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EFFECTS OF ORIGAMI CONSTRUCTION ON CHILDREN WITH DISABILITIES

Abstract The purpose of this paper is to explain how origami can be used to foster life and academic skills in struggling students in rural schools. At-risk students often lack the social, behavioral, study, self-management, academic and life skills to face their daily challenges. This paper describes: (1) benefits of origami and its integration into various aspects of special education services, (2) operational definitions of origami, diversity and disabilities, (3) how origami is instructed, (4) consideration for origami and types of disabilities, and (5) cultural and linguistic impact in rural schools. A graphic instruction on how to paper fold a drinking cup is also provided.

ART THERAPY AND SPECIAL EDUCATION SERVICES

Art therapy is considered a related service modality in special education (IDEA, 1997). Art therapy can play an important role in special education because many students with disabilities need special instructional treatment (Sze, Murphy, & Smith, 2004). Students with disabilities are encouraged to use unique art media to express themselves creatively and beyond their normal realm of expression, so that they may learn more about their own abilities (Prestia, 2003). Art therapy such as origami is an ancient method for healing. It neutralizes negative feelings, increases stress tolerance level and harmonizes inner peace (Bandura, 1977). The use of art therapy can help people who are crippled by varies cognitive and bio-psychosocial problems. It can also help to improve the quality of life for people with disabilities of various kinds (Sze, 2004). The IDEA (Individual with Disabilities Act) requires schools to provide related services and equipment for a student with a disability to ensure a "free and appropriate" public education. The reauthorization of IDEA (1997) mandates related services to be included into the Individual Education Program (IEP). In 2001, with passage of the No Child Left Behind Act (NCLB, 2001), the U.S. Department of Education is embracing evidence based research in order to improve the effectiveness of educational intervention and in turn, academic achievement. Regular education and special education teachers are given increased responsibilities for students with disabilities in their classrooms (Sze & Yu, 2004). Recent research indicates that origami learning has a positive impact on students' cognitive development. At present, there is interest and opportunity to examine the educational benefits of origami for students with or without disabilities. However, very few studies provided a comprehensive view of some disability categories such as autism, mental retardation (MR) or cognitive delays, attention deficit hyperactive disorders (ADHD), learning disabilities (LD), hearing impairments (HI), emotional and behavioral disorders, (EBD), physical and other health impairments (POHI), and students from culturally and linguistically diverse (CLD) background

Given changing demographics, all educators must face the reality of culturally and linguistically diverse students in today's classrooms (U.S. Department of Education, 1998). School districts which never before had to instruct these students are now finding they must meet this need. Multicultural education is intended to decrease race, ethnicity, class, and gender divisions by helping all students attain the knowledge, attitudes, and skills they need in order to become active citizens in a democratic society and participate in social change (Valdez, 1999). It is imperative that teachers learn how to recognize, honor, and incorporate the personal abilities of students into their teaching strategies (Gay, 2000). If this is done, then school achievement will improve.

The diversity in size and resources impinges negatively on rural schools (Sze, 2004). Smaller schools or those less financially able, have had to be content with less technology, especially computers, software, and multimedia applications (Kozleski, Mainzer, Deshler, Coleman, & Rodriquez-Walling, 2000). Students are too often left to forage through the same old curriculum, in the same old manner, with the same old results, namely poor student achievement, motivation, and inspiration (Howley & Howley, 1987). Many sources offer

suggestions on how to make mathematics more interesting and fun. As Stein and Bovalino (2004) pointed out, the use of manipulatives is recommended by professional mathematics teachers and their associations. Creative teachers and students, however, can generate many items with available scrap materials, donations, and redesign of projects. Low budget activities such as paper folding, geoboard lessons, tangrams, etc. are often readily shared among teachers at professional conferences (Parsons, 1987). Opportunities for changing the traditional narrow approach to teaching exist.

OPERATIONAL DEFINITIONS OF ORIGAMI, CULTURALLY & LLINGUISTICALLY DIVERSE POPULATION, DISABILITY RELATED SERVICES, & RURAL SCHOOLS

Origami: Origami is a Japanese art of folding paper into shapes representing objects (Webster dictionary). An early use of the term referred to Japanese paper folded in half, thirds or smaller sizes (Heibonsha, 1932). Folded paper came to be used for certificates which accompanied valued objects such as swords or gifts presented to others.

Culturally and linguistically diverse students: Refers to where language spoken at home or by (a) parent(s) is a language other than American English and/or where the social customs of the child or the young person and their family are different from the range of American cultural and social customs. Diversity, simply put, refers to all of the ways in which people are different. This includes individual, group, and cultural and linguistic differences (Bucher, 1999).

Disability related services: Every year, under the federal law known as the Individuals with Disabilities Education Act (IDEA), millions of children with disabilities receive special services designed to meet their unique needs. For infants and toddlers with disabilities birth through two and their families, special services are provided through an early intervention system. For school-aged children and youth (aged 3 through 21), special education and related services are provided through the school system. These services can be very important in helping children and youth with disabilities develop, learn, and succeed in school and other settings.

Rural schools: According to the National Middle School Association, the definition of a rural and/or small school is a rural and small town setting with a population of under 25,000. Small schools do not necessarily mean rural, and rural does not mean small. A small school could be an urban school with a decreasing population. Rural schools can be large due to the center school concept where students are bused in to one school to save on costs. Some schools are considered small when compared to the mega-schools of several thousand that are common in some districts. A small school could be one designed to accommodate a specific population of students and their unique needs or a private school. Rural and/or small schools have similar needs and concerns (U.S. Department of Education, 2004).

HOW IS ORIGAMI INSTRUCTED?

Without using scissors or glue, a practitioner of origami can crease and fold sheets of paper into an astonishing wide array of forms. While folding paper into origami, indeed, children assume always an active role, manipulate the reality, construct it, and work it out again. Origami is cognitive challenging and is relevant to the children experience and interests (DeBono, 1991). Learning to fold paper into origami takes only practice: trying to simplify the steps for our children is certainly a positive way to strengthen their motivation because badly performed models are not congenial and incomplete ones give only disillusion. To teach origami, a teacher needs to be prepared to fold the model enough to know it backwards and which moves or folds are difficult. For difficult move, a teacher may have to prepare several precise explanations. It may take three times as long to teach the model as it does to fold it, so time has to be watched. Besides being familiar with the vocabulary, a teacher understands the skills of novice, intermediate, and advanced students and tries to match the model being taught to the students' level of competence, with enough difficulty to maintain interest but not enough to raise frustration. A teacher decides on the size and type of paper needed to be large enough to be seen from the back row. From a distance, the contrast between the white side and light colors or foil cannot always be distinguished. A teacher may even teach several people the model in advance and learn by their reactions where the instructions need to be improved. It is important to provide a finished model.

During the instruction, the teacher introduces the model, background information and benefits to students on the origami project. A good teacher creates a pleasant atmosphere by sharing jokes or stories while waiting for the students to finish a move. Always begins at the beginning unless students all know what it is mean if asked for a specific base. Throughout the verbal and visual instruction (Phibbs 1991), the teacher uses origami vocabulary to describe each fold or base. In origami, pronouns like "it", "this", "there", or words like "over here" are not precise enough to be part of origami vocabulary. When describing a fold use its name, the place where the fold begins and ends, or other "landmarks" to locate it exactly. The teacher encourages the students to observe his or her demonstration of a move before they attempt it. Sometimes it may be helpful to teach each move twice.

Teacher uses a large piece of paper to demonstrate the model and gives the class as much assurance and positive encouragement as he or she goes. Students are also encouraged to compare their model with their neighbor. More skilled folders can help by demonstrating on their own model. If necessary, the teacher walks over to the student who needs help in performing the move to enable the student to proceed to a satisfactory end. The students' self satifaction is the one great essential. They must succeed (Tolman, 1932). Frustration and failure will alienate them from origami altogether.

ORIGAMI AND TYPES OF DISABILITIES

Origami has been a great success (Table 1) in improving attention span and concentration for students with Attention Deficit Disorder; sequential and direct teaching for students with Learning Disabilities, relieving stress and anger for students with Emotional and Behavioral Disorders, providing structure and logical steps (Swanson, 1999) for students with Autism, guiding oral language for students with Speech and Language Impairments, improving motor skills for students with Physical and Health Disabilities, increasing spatial reasoning for students with visual impairments, providing a 100% visual presentation to students with hearing impairments, improving memory and organization skills for students with Traumatic Brain Injuries, improving cognitive processing for students with mild Mental Retardation, increasing positive learning experience for students with low self-esteem (Rogers, 1969), relieving boredom for students with giftedness (Gardner, 1993), and promoting academic and social adjustment for student from an at-risk background.

TABLE 1. TYPES OF DISABILITY CONDITIONS AND EDUCATIONAL BENEFITS OF ORIGAMI

Types of disability conditions	Teach academic skills through origami construction
Attention deficit/hyperactive disorders	Improve attention span and concentration
Learning disabilities	Explicit instruction and sequential learning
Emotional and behavioral disorders	Relive stress
Autism	Provide structure and logical steps
Speech and language disorders	Guide oral language
Physical & health impairments	Improve motor skills
Visual impairments	Increase spatial reasoning
Hearing impairments	Provide 100% visual presentation
Traumatic bran injuries	Improve memory and organization skills
Mental retardation	Improve cognitive processing
Low self-esteem	Provide positive learning experiences
Gifted students	Relive boredom
At risk	Enable academic adjustment
Cultural and Linguistically diverse	Empower social adjustment

CULTURAL AND LINGUISTIC IMPACT IN RURAL SCHOOLS

Discover Both Individual Difference and Universal Commonalities

Origami challenges students to find meaning in what they produce by naturally raising questions about their own assumptions and prejudices about Japan, their aesthetic perspective, and their ability to empathize with a culture that is different from their own (Gay, 2000). Through the use of origami, students have the opportunity to discover both individual difference and universal commonalities between the western and eastern cultures. They

are able to explore the differing perspectives, examine stereotypes, develop global awareness and hopefully, celebrate the diversity in their own classroom (Leo, 2001).

Address Diversity Issues

Teachers face the challenge of addressing diversity issues within school district curriculum demands, as well as in increasing need to address social competence and acceptance (Leo, 2001). Origami activity allows all students to participate in individual and cooperative relationship. The final product can be display and serves as a visual reminder of a supportive classroom community. Therefore, taking the necessary time to create a supportive classroom community where students accept each other's learning is crucial issue for teachers (Harriot & Martin, 2004).

Learn Patience, Discipline, Order, Precision and Harmony

Origami may appear to be a simple and entertaining art activity for the western classroom. However, the multicultural implications of using origami go far beyond the activity itself. The basics involve learning traditional folding techniques, along with some fundamental attributes that are generally prized in the Asian culture (Sze, 2004), namely, patience, discipline, order, precision, and harmony within the group. In paper folding, the teacher is providing a rubric or creating a test or other assignment to measure a student's ability to meet the academic standards of the class (Epstein, Brosvic, Costner, Dihoff, & Lazarus, 2003). Students' success in the exercise is predicated upon the act of folding and not by the teacher. It is up to the students to carefully fold their paper and follow directions in order to be successful. As students practice the exercises, they begin to understand and experience some of the complexities and interconnections of life laws and perseverance. Students construct a true sense of increased accomplishment, proficiency and self-esteem.

Naturalistic Rural Setting

A teacher may even teach several people the model in advance and learn by their reactions where the instructions need to be improved. It is important to provide a finished model. Teachers should seek an understanding of the phenomenon of learning by examining the students' experiences (Bruno, 1966). Origami learning can be used because the learning is conducted in a naturalistic setting involving the content and settings people learn with (Marton & Entwistle, 1984). More attention, energy, and resources need to be devoted to understanding the social, emotional, and academic needs of students (Dewey, 1902) with disabilities. At the same time, sustained effort must focus on creating alternative service delivery systems that will enable students with disabilities to realize the potential origami construction can offer.

SUMMARY

Origami can be used to foster life and academic skills in struggling students in rural schools. At-risk students often lack the social, behavioral, study, self-management, academic and life skills to face their daily challenges. It is important to understand the benefits of origami and its integration into various aspects of special education services, how origami is instructed, consideration for origami and types of disabilities, and its cultural and linguistic impact in rural schools.

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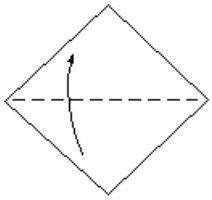
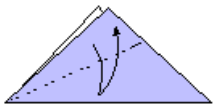
HOW TO FOLD A DRINKING CUP

DRINKING CUP

1

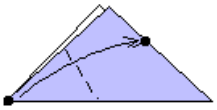


2



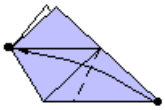
pinch only

3



marked points meet

4



marked points meet

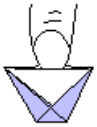
5

fold upper layer down

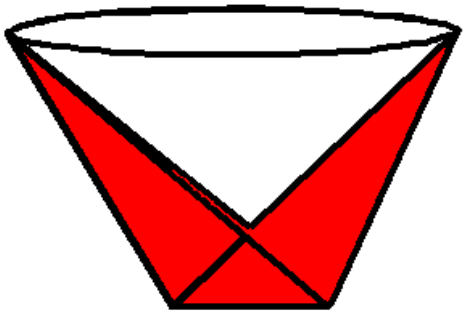
6

fold flap to back

6



push finger inside and round out



traditional model

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