PERFORMANCE THEORY

A holistic approach to movement education in sport and fitness: A systems based model

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Summary The typical model used by movement professionals to enhance performance relies on the notion that a linear increase in load results in steady and progressive gains, whereby, the greater the effort, the greater the gains in performance.

Introduction: Traditional approaches to movement progression typically rely on the proper sequencing of extrinsically based activities to facilitate the individual in reaching performance objectives. However, physical rehabilitation or physical performance rarely progresses in such a linear fashion; instead they tend to evolve non-linearly and rather unpredictably. A dynamic system can be described as an entity that self-organizes into increasingly complex forms. Applying this view to the human body, practitioners could facilitate non-linear performance gains through a systems based programming approach.

Systemic Model: Utilizing a dynamic systems view, the Holistic Approach to Movement Education (HADME) is a model designed to optimize performance by accounting for non-linear and self-organizing traits associated with human movement. In this model, gains in performance occur through advancing individual perspectives and through optimizing sub-system performance. This inward shift of the focus of performance creates a sharper self-awareness and may lead to more optimal movements.

Overview
A softball pitcher experiences chronic tension in her upper back from the extensive practice associated with throwing. In response to this tension, she may have adjusted her shoulder to reduce the pain associated with forcibly extending her arm. This is not something that she consciously processed. Rather, it was the way her body organized itself to meet the demands of the movement task while simultaneously minimizing discomfort. However, because it utilized a contorted positioning, this modified posture eventually resulted in intense shoulder discomfort. A therapist taking her case developed a series of exercises intended to reestablish a more proper output of the shoulder muscles. Through practice and effort, she becomes increasingly able to meet the range of motion and strength standards that

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relate to ‘normal’ shoulder movement. To further aid in restoring her shoulder movement, the therapist may also provide feedback on the non-normal aspects of her reaching pattern.

This would be a complete example of movement education if it ended here. However, over the next three months she notices a resurgence of pain; it is now in her upper back and neck. Through therapy, she was able to meet the goals set forth by the practitioner. Since therapy addressed ‘normal’ outcomes, but did not generate a resetting of systemic elements, the goals of therapy were achieved through a further distortion of posture. From this account, the post therapy posture now has two dimensions of distortion.

With time, utilization of non-optimal patterning from this distorted posture becomes more engrained and perhaps furthers postural imbalances. Eventually, this downward cycle may likely lead to decreased movement and physical activity.

Many questions related to movement lack definitive answers. Some of the most significant are: Can movement patterning be restored after injury? What are best ways to move? What are the instructional components that best foster optimal movement? What factors lead to most optimal movement performance? What can movement professionals do to better facilitate motor proficiency in others? Considering such questions, it becomes readily apparent that a gap in care exists between appropriate movement guidelines and effective approaches toward individually directed movement outcomes. A next step is to shrink this gap between guidelines and effective approaches. The result would be a determination of best practices for achieving movement optimization.

Traditional movement programming approaches are grounded in the idea that repetition and practice directly lead to performance gains. Steady advances in movement performance occur best when the mover practices and receives feedback on a sequential set of motor tasks (Magill, 2004). However, for anyone who has worked to achieve a movement goal, it quickly becomes evident that performance progresses in non-linear ways. Such deviation of actual performances from a planned systematic progression is likely due to fact the movement evolves idiosyncratically, versus automatically or sequentially (Thelen and Smith, 1996). This statement may be confirmed when one realizes that regular practice and effort alone do not directly account for performances differences between individuals.

Recognizing that movement performance varies between individuals, and subsequently that optimal movement may be the result of individualized oriented practice, it follows that movement education should consider the individual or human versus the pattern or result (Dodd, 2003). The purpose of this article is to illuminate potential guidelines and instructional approaches that may promote such individually directed movement outcomes.

Individualized, holistic, or humanistic approaches are viable alternatives to traditional movement programming. If a new perspective on movement programming is to have merit, it should rely on sound theory and be supported by research. Based on systemic views, case studies, and quantifiable data from a proven movement education framework, the Holistic Approach to Developmental Movement Education (HADME) model (Polsgrove, 2008) provides a valuable point of entry into a dialogue on optimal movement. A holistic approach to movement education and re-education is intended to enrich practitioner views, so that they may better meet the needs of their clients, students, patients, players, or performers. Note that the inclusive term practitioner is used to describe any professional who provides instruction for the purposes of improving movement performance. The term practitioner includes individuals such as personal trainers, coaches, physical education teachers, and both physical and occupational therapists.

Introduction

In this increasingly technological age, Americans are becoming more obese (Centers for Disease Control and Prevention, 2010) and moving less (Fahey et al., 2005). In response to this crisis, health professionals have modified programming initiatives to encourage regular physical activity. Commonly, these actions have translated into a simplification of fitness tasks, such as "great abs in 5 min", “10 steps to getting fit", or the offering of the latest and greatest exercise fads. Despite this pandering to the perceived needs of sedentary people, trends in physical activity remain essentially unchanged (Kyröläinen et al., 2010; Mack et al., 2009; U.S. Department of Health and Human Services, 2010).

One explanation may be that with a growing emphasis being placed on competition at a young age, the need for proper skill development is overlooked (Gallahue and Ozmun, 2006). On this approach, it is often assumed that the movement skills necessary for a given set of activities are already in place. The inclusion of developmental fundamental skill development is therefore not a necessary part of movement instruction (Gallahue and Cleland, 2003; Gallahue and Ozmun, 2006). For anyone not naturally skilled, practice and or repetition alone will not necessarily result in improved performance. Exercising with such a dissociated mindset can be an arduous event where the learner must continually look for external motivation to make physical activity enjoyable (American Council on Exercise, 1996; Beardsley, 1988; Fahey et al., 2005; Polsgrove, 2006: Williams, 1998).

Instead, it seems that if the learner can focus his or her attention inward, movement takes on a more personal meaning and purpose. In fact, many contemporary movement researchers and scholars (Coker, 2004; Csikszentmihalyi, 1990; Dodd, 2003; Gallahue and Ozmun, 2006; Gallahue and Cleland, 2003; Haywood and Getchell, 2005; Lam, 2005; Magill, 2004; Mosston and Ashworth, 2002) have expressed the need for such a shift in perspective. They do so by suggesting that a richer movement approach may be gained through events that promote a greater understanding and knowledge of the body and how it works.

This inward focus could provide the foundation for identifying optimal movement approaches and guidelines for appropriate individualized performance outcomes. This shift in perspective from external objectives to an internal focus is not a new concept. However, what is novel here is the notion of determining ways and approaches that utilize and apply an internal view. For instance, it is common for scholars or well-known fitness personalities to promote their particular approach for movement success. The newbie practitioner
who implements such approaches would most likely only
 glean aspects that resonate with their current views and
 interests. In this way, a practitioner’s development arises in
 isolation and is more or less independent of others’. In
 contrast to such popular methods, the shift advocated in this
 article is a one from best practices to a consideration of how
 overarching and individual factors may be employed to
 prompt more optimal movement. Expressing and sharing
 holistic viewpoints could be used to reaffirm or modify theory.
 To this end, the utilization of a unifying theory on how
 movement occurs seems appropriate (Dodd, 2003).

 A system is commonly defined as a complex and self-
 organizing entity (Thelen and Smith, 1996). As noted by von
 Bertalanffy (1968), defining systemic features are transfer-
 able and may be used to express interactions in a variety of
 fields and settings. This statement gives rise to the idea that
 significant system features may be applied to any system. If
 one were to consider the human body as a system, von Ber-
 talaffy’s view would allow for the defining systemic features
 to be applied to that system. Further, systemic properties as
 identified by other fields could serve as a foundation for
 expressing human movement.

 Applying the tenants of dynamic systems theory to human
 actions, Thelen and Smith (1996) inform us that voluntary
 movement is a systemic response toward the fulfillment of a
 goal. From the systemic perspective, a given movement
 can be thought of as an optimal response by the individual to
 meet the specific task demands within a set of constraints.
 For example, the movement solution that a basketball
 player makes may simultaneously include dribbling and
 acceleration to the left to avoid a defender. Recognizing
 that a resulting movement is the most economical response
 by a human organism to fulfill a goal is to understand how
 human movement is representative of the system as a whole.

 Considering the human body, as a system is to extend this
 notion to all human aspects: mental, emotional, perceptual
 and physical. As such optimal movement education is
 tailored to the learner in a manner through a holistic
 consideration of the individual. Further, successful
 programming for a system must be sensitive to the dynamics
 occurring between the learner and the practitioner (Polsgrove, 2008). Focusing on understandings and
 advancements in performance becomes a process of maxi-
 mizing the individual system through the optimization of its
 sub-systems. Moreover, programming becomes a discovery
 process of optimizing sub-systems functioning in such
 a manner that promotes substantial gains in performance and
 understandings.

 Holistic approach to developmental movement
 education model

 In an attempt to overcome the gap between appropriate
 movement guidelines and effective approaches toward indi-
 vidually directed movement outcomes, a series of small
 qualitative studies was conducted to represent how systems
 theory can be used to optimize the movement performance of
 individuals. The sum of this work (Polsgrove, 2006) is repre-
 sented in a systemic training model that was termed the
 Holistic Approach to Developmental Movement Education
 (HADME).

 Figure 1 provides an overview of the heuristic device
 used to conceptualize this systemic approach to movement
 education and re-education. For this model to work
 successfully, it is essential that both the learner and the
 practitioner share the desire to optimize the learner’s
 movement performance. Whereby, holistic and synergistic
 interactions work to define and modify the human system
 toward a more optimal movement performance.

 The HADME framework delineates how holistic movement
 education occurs through a continual and interactive process
 between the learner and the practitioner. The model pre-
 sented in Figure 1 depicts the HADME from two levels of
 description. From general to specific these two levels are: (1)
 Overview and (2) Phases in Holistic Instruction. From an
 application standpoint, it is useful to consider the HADME at
 both levels. In this way the practitioner can “zoom in” and
 “zoom out” and up or down to get general or specific direc-
 tion on the flow of an exercise session. For clarity’s sake,
 a description of systemic movement for each level will be
 expressed separately and in greater detail in the following
 sections.

 Level 1: overview of the holistic approach to
devolutional movement education

 At the Overview level, the HADME process can be thought
to occur in the most general terms. Namely: 1) evaluation
of the system, 2) programming, and 3) identification of
more optimal movement patterning. A holistic approach to
movement considers the body as a system and is designed
to determine how performance can be best optimized. As
illustrated in Figure 2, holistic instruction begins with an
evaluation of the system. Identifying the significant
systemic features should relate to the overall organization
of the body. Restated, this initial step consists of identi-
fying the primary systemic factors (affordances and
constraints) that may contribute to non-optimal perfor-
ance toward a movement goal.

 For example, input provided to the softball pitcher
complaining of shoulder pain may not be localized to the

![Figure 1](image-url)

**Figure 1** The Heuristic Model of the Holistic Approach to Developmental Movement Education.
shoulder. Instead, consideration would be given to the condition of the whole body/system. The practitioner may find tensions in the hip and/or back that may be contributing to the shoulder pain.

Having determined a systemic organization, appropriate programming is implemented in an effort to identify more optimal movement patterning. Participation in a movement routine that promotes more optimal movement may provide new insights about the system. The identification of more optimal patterning is marked by a shift in the organization of the system. Whereby, a systemic re-organization results in more optimal posture and affords movement options of more optimal patterning.

Level 2: phases of the holistic approach to developmental movement education

At a second level or process level of HADME, the phases of holistic instruction delineate three distinct groups of related interactions. In this view, HADME can be described in three phases: (1) scoping, (2) tooling, and (3) applying.

Thus, holistic movement education at the phase level, as seen in Figure 3, occurs in a guided and deliberate way. Holistic framing begins with scoping by the practitioner to determine systemic organization and ends with the learner applying system organization. A comprehensive account of this phasic process is described in the following sections.

Phase 1: scoping

In this phase of holistic education, the practitioner establishes a mental representation of the learner. This representation is best facilitated as the practitioner observes the learner during a given movement. As a representation emerges, the practitioner is able to more readily identify significant systemic attributes of the learner.

Such significant features used for a representation are those that provide useful indicators of an individual’s current skill and motivation for movement could include: standing with asymmetric posture, walking with a limp, walking slowly, or depicting a positive and enthusiastic mood. Additionally, the practitioner can identify indicators about systemic organization through statements such as, “I was thinking that I really need to work on my abdominal strength today.” or “I was shoveling snow yesterday and my back is really sore.”

Through the gained knowledge of the individual’s systemic features, the practitioner works to construct a mental facsimile of the learner’s current systemic organization. Ideally, this likeness will serve the practitioner as a way to establish a meaningful interaction with the learner about holistic education approaches. Identification of the significant systemic attribute is a newly found shared knowledge that will serve as the starting point for systemic optimization.

In this phase, a tense upper back or shoulder discomfort could be thought of as defining systemic attributes of the softball pitcher. Inquiry by holistic trainer therefore, would be to understand movement aspects that may contribute to her overall bodily organization. Such analysis could be a determination of poor hip strength, back pain and postural distortion.

In sum, during the scoping process the practitioner is able to identify those systemic features that are more optimizing, as well as those that are non-optimizing. From these insights a systemic likeness is established that can be related to the learner. Referring to this mental model the practitioner next determines a more optimal organization of the system. To achieve this more optimal state, a mechanism or tool is

<table>
<thead>
<tr>
<th>1. Overview</th>
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<tbody>
<tr>
<td>Evaluation of Current System</td>
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<tr>
<td>Programming</td>
</tr>
<tr>
<td>Identification of More Optimal Patterning</td>
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**Figure 2** Overview of the Holistic Approach to Developmental Movement Education.

<table>
<thead>
<tr>
<th>2. Phases</th>
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<tbody>
<tr>
<td>I. Scoping Evaluation of System</td>
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<tr>
<td>- Pain</td>
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<tr>
<td>- Symmetry</td>
</tr>
<tr>
<td>- Comments</td>
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<tr>
<td>- Unusual sounds</td>
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<tr>
<td>- Constant tension in ROM</td>
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<tr>
<td>- Natural posture</td>
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<tr>
<td>II. Tooling Interaction of Systems</td>
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<tr>
<td>- Rules of performance</td>
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<tr>
<td>- Strategies</td>
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<tr>
<td>- Tools of practice</td>
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<tr>
<td>III. Applying Reorganization of Systems</td>
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<tr>
<td>- Gained understanding</td>
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<tr>
<td>- Increased confidence</td>
</tr>
<tr>
<td>- Reduced compensation</td>
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<tr>
<td>- Rapid gain in strength</td>
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**Figure 3** The three phases of the Holistic Approach to Developmental Movement Education.
needed. A description of the tool development process will be identified in the next phase of the HADME.

**Phase ii: tooling**

By adhering to the practitioner parameters set forth by a systemic view (Polsgrove, 2006), movement progression is guided toward optimization through meaningful physical adjustments. During the *scoping* phase a more optimal organizational state of the system is identified. Now, in the *tooling* phase, the prompt that elicits a systemic shift is defined. In this phase of the HADME model practitioner and learner work together to define a *tool* for prompting systemic change. In systems terminology, such a factor that prompts a shift in the organizational state of a system is termed a *control parameter*. In this phase the learner develops an effective *tool* that can be readily applied to evoke a positive systemic shift.

To successfully facilitate this process the practitioner must first foster the learners’ understanding of how the body functions as a system. Seeing the body as a system is to see the cause-and-effect relationship between bodily control and the efficacy of movement. Having achieved a sense of this relationship, a *tool* is defined as the prompt that shifts the system toward greater systemic balance and more optimal movement. On this view, an effective *tool* is one that prompts more optimal systemic organization, while a less effective tool prompts a less-optimal systemic organization. The development of an effective optimizing tool occurs through meaningful practitioner–learner interaction. From this interpersonal dynamic, the effectiveness of physical adjustments can be observed when the learner is able to perform more optimal movements. Thus, the learner advances her clarity of systemic functioning through an increased ability to adjust the body to move more optimally. Functional development of a tool is achieved when learner gains conceptual knowledge of how to adjust the system through the use of a *tool* to promote a more optimal movement.

An example of how tool development may occur with holistic education can be found in the pitcher with chronic upper back and shoulder pain. Through trial and error the trainer determines that the pitcher feels tension in the right shoulder and neck, as well as low back discomfort. For the pitcher to throw or reach with these constraints, the trainer determines that there must be weaknesses in the posterior shoulder and abdominal muscles. Further, the trainer reasons that these areas of poor strength are coupled with tension in the chest, upper shoulder and hamstrings. Considering these multiple factors, holistic programming by the trainer commences with the intent to develop a more balanced body. In this instance the trainer hypothesizes that with an increase in core engagement, a reduced tension of the shoulder and hamstring muscles would allow for a more balanced posture. Confirming this relationship of core with shoulders and hamstrings with the pitcher, the optimizing *tool* is identified. The trainer will then aid the pitcher in strengthening the relationship between the optimizing tool and performance. This could be done by illustrating to her how varying degrees of engagement of the abdominal muscles corresponds to a deeper stretching of the shoulder and hamstring muscles. Once a cause and effect between posture and performance can be observed, the trainer prompts the pitcher to create a mental model of this occurrence by explaining the sensation of stretching with more optimal posture. With a functional optimizing *tool* and an understanding of how to utilize it, a next step in movement optimization is its’ application to other events.

**Phase iii: applying**

The procedures comprising the *applying* phase of the HADME are used to engrain the patterning of the newly formed systemic optimizing *tool*. Due to the tenuous state of the optimizing *tool*, its appropriate and consistent application is limited. The *tool* is best developed when practiced under a variety of conditions. The ultimate purpose is to fashion a more optimal systemic organization.

The procedures used in this phase of holistic instruction are essentially a recapitulation of those used in the *tooling* phase of HADME, but they are now applied through a series of related optimizing actions. In this phase, the practitioner again employs the use of systemic based strategies that foster the learner’s ability to implement the tool in a variety of movement conditions. Thus, through repetition, reflection and application the ability to use the optimizing tool effectively increases incrementally. Adoption of the tool by the system occurs through its application to increasingly more difficult movements. Once the tool may be adeptly *applied* to a movement task, progress is made when it is used to surmount challenges of increasing difficulty. Such increase in demand could occur through load, volume and functional challenge. For instance, greater application of the tool could occur through more resistance or repetition (Bompa and Haff, 2009). Additionally, tasks that are performed while lying on the floor are less of a systemic challenge than those done on one foot or on a balance board (Yoke, & Kennedy, 2003). By *applying* the tool to progressively more challenging tasks the learner deepens their understanding of the body as a system. They also begin to recognize the ways in which the optimizing tool promotes and engrains positive systemic change. Thus, through the process of identifying and *applying* a change *tool*, more optimal movement results.

An illustration of this developmental process can be found in our pitching example. As the softball pitcher gains an understanding of how to utilize abdominal tension (optimizing *tool*) to elicit a more optimal posture, the holistic minded trainer facilitates her patterning by requiring her to *apply* that posture to a variety of pitching related activities. This first level may begin with stretching of chest and hamstrings. Next, she may utilize a resistance machine to strengthen her chest and hamstring muscles. Progression could continue as *application* of the optimizing *tool* is used to ensure more optimal movements when completing more complex tasks such as a dumbbell chest press or performing unilateral leg curls. Ultimately, the functional development of the tool will allow for a more optimal throwing and running patternning.

A complete HADME instructional session utilizes the tool to create more optimal patterning under a variety of movement conditions. Indicators of successful systemic optimization by the learner may include: improved understanding of movement, increased confidence, gains in strength, decreased pain and increased performance in everyday activities. With this shift, the learner achieves a richer understanding of how to...
utilize the optimizing tool. For the practitioner, this translates to a gained understanding of systemic movement.

Summary

Whether the goal of the movement task is to improve athleticism, or to have a greater ease of movement during daily physical activities, we all adopt strategies for modifying our performance in the hope of making significant improvements. Typically, our first strategy for improvement occurs through strengthened resolve, as we vow to simply do more or to try harder. This notion is echoed in common performance lore, through such homilies as ‘No pain, no gain’; ‘Mental toughness’, ‘Push through it,’ or the recent well known and marketed ‘Just do it.’ Indeed, gains in performance will and do occur due to physiological modifications made as a result of greater practice and increased effort. It is under this scenario that skilled movers frequently reap the most benefits. For the less-coordinated, injured, inexperienced, or plateaued mover, practice alone does not necessarily make perfect. Due to factors such as lack of knowledge, physical dysfunction, insufficient coordination, or poor self-esteem, individuals who do not move well must often rely on less than optimal movements to meet the demands of practice and repetition.

In our familiar softball pitcher example, we may relate to pains associated with the repeated movements and the desire to exercise while injured. Over time, such actions may result in a non-optimal organization of the body. This systemic state may be observed through chronic pains or increased imbalances of the upper back and shoulder. Traditional treatment may likely focus on increasing functionality by restoring strength and range of motion of her shoulder. A holistic approach however, would be to consider the body as system where non-optimal functioning areas such as the abdominals, shoulders and hamstrings may be identified. Once these areas of non-optimal performance have been determined an optimizing tool for re-organization toward more optimal performance is determined. For the pitcher, engagement of the abdominal muscles serves as a tool to improve spinal alignment and distribute muscle tension more evenly. Optimization occurs as shoulder pain decreases and movement requires less effort.

Accepting that the body is a system allows for a holistic view of it. A model for training holistically is one that considers movements related to the physical as well as the cognitive. A movement education format, such as that offered by the Holistic Approach to Developmental Movement Education heuristic, accommodates a holistic view and allows for interaction of the body with the mind. The holistic practitioner who conceives of movement as systemic or humanistic is able to offer instruction to optimize mover performance. As more-optimal movements patterns are developed and reliance upon non-optimal movements patterns diminishes, the body begins to function more efficiently and effectively.

In summary, the intended outcome of the Holistic Approach to Developmental Movement Education is for the learner to gain a clearer understanding and knowledge of how to better adjust the body to meet the requirements of the current task. Through greater awareness, appropriate strategies can be adopted that promote optimal individual performance. In this manner the probability of adopting a more active way of life may be increased.

References