discoveries from the Dunst et al. (2012) analysis indicate that by increaseing interest-based therapy ASD children overcome some of their sterotypical symptons and improve negative behavior.

 Social-effective behaviors encompassed by austism spectrum disorders are comprised of negative behavior consequences psychologists and occupational therapists are desperately struggling to overcome. Some examples of theses consequences are easily distressed or irritated, extreme frustration, lack of communication (e.g., vocal comunication as well as body language) and deficits in establishment of relationships. Innovative research specifies that the negative consequences of social comportment connected with autism can be diminished when the children’s interests are incorporated in the learning environment (Trivette & Dunst, 2011). By reading the research of Boyd et al. (2007), Koegel et al. (1987), and Vismara and Lyons (2007) a common denominator in the area of circumscribed interests is children generate positive behavioral consequences of augmented communication capabilities, positive collaboration amid cohorts, and cooperative attention when placed in an educational environment of their particular fascinations.

 The research provided in the field of psychology exemplifies the prominence of specific obsessions of ASD patients. These preoccupations stipulate a connection into the autistic brain in order to educate and train children the significance of social norms, communication, and relationships. By interpretating how the brain operates and why individuals react in certain ways, experts can provide insight on the positive consequences of interest-based learning.

Music, A Practical Example of Circumscribed Interests Found in Interest-Based Learning

 Music plays a valuable role in everyday life no matter what community, nation, or society of which an individual is a part. It touches a part of a person’s life emotionally and spiritually. When a musical beat or rhythm is heard, the brain activates areas not thought to be an area that should be activated (Paris, 2010). “Rhythm processed by the auditory system projects into the motor structures of the brain, creating entertainment” (Paris, 2010, p. 2). Children with autism have less coordination of rhythm from one point to another, even though brain cells require a specific need to follow a rhythm to allow the brain to produce a response. Music is significant in autistic therapies because it provides and creates an organized stimulus in the brain that assists the mind systematically to sustain the cadence from a music beat (Tan, 2011). It is safe to determine that the application and arrangement of musical composition is responsible for the engagement of the child during therapy (Tan, 2011).

 The principal purpose of music is to convey emotion (Quintin, Bhatara, Poissant, Fombonne, & Levitin, 2011). Patients who are diagnosed with ASD have decreased ability to display emotional recognition. By applying music to therapy sessions, the focus is on the rhythm or the beat of the music instead of singular dependence on verbal material. Because of the methodical rhythm, people with ASD can cultivate reasoning strategies permitting them to disentangle emotion identification tasks effectively (Quintin et al., 2011) through musical therapy due to where the cadence activates in the distinctive areas of the brain. People with autism spectrum disorder tend to show a preference to music allowing them to comprehend and recognize the emotions associated with music (Molnar-Szakacs & Heaton, 2012). The discoveries made in psychology and music afford opportunities for professionals to concentrate on the regions of the brain that are depicted as the emotion processing centers in order for further analysis.

 Due to impaired functions, music therapy provides a non-verbal outlet in order for patients to express themselves. “The interpersonal timing and reciprocity in shared play, turn-taking, listening and responding to another person are augmented in music therapy with children and adults with autism to accommodate and address their styles of communication” (American Music Therapy Association, 2012, p. 2). Music also delivers aural, imagistic, and palpable stimulation permitting augmentation of fine and gross motor skills (American Music Therapy Association, 2012).

The Common Beat

 Exploring the common ground among the disciplines of ***genetics****,* ***psychology*,** and ***music*** bring forth the understated conflicts and common theories mentioned throughout the research evaluated. Table 1 (Campbell, 2012) will provide the perspectives of the authors’ research in order to fully compare their insights and formulate a proper understanding of the eminence of interest-based learning in the realm of autism. By paralleling the mutual arguments of ***genetics, psychology*,** and ***music***, the integration process will develop into an all-encompassing solution needed for the children and adults going through autistic therapy of tomorrow.

Final Integration of Interest-Based Learning

During Education and/or Therapy

Restatement of purpose

 Autism spectrum disorder is a developmental and social behavior condition that in a way is plaguing children around the world. The purpose of this research is to bring forth information to provide awareness and insight to parents, educators, and therapists the significance of interest-based learning due to the production of positive behavioral and cognitive consequences. By ascertaining the collaboration that subsists in ***genetics, psychology***, and ***music***, the production of a comprehensive learning model is introduced in order for an autistic child to have the same possibilities as a child without autism to transcend the present odds and expand their diurnal proficiencies. The new model accomplishes the essential interdisciplinary methodology desired for solving the present enigma today (Biox Mansilla, 2005). Many experts have proposed different techniques that can be utilized to integrate concepts or ideas across academic domains. Repko (2008) acknowledges five different integrative techniques including: expansion of a theory, redefinition, extension, organization, and transformation.

Techniques of Integration

 The techniques discussed by Repko (2008) are essential when faced with the challenge of attempting to create common ground in disciplinary insights of study. The first integrative technique exhibited is expansion of a theory. This method allows the expert to cultivate or modify an original theory by complementing additional elements to improve diversity as well as, encompass a more comprehensive understanding (Repko, 2008). When utilizing the practice of *redefinition*, scholars acclimatize a notion or postulation in order to convey a collective meaning amongst disciplines (Repko, 2008). When investigators apply the technique of *expansion*, the idea is protracted past the field of a discipline into an alternative area of study (Repko, 2008). A more complex skill Repko (2008) explains is *organization*. The two-part process implicates the relationship of the fundamental unity in the connotation of the idea and redefines it, and then *organization* is used to convey the relationship of the redefined concepts (Repko, 2008). The final integrative technique introduced is *transformation*. Variables of *transformation* are employed to convert foundational viewpoints into solutions that can be studied and anticipated in every perspective (Repko, 2008).

Implementation of the Integrative Techniques

 Organization is one of the techniques implemented in the composition of this investigation. One example of organization is the logic of the order. It is described as the foundation for exhibiting the overlap of the three disciplines included in the research and indicates the transition from one field of study to the next (Atha-Weldon, personal communication, August 1, 2012). The first discipline explained in the logic of the order is genetics. Genetics was chosen first in order to provide a substantial background to the biological mechanisms of the human body pertaining to people with the disorder of autism. Secondly, psychology was explained in order to bring forth the particular deficits in cognitive functioning of those with ASD. Through psychology, experts are uncovering avenues in which the autistic brain functions. As scientists ascertain additional comprehension of cognitive functions, the investigations become more exclusive and meticulous. Lastly examined in the logic of the order is music. Music is approached as an avenue in which people with ASD can cultivate enhanced cognitive processing by absorbing more profound emotional recognition. Another organizational technique displayed in this investigation is The Common Ground Table (see Table 1, Campbell, 2012a). This table provides the informational discoveries that united the common themes across the chosen disciplines of interest-based learning for individuals with autism spectrum disorder.

 An integrative technique that Repko (2008) does not mention is the proposal of a problem-solving model. The concept of the new model allows teachers, therapists, and parents to incorporate interest-based learning into their educational curriculum (Campbell, 2012b). The model will adhere to the same four components found in most problem-solving models by stipulating a ***problem definition*** *or mission statement,* ***perspective-taking*** *or viewpoints,* ***organization*** *or structured integration, and* ***implementation*** (Atha-Weldon, personal communication, June, 2012). After the introduction, the **Problem Definition** illustrates the importance of interest-based learning by incorporating music as an example of a potential fascination in order to produce positive behavioral consequences and improve cognitive capabilities of children with autism spectrum disorder. The component of **Perspective-Taking** was achieved as a result of the diverse disciplinary insights obtained from present studies in *genetics, psychology*, and *music*. The **Integrative Technique** of **Organization** sanctioned the development of a functioning model entitled the Campbell Model of Interest-Based Learning (Campbell, 2012b). The last component of the problem-solving model is **Implementation.** By exercising the Campbell Model of Interest-Based Learning, teachers, therapists, and parents can implement the stages of the model in order to effectively connect and educate children who display autism spectrum disorders (see Appendix, Campbell, 2012c).

Conclusion of Research

 The likelihood of autism is growing each and everyday. Even though experts have uncovered many factors in the field of *genetics, psychology*, and *music*, the idea of a cure or total prevention of autism is not necessarily in reach due to the major unknown factors that encompass the disorder that have yet to be discovered. This is not to say that experts in this area of research will not one day find a cure or prevention; but for now, it is essential for a more proactive learning model to expand the competencies of those with ASD. This model aspires to enable educators by providing them with a solid foundation when teaching autistic children. A disadvantage to the Campbell Model of Interest-Based Learning (Campbell, 2012b) is the requirement of time and effort on the educator’s part to implement the plan effectively. This idea can be taught or presented in a workshop setting to further educate seasoned teachers and therapists. A different way teachers and therapists can be taught is by incorporating the Campbell Model of Interest-Based Learning (Campbell, 2012b) during their undergraduate or graduate education. This model will in turn benefit everyone who employs the concept in several ways. One way the model is beneficial is the teacher or therapist can gain a working knowledge of the child’s specific positive and/or negative behavioral consequences permitting the instructors to remain in control and tailor the educational environment. Building on the last point, if the learning environment is controlled the other pupils have better learning experience without unnecessary disruptions that could be easily curtailed from the beginning. The model is not a perfect model nor has it been developed through clinical case studies. If parents, educators, and therapists, take into account that the model could potentially be a flexible addition to the curriculum, the personal experiences can develop into a more comprehensive, complex model in the future. Other disciplines that could be incorporated into this research could be economics and sociology. *Economics* would explain how financially the independent school districts can incorporate the model into the curriculum. *Sociology* would offer significant data through analyzing populations with or without ASD to specify additional profound intelligence to support the Campbell Model of Interest-Based Learning (Campbell, 2012b). If people embrace the components of this guide, they just might find the encouragement to persistently connect and educate autistic children. This investigation provides a comprehensive understanding of autistic deficiencies and enables teachers to expand beyond the known barriers by using the fascinations of autistic interests to yield a more knowledgeable autistic pupil.

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Introduction

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Table 1

*The Common Beat Regarding Interest-Based Learning in Autism Spectrum Disorders* (Campbell, 2012a)

|  |  |  |
| --- | --- | --- |
| **Genetics** | **Psychology** | **Music** |

|  |
| --- |
| **Common Ground** |

|  |  |
| --- | --- |
| **Genetics** **And****Psychology** | Through the intense investigations of the genetic disposition of the human composition, researchers are one step closer to understanding the causations and interconnections of those with autism spectrum disorder. By studying the human genome, environmental factors, and toxic chemicals of individuals with and without autism is substantiating there might be more to ASD that has not been discovered. While geneticists keep searching, psychologists play an essential role in the circadian application. By considering the brain patterns and the cognitive interactions, psychologists and occupational therapists can formulate suitable educational procedures to facilitate intellectual advancement in those with the disorder. |
| **Psychology****And** **Music** | Many psychologists and other medical professionals, such as occupational therapists, concentrate on enhancement and development of cognitive processing. Experts are beginning to research the magnitude of circumscribed interests and how the fascinations bring forth positive behavioral consequences. A beguiling example of a *circumscribed interest* is music. Music is utilized as an avenue into the heart and soul of the patient in order to bring forth the appropriate emotional reactions and recognitions that ASD children seem to lack. These developments specify an ideal educational foundation for therapies across the world. |
| **Music** **And** **Genetics** | The brain is a complex organ and science is still not copiously cognizant of everything it has to offer. When music is introduced to an autistic child the cadence awakens certain areas of the brain, not necessarily known to ignite. The rhythm provides stability and constructs motor configurations in the brain. New pathways for neurons are manufactured allowing for auditory and motor entertainment. Music also delivers an organized and coordinated beat that most autistic children are drawn to because the brain is then capable of developing methodological pathways producing reactions to emotions. |
| **Combined****Insights** | *Genetics*, *psychology* and *music* along with many other disciplines and sub-disciplines operating together can produce a new type of learning model. An ***Interest-Based Learning Model*** is needed in order to improve the genetic structure and make advances in cognitive processing while utilizing circumscribed interests like music, or art, sports, theater, math, science, engineering, etc. Whatever the fascinations may be of an autistic child, if psychologist, occupational therapists, teachers and parents will incorporate these obsessions as a part of the educational system, the child will have an opportunity to surpass the current probabilities and expand their quotidian capabilities. |

*Figure 1*.

The Campbell Model of Interest-Based Learning (Campbell, 2012b)

(Smart Art Graphics, 2011)Appendix:

*The Campbell Model for Interest-Based Learning* (Campbell, 2012c)

*The Campbell Model for Interest-Based Learning* (Campbell, 2012c)

I. **Affirmation of the Fascination**

 1. Comprise an assessment of certain interests or fascinations of the child.

 A. First ask the parents what these interests might be.

 \* Examples of a particular interest of an autistic child might be:

 a. Music – His or her fascinations may lie in playing an actual instrument, watching someone else play an instrument, or listening to music through headphones or stereo device.

 b. Art – This could include sketching, painting, sculpting, etc.

 c. Sports – Could be fascinated by attending an actual sporting event, or watching via the television

 d. Numbers/statistics – These could include intense memorization of certain statistics of their favorite sports team or constantly counting the words on a page

 e. Objects of a certain shape – An example could be round balls only stimulate them or only engage with square building blocks

 B. If the child has more than one interest, make sure to make note of this difference in order to adjust education and therapies with alternative fascinations. This notion allows for progressive cognitive functioning.

 C. If the child shows no obsessions towards a particular object or interests, it is the therapists or educators goal to introduce new things to the pupil to see if something stands out beyond all the rest. You must be careful here, because due to the behavioral and cognitive processes of autistic children, you might have to introduce something new only once a day in order to encourage positive behavior, there is a possibility of irritability.

II. **Procure the Temperment**

 1. By conferencing with family members and educators, customize their perspectives to help outline the areas in which the child displays negative behaviors. Once the problem matters are identified and acknowledged, there can be a valued adjustment made to the curriculum in order for the child to surpass the markers that are placed upon him or her instead of constantly being hindered to progress.

III. **Configuration of Fruition**

 1. Once the problem areas are identified and different perspectives have been gathered, next in line is organization of the curriculum in order to properly connect with the pupil. Another way to configure the fruition of a child with ASD is for the parents to construct an educational portfolio of the positive and negative behavioral consequences in order for the pupil to make a stress-free transition from one grade level to the next (Lingle, personal communication, August 2, 2012).

IV. **Significant Application**

 1. The most critical component of the Campbell Model of Interest-Based Learning is application. The captivations of the autistic child are collected and perspectives are assembled from the family and may be even personal observations from the therapist or teacher. This permits for culmination of a sound foundation for a better learning environment, allows teacher – pupil engagement, and encouragement for the child to develop in the areas of deficiency and ascertain something unfamiliar.

V. **Higher Cognitive Processing**

 1. Once the Four stages of the model have been applied, the child is more readily capable to acclimatize to his or her environment and improve understanding.