



Conductive Education

Benefits and Challenges

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Conductive education (CE) is an intensive, holistic approach to the education of people with physical disabilities that recognizes that teaching and learning are related to the emotional, cognitive, and physical aspects of individuals. András Pető developed this approach to learning in Hungary after World War II. His method for helping children learn skills to improve their function in different environments, which he called “orthofunction,” included intensive daily integrated social, communication, and motor activities (Bourke-Taylor, O’Shea, & Gaebler-Spira, 2007). These activities were designed to be carried out in a structured environment, such as a classroom, for several hours each day.

Despite its popularity in the United States and throughout the world, research has not demonstrated a clear advantage of CE over traditional forms of schooling and therapeutic intervention. Yet, the number of centers offering CE continues to increase, and school districts are being asked to consider this expensive and time-consuming approach by families who advocate strongly for CE programs for their children with disabilities. This article addresses the history and content of CE, the different types of programs available, family perspectives about CE, comparisons between CE and traditional special education services, and the benefits and challenges of different CE models so that teachers and administrators can make informed decisions

to appropriately support children and families.

Early History of Conductive Education

Conductive education emerged from Hungary in the 1960s, and by the early 1990s, programs were developed in England, Canada, New Zealand, and other countries (Lambert, 1994; Sutton, 2000; Wagner, 1994). Television productions highlighting CE such as the BBC’s *Standing Up For Joe* about the Horsley family (Paul, 1985), and *To Hungary With Love*, which described the beginning of the globalization of CE (Paul, 1986), caused a surge of interest in England and around the world (Sutton, 2000).

The level of adherence to Pető’s program necessary to provide optimal

results was debated in the literature (Bairstow & Cochrane, 1993; Sutton, 1984). In particular, the debate addressed whether CE centers needed to be freestanding, modeling themselves on Pető's institute in Hungary, or whether new models integrated with existing school systems were appropriate (MacKay, 1995; Wagner, 1994; Weber, 1995). Many program developers decided that changes in the mode of delivery were acceptable and necessary because of differences in culture between Hungary and other European countries (Weber). By the late 1980s, families in the United States were beginning to hear about CE, and programs were established in several states. A *60 Minutes* television program about CE in 2004 helped to expand the movement in the United States (Pelley, 2004). More than 100 CE programs now exist in more than 20 states (Bourke-Taylor et al., 2007), and 40 programs employ trained conductors in England (Morgan & Hogan, 2005).

Case Study: One Family's Story

Ricky Wood, a parent of a 5-year-old girl named Peggy with severe cerebral palsy, heard about CE from other parents and looked it up on the Internet. From what he saw, it embodied his values of addressing children's needs holistically, and yet had promise to yield real results in terms of increased functional skills for his daughter. Cerebral palsy is a non-progressive motor disability caused by damage to the developing brain. It can result in problems with movement and posture and also can affect speech, eating and swallowing, and other activities of daily life. Ricky hoped that CE would provide the intervention that Peggy needed to progress in her skills. He traveled to Israel to visit programs and interview other parents.

Ricky found that the CE programs in Israel were usually independent centers, modeled after the Institute for the Motor Impaired, András Pető's program in Hungary. The programs employed *conductors*, people with extensive training from Pető's institute in Hungary, who assessed each child and planned

and administered their programs. The parents he interviewed gave him some mixed reviews. Some parents complained that the results for their children were less than they had hoped. Others complained about the time CE demanded of themselves and their children. All of them liked CE because it treated their child as a whole person. They were tired of their children being treated by different therapists and teachers, each of whom addressed a different aspect of development. Parents were happy that their children were motivated and socially stimulated in the CE program.

The holistic nature of CE intrigued Ricky, and he decided to begin a CE program. His endeavor paralleled others in different states across the United States in the late 1990s. He contacted a Hungarian-trained conductor who was living and working in Los Angeles, and he invited her to teach a 1-week introductory session for parents in Ricky's home state. Parents were enthusiastic, so Ricky invited the conductor to teach a 4-week summer camp at his home. After the first camp, he noticed that Peggy was making some progress in her skills. She was able to sit upright

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on the floor with her legs in front of her while supporting herself with her arms. She was able to lift her arms briefly without falling, and she could reach upward purposefully. Previous to the summer camp, Peggy needed support to sit on the floor and was only able to reach upward with assistance.

Ricky continued making his house available for CE camps until the local elementary school allowed the group to use a classroom for 1 month in the summer. He realized that Peggy lost some of her skills during the intervening months, so he started weekend supplementary camps at his house to assist all of the children to maintain their newfound abilities.

What Does Conductive Education Look Like?

The Conductor

The heart of the CE program is the conductor. Most conductors undergo training at the Pető Institute over 3 to 4 years to receive their unique certification. Several universities in England and the United States also provide this training. In some countries the conductor may be an educator, physical therapist, occupational therapist, or other professional who works in an interdisciplinary way to support children's developmental needs. At least one undergraduate program in the United States (Aquinas College, Conductive Learning Center, 2428 Burton Rd., S. E., Grand Rapids, MI 49546) prepares teachers with an endorsement in physical and other health impairments using Pető's model and in partnership with the Pető Institute. These teachers are known as teacher-conductors.

Conductors develop close relationships with their students and create encouraging learning environments where students can develop a sense of accomplishment and success. Their holistic approach of integrating motor,

language, and academic skills assumes that children can learn motor skills the same way they learn cognitive and communication skills. The conductor continuously observes the child's responses, adapts programs to meet the learner's needs, and works to integrate all activities into daily routines.

Group Format of Instruction

Children participate in CE in groups that are generally matched for age and functional skills. The diversity that results from each child's unique personality and abilities promotes learning. Social support is an important aspect of CE and promotes motivation and learning through peer relationships

as well as modeling. The group consists of the children, their caregivers, and the conductors.

Daily Routine

Routine is important to help children become comfortable with the setting, the people, and the activities. Efforts are made to assist children to set their own goals, take personal responsibility for reaching these goals, and learn how to interact with others so that they can participate fully in school and other community settings (Hari & Akos, 1988). Conductors set routines for each group to facilitate children in the group toward meeting their individual goals. A routine might include group activities, with children working together yet doing the activities differently depending on their skill levels, individual characteristics, and goals. Routines integrate language, motor, academic, and other skill domains, using each to reinforce the other. For instance, singing is frequently combined with movement to emphasize the rhythm of movement and the importance of posture. Children simultaneously practice motor and other skills.

Task Series

Tasks are broken down into smaller functional units. For example, getting up from a chair includes shifting one's weight forward, sliding to the front of the chair, getting one's feet under the body, grasping the arms of the chair and pushing upward, putting weight through the legs, and standing up. Some of these skills are also used to move from a chair to a bed. Therefore, task series can be treated as individual skills to be learned and practiced together in different sequences for various functions. Children learn to change the components depending on the circumstances or the goal.

Children first learn the individual tasks in the series and are supported by verbal reminders from the conductor or their caregivers. Once they can replicate the tasks, children practice the series in different functional environments. External verbal reminders become internal as the child reminds herself of the sequence of tasks and

how to perform each one. Once the task series becomes automatic, verbal reminders are internalized, and the child focuses on generalizing the skills to other environments such as getting in and out of a car.

Rhythmic Intention

Pető believed that language and learning are intimately related. Just as Vygotsky (1978) believed that children use language to mediate learning, Pető believed that language can assist a child to learn motor skills (Hari & Akos, 1988). Rhythmic intention is the use of language such as counting *one, two, three* or *up, up, up* to prepare for and regulate movement. External language from an adult, later vocalized by the child, assists in the initiation and regulation of movements until the child gains independent skills. Then the language is internalized as the skill becomes more automatic. Songs and rhymes used by the group promote social skills, cooperation between children, and language development, as well as facilitate movement skills. Children can also develop a sense of time and timing, necessary to cooperate with others while using language or movement.

Facilitation

Tools external to the child that are environmentally based are known as facilitators. Examples include adults such as caregivers and conductors, furniture and space in the learning environment, and routines and learning strategies.

Furniture used in CE is simple. Wooden chairs with ladder-like backs, slatted tables, wide stools or benches, and floor ladders all help children learn movement skills and provide handholds and stability. If children have difficulty learning movements while standing up, they begin by lying on the tables to learn skills in the lying down position. Once they gain that movement, they try again while sitting or standing up.

The conductor is the most important facilitator. Through managing the learning environment, developing relationships with the children and care-

givers, and developing and adapting routines and strategies, the conductor assists children to set and achieve their personal goals.

Case Study

Peggy enjoyed the CE summer camps, evidenced by her engagement in the tasks, her motivation to try new things, and her focus during the activities. The family living room was full of six children, their caregivers, and the conductor for 6 hours every weekday during the 4-week summer camps, and on 2 weekend days each month during the rest of the year. The conductor developed routines and activities that incorporated music, rhymes, motor exercises, and language. In one activity, the children sat on benches with their caregivers behind them giving them support as needed. The children practiced their balance skills while they held wooden rods, lifted their arms, and sang words about sitting by themselves and moving their arms to the melody of the ABC song. The group managed without much of the usual CE equipment such as wooden tables and chairs. Ricky built some benches, and they used the carpeted floor for the exercises and task series. Because it was too expensive to bring the conductor back for the monthly weekend supplementary sessions, parents took turns leading them. When the local elementary school allowed the group to use a classroom for their summer camp, Ricky's family reclaimed their home.

Ricky recruited other families through word of mouth and newspaper advertisements. It was difficult to recruit many children similar in age and functional skills to his daughter. The group, therefore, was not matched well and the conductor was challenged to make the activities and routines fit all of the participants. The group had to adapt the program to fit their circumstances.

As time passed, families dropped out of the program. Because an adult needed to be with each child continuously, the time commitment was great. The urban center where the program was held was too far for many families to travel to daily. With so few families

involved, the financial commitment was very high. Ricky was doing most of the program planning, recruiting, and organizing. After 5 years the funding problems, overreliance on one person to run the program, lack of consistency in implementing the program, and difficulties keeping families enrolled caused it to fold. The CE program was no longer able to sustain itself.

Research Evidence

Although popular with families, the existing research data do not support the efficacy of CE over that of standard educational and therapeutic approaches. In one of the most recent and comprehensive studies on CE for children, Darrah, Watkins, Chen, & Bonin (2004) completed a systematic review of the literature published between 1995 and 2000 as an evidence report for the American Academy for Cerebral Palsy and Developmental Medicine. Of the 88

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articles reviewed, only 15 published in English met the inclusion criteria of researching CE intervention for children. Fourteen of these studies identified more than 90% of the subjects as children with cerebral palsy, and one studied a population that included 75% children with cerebral palsy. Only four studies met the highest research rigor of using a randomized, controlled experimental design, or the less rigorous quasi-experimental design. Numerous variables were examined in these studies, including (a) motor actions, (b) school performance skills, (c) cognitive abilities and behaviors, (d) activities of daily living, and (e) language. All of the results demonstrated no clinically significant differences as a result of children's participation in CE.

A review was also published in Canada in 2000 that found no particular benefit or detriment to children in CE programs in Canada (Ludwig, Leggett, & Harstall, 2000). Most of the

Canadian programs were found to be adapted from the Hungarian model.

A criteria-based appraisal of systematic reviews by researchers in Finland also examined the effectiveness of physiotherapy and conductive education. They found 21 reviews that were published around the world through 2007, 6 of which had high research quality. Although they found effectiveness for some interventions such as hippotherapy, constraint-induced movement programs, and strength training, they found no benefit for CE among the high-quality reviews. They advocated extreme caution when interpreting the reviews and studies of lesser quality (Anttila, Suoranta, Malmivaara, Mäkelä, & Autti-Rämö, 2008).

Since Darrah et al.'s comprehensive study in 2004, few papers have been published on CE. Stiller, Marcoux and Olson (2003) studied three groups—children in a CE program, those receiving intensive therapy, and those receiving

special education. All 19 children made improvements, especially in self-care areas, but CE was not shown to be more or less effective than treatments for other groups in the project. The study had significant limitations including (a) a small number of participants, (b) a non-matched model, and (c) short duration.

Liberty (2004), using two preschool classrooms in New Zealand, found that children in a CE program gained more motor skills than children in a typical classroom. Because this was a population of convenience rather than matched samples controlled for secondary influences such as parental socioeconomic status, severity of disability, age, or gender, it is difficult to give much power to her result.

Odman and Oberg (2006) did a quasi-experimental study comparing intensive physical therapy with CE in a population of 54 children with cerebral palsy from 3- to 16 years of age. They

found no significant differences in either clinical assessments or parental reports between the two groups. Both groups had similar expectations, with parents reporting that they were looking for improvements in motor skills.

The Appeals and the Realities of Conductive Education

Lindstrand, Brodin, and Lind (2002) found that when parents are involved in the planning and implementation of a CE program, both their hopes for their children and the opportunities to reinforce skills with their children increase. This result is similar to those of other studies on parent partnerships with educators (Epstein, 2001).

Ricky and Peggy's story illustrates some of the many attractions that CE holds for families including the interdisciplinary nature of CE. Conductors implement integrated activities that address motor, communication, self-help, and academic goals for children within the same activities. Parents see this as a holistic approach, where their child's needs are addressed together rather than separately. The group setting allows children to learn from each other and from the adults present. This is compared to the individualized therapy settings that are used in many school systems. CE utilizes music, rhythm, and language to help children learn and integrate new skills and improve their existing skills. The intensive intervention allows more one-on-one time with trained personnel than traditional settings for physical, occupational, and speech-language therapy in schools. Thus, it appears to hold potential to allow children to learn skills faster than in typical programs.

Yet, the costs to parents in training, time, and money prevent some grassroots programs like Ricky's from flourishing. Without the support of school systems or other organizational structures, it is difficult to recruit students and to develop and sustain programs.

As parents learn about CE, they advocate for school systems to pay for their children to attend these programs or to develop programs. Many school systems deny these requests, citing research showing that CE has not been

shown to improve outcomes better than traditional interventions. In an effort to address these difficulties in England, Morgan and Hogan (2005) examined British administrators' knowledge of CE related to denying parents' requests for placing their children in a CE setting. They found that administrators have disparate understandings of CE, meaning that many are not knowledgeable about the program. Placement decisions are frequently made on the basis of other factors such as cost, availability of programs, and availability of funds rather than knowledge of CE and the needs of the individual child. The authors suggested that training would reduce these disparities and resultant conflicts with parents.

Models of Conductive Education Programs

Three types or models of CE programs have been identified—pure models, adaptive models, and alternative models (Wagner, 1994). The pure model is the same as the Petö Institute in Hungary. This independent institute uses groups of conductors to lead classes, trains student conductors, and integrates Hungarian culture into the program. Because culture varies in different locations, no other programs can truly match this model.

Adaptive models have classes led by conductors trained in the Hungarian model, but most do not have student conductors or ongoing training of conductors. Adapted programs are generally run similarly to the Petö Institute, although they allow for local customs. Most of the programs in the United States use Hungarian-trained conductors and can be considered adaptive models (Bourke-Taylor et al., 2007). These programs may be run within schools or affiliated with schools. They may work with preschool populations or adults (Brown, 2006) or may be run as summer camps or after-school programs (Bourke-Taylor et al.).

Alternative models include those centers that are run by therapists or teachers who have not been trained at the Petö Institute (Wagner, 1994). In general, these centers follow the princi-

ples of CE, but do not necessarily adhere as closely to Petö's model as other programs. Because their leaders were not specifically trained in Petö's techniques, they may be more eclectic in their approaches, while still being motor focused and intensive. These types of programs are common in England, Sweden, Australia, and New Zealand (Bourke-Taylor et al., 2007; Wagner).

A new model is emerging. With the advent of new training programs for conductors in England and the United States, some centers can employ conductors trained outside of Hungary, as well as provide training for new conductors.

Comparison Between Conductive Education and Traditional Special Education Models

As described earlier, CE is implemented in a variety of ways, as are special education services in schools. Most CE is offered in standalone settings separate from schools (Bourke-Taylor et al., 2007; Wagner, 1994). Children may attend school in the morning and half-day sessions of CE in the afternoon. They may also attend CE for 1 or more months as an intensive alternative to school, or in the summer.

Children attend CE programs in groups with peers with similar disabilities. They may develop relationships with peers and feel connected to their classroom communities. Schools, however, include all children by law. The Individuals With Disabilities Education Act (IDEA) requires that all children be educated in the least restrictive environment that is most appropriate for their needs (U.S. Department of Education, 2008). Sometimes this is the general education classroom, and other times it may be a self-contained classroom or a separate school, depending on the specific needs of the child. For children in inclusive settings, education occurs entirely with nondisabled peers with appropriate supports provided in the classroom. An inclusive environment is more than physical proximity; all children are members of the classroom community, and relationships are

allowed to form between children (Gee, 2004). In some circumstances, children may receive supplementary services in alternative settings such as a resource room or a physical therapy room for periods of time during the day (Silberman, Bruce, & Nelson, 2004).

Conductors have a whole body focus and are trained to integrate motor skills with cognitive, communication, adaptive, and social skills into the structured routines of the day (Aquinas College, 2008). Because all of the children have neuromuscular disabilities, motor skills are a focus. Conductors work with parents as participants who provide support to their children. Teachers, in contrast, have an academic focus and, with the support of other team members, integrate social, adaptive, motor, and communication skills into the child's day in a structured learning environment. Parents are full members of the team.

A unique feature of CE is the integration of motor, academic, functional, language, and social skills in functional activities. Children are expected to learn motor skills in the same way they learn academic skills. Practice occurs in a whole class format with children matched by motor performance ability as well as age and academic abilities. In a CE classroom, you might see six to eight children, each on a slatted table, doing physical exercises while singing. The conductor leads the session, but the children do the exercises independently or with the help of a parent or volunteer. The principal aim of the system is for the child to learn skills to function at home and at school (Metera & Buchajczyk, 2001). In contrast, children at school focus primarily on academics, with emphasis on speech, motor, and social skills principally to support their academics (Rapport & Effgen, 2004).

Several models of intervention have not been addressed in the previous description. Schools that include CE centers are rare, but may provide free access to this model of service for families. Intensive therapy models, including daily physical, occupational, or speech intervention, may also be part of some innovative school programs.

Table 1. Comparing Conductive Education With Traditional Special Education Services

Conductive Education	Special Education
Individual goals, but activities are done in groups	Individual focused; individualized education program (IEP) based
Motor focus (integrated motor, communication, social, and academic)	Academic focus (individual physical, occupational, and speech therapies are to support child's benefiting from education)
Intensive (3-6 hr/day)	Services from therapists are intermittent: 1-4 times/month. Activities may be integrated throughout the day by teacher)
Led by Conductor	Led by teacher with the support of an interdisciplinary team
Simple wooden furniture	Sometimes expensive adaptive equipment
Can be expensive, many insurance companies will not cover	Free

These types of programs would more closely match the intensity and content of CE programs, but will not be discussed here.

One other way in which CE centers and schools differ is that of cost. Most CE centers are private, and necessarily charge fees for attendance. Fees can range from \$15 to \$60 per hour. The programs are intensive and generally require from 15 to 30 hours per week of participation. This can cost from \$1,500 to \$4,000 per month depending on the hours of participation and the specific fees. In contrast, special education is free to families. Because CE has not been shown to be more effective than traditional intervention, it is not cost effective. Many insurance companies will not pay for this intervention (Aetna, 2008). Table 1 summarizes some of the most important contrasts between CE and a traditional school-based approach.

Discussion

Those early discussions in the literature regarding the cultural incompatibility of transplanting a Hungarian system of education and rehabilitation into other cultures may have presaged the evolution of CE in the United States and around the world (MacKay, 1995; Sutton, 2000; Wagner, 1994; Weber, 1995). New models have been developed to fit CE into existing systems of education and rehabilitation, and these models continue to evolve.

Conductive education provides a structured program that is appealing to children and families because it is intensive, integrated, and engaging. Conductive education programs have been in the United States for the past 20 years, and the number of programs continues to increase. Unfortunately, research has not demonstrated its efficacy beyond that of traditional approaches, and it can be expensive as an add-on or a replacement for those approaches. Another drawback to CE programs is that they segregate children with disabilities. Because of their focus on developmental goals, the programs are not appropriate for typically developing children. Regardless of these findings, the number of CE centers is growing. Parents are attracted to the engaging and intensive activities and feel greater hope for their children's improvement (Lindstrand et al., 2002). Conductive education centers are operating in a variety of settings in nearly half of the United States and in many other countries around the world.

The limited number of studies and the lack of quality design of many of these studies provide inconclusive evidence for the effectiveness of CE over other forms of therapeutic intervention. It is unclear how much of this lack of evidence is due to the challenges in designing effective outcome studies. The difficulties involved in designing rigorous research to test the efficacy of

CE include (a) the wide variety of program delivery models, (b) the range of children served by those programs, and (c) the difficulty in determining appropriate characteristics to test (Bourke-Taylor et al., 2007; Wagner, 1994).

The popularity of CE is most likely due to the appeal to families who welcome integrated and intensive programs for their children. Schools have not typically focused on motor outcomes, yet many parents see motor skills as important for their children. However, families must balance the inconclusive evidence of efficacy of this approach with their family's needs, including consideration of the cost, time, commitment, and accessibility of the programs.

The research, although not demonstrating CE as more effective than other treatment methods, has not shown it to be less effective either. Therefore, it may be a valid choice for some families who prefer an integrated and intensive approach to intervention, and who can afford it. Conductive education is one choice among many for parents, and the benefits and costs for individual children and their parents should be weighed as part of the decision-making process. Children with neuromuscular disabilities, like cerebral palsy and spina bifida, may benefit from the emphasis on motor development, especially as it integrates with communication and social development. The philosophy of CE does not

fit with the philosophy of inclusion, but the social benefits of spending time with children with similar disabilities may be worthwhile. The decisions about whether or not to participate in CE will be individual to each family in their unique circumstances.

New research is needed using rigorous research designs to explore the appeal of CE to parents, to evaluate the effectiveness of different models of delivery, and to continue to evaluate the efficacy of CE as an intervention modality. Outcome measures that consider all aspects of a child's development including social skills, motivation, purposeful intent, goal setting, and nonverbal communication skills, as well as the more traditional motor, communication, and self-help skills may help to identify strengths of CE.

Families will continue to look for educational and therapeutic approaches, like CE, that hold promise for functional improvement and social inclusion. Educators need to be familiar with this educational approach in order to work effectively with children and families who are participating in CE.

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TEACHING Exceptional Children, Vol. 41, No. 5, pp. 66-72.

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