

Mentoring the gifted: a conceptual analysis

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Mentoring is considered among the most effective pedagogical measures, yet it is rarely used in gifted education. One of the main reasons for this neglect seems to be the lack of a thorough analysis of its conceptual foundations from the point of view of giftedness research. This contribution starts with a discussion of conceptual and definitional issues pertinent to mentoring gifted individuals. An ideal definition is proposed, followed by a review of the effectiveness of mentoring programs. Existing mentoring programs rarely take full advantage of the educational potential inherent in mentoring. Next, the conditions and characteristics of effective mentoring are analyzed. From a general pedagogical point of view, mentoring should allow full use of the “Learning Triad” of modeling, instruction, and provision of learning opportunities and satisfy the “Big Four” effective learning processes (improvement-oriented learning, individualization, feedback, practice). Mentoring can promote excellent development of the whole actiotope of a gifted individual.

Keywords: mentoring; excellence; giftedness; sociotope; actiotope

1. Introduction

Mentoring is among the most exciting, but also most confusing, topics in pedagogy. The fascination comes from the fact that demonstrably it *can be* by far the most effective pedagogical measure (Bloom, 1984; Walberg, 1984). This also makes mentoring very attractive for gifted education with its high goals for gifted individuals. What is confusing, however, is that meta-analyses attest to only modest results for typical mentoring and we lack a meta-analysis or a review of mentorship of gifted individuals altogether (e.g., Allen, Eby, Poteet, Lentz, & Lima, 2004; DuBois, Holloway, Valentine, & Cooper, 2002; Eby, Allen, Evans, Ng, & DuBois, 2008). Moreover, no comprehensive definition is in sight. In fact mentoring tends to be one of those notorious “toothbrush” concepts: every researcher has their own definition, a definition that is practically never used by colleagues. Consequently, the current research landscape is characterized more by separate paths than any fruitful, common efforts.

In fact, the spectrum of mentoring ranges from a highly personal dyadic relationship between a professional mentor and the mentee all the way to group e-mentoring by pedagogically untrained laypersons, in which communication is time-delayed over great distances and no personal acquaintance exists (Stoeger, 2009). It is therefore easy to see that each definition risks being insufficient to the specifics of the many

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forms of mentoring. Furthermore, a transfer of knowledge from one form of mentoring to another or from mentoring to mentoring gifted individuals seems extremely difficult. In the following discussion, therefore, no universal key to all mentoring forms is elaborated. Rather, as a point of departure, an *ideal type* of mentoring gifted individuals is chosen.

2. An “ideal type” of mentoring gifted individuals

The first historical mention of mentoring dates back to the 12th century before Christ. As Odysseus left his home in Ithaca to join the Greek campaign against Troy, he entrusted the supervision of the education of his son Telemachus to his friend and companion Mentor. Mentor was much more than simply a teacher; he was also a fatherly friend, a wise counselor, and an attentive protector. The relationship of Mentor and Telemachus enjoyed a special feature: from time to time, the goddess of wisdom, Pallas Athena, slipped into Mentor’s form and assumed his role.

This model from antiquity seems to first appear in modern times and with a pedagogical intent in 1699 in *Les Aventures de Télémaque* by François de Salignac de La Mothe Fénelon, author and pedagogue. The concept of *mentoring* came into general usage in France and England quite soon thereafter, whereby Clarke (1984) pointed out a strange asymmetry: “By the early eighteenth century and unlike *Télémaque*, who retained his strictly fictive status, Mentor had entered both French and English as a common noun” (p. 202). We speak of “a mentor,” however, not of a mentor’s “Telemachus,” but rather, of his/her “mentee.”

The mythology of the mentor is present in many mentor–mentee relationships. Examples of institutionalized forms are the relationship of master and apprentice, or teacher and pupil in rabbinical Judaism. Well-known mentoring pairs are Aristotle and Alexander the Great and J.C. Bach and W.A. Mozart. In literature and film, too, the *motif* of the mentor is frequently used, as for example in the Star Wars films, in which Obi-Wan Kenobi is first the mentor of Anakin Skywalker and later also of his son Luke Skywalker.

All these mentoring examples are similar to the original relationship of Mentor and Telemachus that gave mentoring its name, so that, at first, it would not seem impossible to arrive at a comprehensive definition. In fact, the typical (theoretical) definitions assembled in Table 1 show unmistakable similarities, although scientific definitions for the mentoring of the gifted are nonexistent. Features in common with the mythical model are, essentially, the emphasis on a personal, dyadic, hierarchic relationship aimed at promoting, through the mentor’s supervision, the learning, development, and progress of the mentee.

However, the mentoring concept has become in recent decades increasingly less strict and the diversity of its application is surveyed only with some difficulty. Thus, besides dyadic mentoring, various forms of team and network mentoring have become established. Williams (2000), for example, describes a program in which a group leader is mentor to single group members, and these, in turn, serve as mentors to each other. Such “circles of influence” are characteristic of “cascading” mentoring, in which, for example, a professor supervises students, who for their part supervise beginning students (e.g., Davis, Ginorio, Hollenshead, Lazarus, & Rayman, 1996). Baugh and Scandura (1999) proposed “sequential mentoring,” in which a mentee has different mentors one after another. Higgins and Kram (2001), in contrast, emphasized the

Table 1. Definitions of mentoring.

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- “A mentor is a person who oversees the career and development of another person, usually [their] junior, through teaching, counseling, providing psychological support, protecting, and at times promoting or sponsoring. The mentor may perform any or all of the above functions during the mentor relationship” (Zey, 1984, p. 7).
 - “Mentors provide young adults with career-enhancing functions, such as sponsorship, coaching, facilitating exposure and visibility, and offering challenging work or protection, all of which help the younger person to establish a role in the organization, learn the ropes, and prepare for advancement” (Kram & Isabella, 1985, p. 111).
 - “This meant that a mentor had to be a father figure, a teacher, a role model, an approachable counselor, a trusted adviser, a challenger, an encourager” (Carruthers, 1993, p. 9).
 - “Traditionally, mentors are defined as individuals with advanced experience and knowledge who are committed to providing upward mobility and support to protégés’ careers” (Ragins, 1997, p. 484).
 - “Mentoring is an intense developmental relationship whereby advice, counseling, and developmental opportunities are provided to a protégé by a mentor, [who,] in turn, shapes the protégé’s career experiences [...] This occurs through two types of support to protégés: (1) instrumental or career support and (2) psychological support” (Eby, 1997, p. 126).
 - “[Mentors are] influential individuals with advanced experience and knowledge who are committed to providing upward mobility and support to their protégés’ careers” (Ragins & Scandura, 1997, p. 496).
 - “We define mentors as ‘individuals with advanced experience and knowledge who are committed to providing upward support and mobility to their protégés’ careers” (Singh, Bains, & Vinnicombe, 2002, p. 391).
 - “Mentoring is defined as a pairing of a more skilled or experienced person with a lesser skilled or experienced one, with the goal [either implicitly or explicitly stated] of having the lesser skilled person grow and develop specific career-related competencies. Your mentor may or may not be your manager” (Godshalk & Sosik, 2003, pp. 423–4).
 - “Mentoring is defined as a developmental relationship that involves organizational members of unequal status or, less frequently, peers” (Bozionelos, 2004, p. 25).
 - “Mentoring: a process for the informal transmission of knowledge, social capital, and psychosocial support perceived by the recipient as relevant to work, career, or professional development; mentoring entails informal communication, usually face-to-face and during a sustained period of time, between a person who is perceived to have greater relevant knowledge, wisdom, or experience (the mentor) and a person who is perceived to have less (the protégé)” (Bozeman & Feeney, 2007, p. 731).
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advantages of arrangements in which a mentee is assigned, at one time, to several mentors. Of course, all these new forms of mentoring also involve the traditionally important personal component of the mentor–mentee relationship. This can, in the newer conception, take very different forms, in which, for example, relations with direct superiors, or strongly formalized relations, are understood as mentoring (Burke, McKenna, & McKeen, 1991; Tepper & Taylor, 2003) in the same way as “e-mentoring,” where “e-mentors” build the mentoring relationship with their mentee online only (e.g., Hamilton & Scandura, 2003; Packard, 2003).

The diversity of the applications of the mentoring concept and the number of different programs put a uniform definition of mentoring and also of mentoring gifted individuals out of reach. Without a uniform definition, it is not possible to determine without a doubt whether a certain program involves mentoring or not. “How mentoring is defined determines the extent of mentoring found” (Merriam, 1983, p. 165).

This problem is intensified by the quite similar concepts of “coaching,” “training,” and private lessons, the contours of which are similarly blurred.

In principle, there are two possible solutions to this conundrum. One could attempt a “superdefinition” that takes in all possible forms of mentoring. This would, however, have to take the scientifically very unsatisfactory form “mentoring is (X_1 or X_2 or X_3) and (Y_1 or Y_2 or Y_3) and (Z_1 or Z_2 or Z_3)....,” where, for example, X is the number of mentors, Y the degree of formality of the relationship, and Z the number of mentees involved. This superdefinition, however, because of the breadth of variation in the forms of mentoring, would soon turn into a conceptual monster.

An alternative possibility is to define an “ideal type” of mentoring.¹ This possibility is not in any way positively distinguished conceptually nor are presumptions made with regard to its effectiveness. It serves exclusively as an abstract and idealized heuristic and, as such, avoids imposing “overly specific and excessively rigid definitions on all investigations of mentoring” (Bearman, Blake-Beard, Hunt, & Crosby, 2007, p. 376), a fully justified critical point. But how can a common point of reference be achieved, to which all particular usages of the concept “mentoring” can be compared? Because almost all authors who have influenced the current concept of mentoring refer to the model provided by antiquity (e.g., Anderson & Shannon, 1995; Daloz, 1983; Field & Field, 1994; Kalbfleisch & Keyton, 1995; Murray, 1991; Parsloe, 1995; Shea, 1992; Stammers, 1992), this also would seem to be the thing to do for the ideal definition:

Mentoring of gifted individuals is a relatively chronologically stable dyadic relationship between an experienced mentor and a less experienced gifted mentee, characterized by mutual trust and benevolence, with the purpose of promoting learning, development, and, ultimately, progress in the mentee.

3. Effectiveness

The effectiveness of mentoring was for a long time demonstrated by means of impressive case studies. An often-cited example is Ernest Rutherford (cf. Ziegler, 2008), the creator of the atomic model that bears his name, and discoverer of the proton. For his scientific achievements, he was awarded the Nobel Prize (among other honors). But his achievements as mentor are probably more astonishing still. No fewer than 11 of his students and team members were themselves awarded the Nobel Prize. Rutherford himself appears to have benefited from excellent mentorship and exposure to a fine role model; his own mentor, Joseph John Thomson, also received the Nobel Prize, as did his son George Paget Thomson.

In the 1970s and 1980s, anecdotal evidence of mentoring effectiveness was complemented by systematic biographical analyses. Vaillant (1977) showed in a review that the most successful Americans for the most part had a personal mentor in their youth. Roche (1979) supported this finding with [more] current data, showing that close to 4000 of the most successful US executives listed in *Who's News* of the *Wall Street Journal* had mentors. Interestingly, those executives who had had a mentor earned more money much earlier or achieved higher educational degrees, in comparison with those without mentors.

In his ground-breaking study, Bloom (1985a) interviewed 120 persons who had achieved excellence in various domains (swimming, tennis, sculpture, piano, mathematics and molecular genetics). He clearly demonstrated that they had grown up in individually tailored learning environments overseen by a personal mentor (Bloom,

1985b). He concluded that individual mentors are necessary for the achievement of excellence (see also Sosniak, 2006).

In particular, when clear goals are set, for example the improvement of school marks, work habits or self-confidence, mentoring is highly effective (e.g., Hock, Schumaker, & Deshler, 1995; Lepper, Drake, & O'Donnell-Johnson, 1997; McArthur, Stasz, & Zmuidzinas, 1990; Merrill, Reiser, Merrill, & Landes, 1995; Slavin, Karweit, & Madden, 1989; Walberg, 1984). Bloom (1984) therefore declared individual mentoring to be the "gold-standard" of pedagogy and learning, against which all other educational techniques must be measured. In fact, one can assume that the effectiveness level of well-conducted mentoring is about two standard deviations. This means, for example, that after mentoring a typical pupil or worker should be in the top 2% of their comparison group. In other words, good mentoring raises the average percentage level from 50% to 98%.

The systematic development and field-testing of mentoring programs began surprisingly late. Bozeman and Feeney (2007) date the beginning at around 1980, the year of Kathy Kram's dissertation, which was the basis for her 1983 *Academy of Management Journal* article, the most-cited publication on mentoring today. Barely 15 years later, there were more than 500 scientific articles on the topic (Allen & Johnston, 1997), and by late 2009 around four times this number had been added. Unfortunately, systematic studies of mentoring in the field of gifted education are rare and a meta-analysis cannot be conducted because of a lack of methodologically sound empirical studies.

The results of reviews of studies with typical populations can be concisely expressed in the assertion that mentoring *can* be extremely successful. The considerable list of positive effects includes, among others, school achievement, salaries, promotions, and motivation (Allen et al., 2004; Blake-Beard, 1999; Crosby, 1999; Dreher & Cox, 1996; DuBois & Karcher, 2005; Fagenson, 1989; Ragins & McFarlin, 1990; Scandura, 1992; Tierny, Grossman, & Resch, 2000; Whitley, Dougherty & Dreher, 1991). But the enormous range of effect sizes is striking. Therefore, it doesn't come as a surprise that this all-round positive picture is made relative by results of meta-analyses, the aim of which is to determine the average effect size of mentoring programs (Allen et al., 2004; DuBois et al., 2002; Eby et al., 2008). Indeed, the average effect sizes are only low to moderate at best. However, it can be reasonably argued that the meta-analyses paint a strongly distorted picture and markedly *underestimate* the possible effects, for five reasons.

First of all, it is apparent that only a fraction of all mentoring programs fulfill the *minimal methodological requirements* to be included in a meta-analysis. The majority of the mentoring programs included were developed by practitioners. In fact, Little (1990) had already warned that "relative to the amount of pragmatic activity, the volume of empirical enquiry is small [and] ... rhetoric and action have outpaced both conceptual development and empirical warrant" (p. 297).

Second, only a very few mentoring programs fulfill *minimum conceptual and theoretical requirements*, already a rather old point of criticism in the still relatively young history of the research field, but one where there has been no decisive improvement. "Research on mentoring has typically lacked an integrated research model or framework" (Burke & McKeen, 1997, p. 44; cf. also DuBois et al., 2002).

Third, meta-analyses do not distinguish between effects of the mentoring programs on variables targeted for improvement by the mentoring program and effects on variables that were not the focus of the program (Allen et al., 2004; DuBois et al.,

2002; Eby et al., 2008). An *undifferentiated presentation of focal and nonfocal variables* leads to underestimations of the intended effects of the program.

The fourth problem is the *nonrealization of generally known criteria of successful mentoring* in the mentoring programs included in the meta-analyses. The most frequent deficits are:

- appropriate training or at least an assessment of suitability of mentors (cf. Graesser, Bowers, & Hacker, 1997; Jucovy, 2001; Miller, 2007);
- careful pairing of mentors and mentees (Eby, McManus, Simon, & Russell, 2000; Finkelstein & Poteet, 2007);
- suitable and sufficient duration of the mentoring program (Allen & Eby, 2007);
- measures to promote the quality of the relation of mentor and mentee (Fagenson-Eland, Marks, & Amendola, 1997; Kram, 1985; Noe, 1988; Scandura & Viator, 1994).

Finally, the fifth problem is that the quality of the program was seldom monitored and the mentors were supervised insufficiently, if at all. Thus there is considerable doubt that mentoring programs were properly implemented. The latter critique makes it usual for *negative* effects of mentoring programs to emerge, for example, neglect, tyranny, exclusion, deception, incompetent treatment, and sexual harassment of mentees (Eby et al., 2000). On balance, therefore, although mentoring can be a most effective development support method, and even constitute its “gold-standard” (Bloom, 1984), its practical application nevertheless often exhibits very serious weaknesses.

4. Qualitative analysis of the effects of mentoring

Qualitative analysis of the effects of mentoring can be undertaken from two perspectives. First, in a general pedagogical sense, it can be asked whether mentoring offers a fruitful frame for gifted education. For this we shall concentrate on whether all three ways of experiencing the *Learning Triad* (Figure 1) are available and to what extent the realization of the *Big Four* (Ziegler, 2007) attributes of successful learning is possible. Second, the objectives that can be pursued in the framework of mentoring can be investigated. Here what interests us most is how well the educational goals formulated in the *Actiotope Model of Giftedness* (Ziegler, 2005) can be pursued.

4.1 General pedagogic perspective

4.1.1 The Learning Triad

Tomlinson (2001) pointed out that the idea of mentoring is actually very old. It is the way people have always passed on their knowledge and abilities. In fact, all three possible forms of the Learning Triad can be used within the framework of mentoring (Stoeger & Ziegler, 2008). Mentors, first, can *model* learning content. Through their advanced experience, they are often in the position both to demonstrate certain actions as well as model attitudes, values, qualities of character, etc. Second, they can *instruct* their gifted mentees and thereby transmit information. Finally, they can *make available or transmit opportunities for experience* to gifted mentees, for example in the form of book recommendations, tours of institutions or access to learning sociotopes (see below).

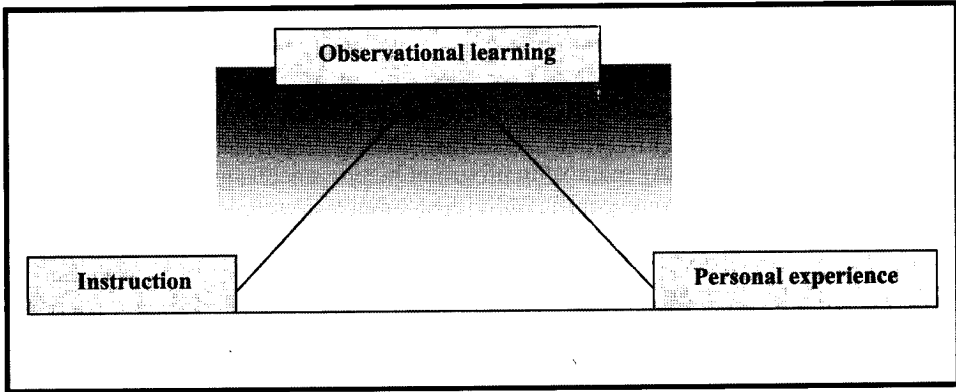


Figure 1. The Learning Triad.

4.1.2 Mentoring of gifted mentees as the optimum framework for fulfilling the “Big Four”

Mentoring of gifted individuals makes possible, like no other pedagogical measure, creation of an optimum framework for the *Big Four*² of effective learning processes (for details see Ziegler, 2007; see also Ericsson, Krampe, & Tesch-Römer, 1993):

- (1) *Improvement-oriented learning*: Experience alone as a rule permits no significant increases in learning. In our daily life, levels of achievement and efforts made generally reach equilibrium rather quickly so that usually no further achievement increases are sought. A mentor must therefore see to it that their gifted mentee doesn't end up standing still, with their development at a sub-optimal level, while they are still capable of significant learning increases.
- (2) *Individualization*: Optimal learning is based on the principle of individualization; within the framework of mentoring gifted mentees, this principle can be nearly perfectly realized. The mentor concentrates on a single learner; plans and oversees their learning and progress; gives individual feedback and recommends remedial phases. Each step in learning can thus be tailored to the talents and learning needs of the mentee. With each mastered learning goal, the next, more demanding goal is taken on.
- (3) *Feedback*: Without suitable feedback, progress in learning is scarcely possible. In unaccompanied learning, routine sets in quite fast. Gifted learners become self-satisfied with their initial rapid progress, often not recognizing where they need to improve and thus overlooking more suitable learning pathways to the goal. One of the most important functions of the mentor, therefore, is to supply the mentee with frequent, good-quality feedback.
- (4) *Practice tasks with minimal transfer*: A successful learning step requires practice and stabilization. Here, as a rule, a variety of practice tasks is necessary; however, these tasks should require only minimal transfer. That is, they must be achievable without using higher-order steps in understanding. This principle – to provide sufficient opportunity for practice with minimal transfer effort required – has been successfully employed for centuries, for example in mathematics, sports or the playing of a musical instrument. Of course, the choice of suitable tasks, and their sequential ordering very often overwhelms gifted

learners, so that one of the most important tasks of the mentor experienced in a domain is managing the mentee's learning steps.

4.2 Educational goals

Within the framework of any mentoring program, heterogeneous goals can be pursued simultaneously, ranging from specific individual support up to general developmental goals (Allen et al., 2004; Boreen, Johnson, Niday, & Potts, 2000; Bullis & Bach, 1989; Burke & McKeen, 1996, 1997; Daloz, 1999; Fagenson, 1989; Head, Reiman, & Thies-Sprinthall, 1992; Murray, 1991; Ragins & Sundstrom, 1989; Singh, Bains, & Vinnicombe, 2002; Wilson & Elman, 1990). Such a wide range of goals calls for a holistic approach. Therefore, educational goals of mentoring are discussed from the systemic perspective of the "Actiotope Model of Giftedness" (Ziegler, 2005, 2009).

4.2.1 Overview of components

In the Actiotope Model of Giftedness, four components of the actiotope are distinguished: the action repertoire, goals, the environment, and the subjective action space (Figure 2).

4.2.1.1 The action repertoire. The development of competence is based on widening a person's *action repertoire*. After mentoring, one might for example be able to give effective talks, better present one's own interests, carry out refined mathematical operations, answer more questions about geography, write programs, sell more insurance policies, etc. Thus, mentoring of gifted individuals is focused on individual behavioral possibilities. An assessment of its effectiveness shows the known advantages of individual vs. group instruction (Walberg, 1984).

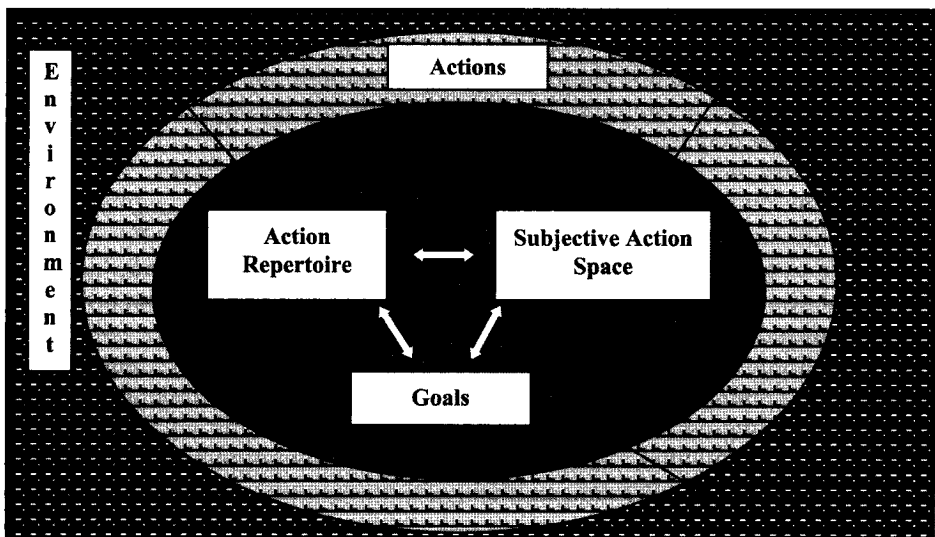


Figure 2. Components of an actiotope.

4.2.1.2 Goals. A particular strength of mentoring is that a variety of goals can be pursued. All of them seem to be important for gifted education. Traditionally, there are two bundles of goals: (1) psychosocial (self-confidence, assertiveness, flexibility, teamwork, leadership qualities, dealing with stress and failure, etc.) and (2) career-related goals that also might aim at excellence. While in (1) the mentor functions as counselor and friend, in the second goal bundle, the mentor is more a coach and promoter (Noe, 1988; Ragins & McFarlin, 1990). It is noteworthy that, most probably, success in mentoring depends on *which* mentor is concerned with *which* goals. Thus, for example, it is often assumed that peer mentoring can be particularly effective to psychosocial goals, while a supervisory style of mentoring is better suited to career-related goals (Ensher, Thomans, & Murphy, 2001).

Besides the two traditional goal bundles, at least two more are of interest for mentoring gifted individuals. Mentoring can also serve (3) the individual orientation. In particular, it offers the possibility of exploring one's own talents and areas of interest (Davalos & Haensly, 1997). Mentors who happen to be domain experts can also assume great significance as role models (VanTassel-Baska & Baska, 2000). A further important aspect is that (4) mentoring can strengthen goal commitment and motivation. In light of the fact that the development of excellence requires years of practice, McGreevy (1990) is right when he points out that "mentors can help one persevere when the difficulties are greatest" (p. 6).

4.2.1.3 The environment. Mentors have several different possibilities for introducing developmental stimuli into gifted individuals' environments. For one, mentors themselves are a part of their mentee's environment, and their own behavior can improve the quality of that environment in many ways, for example by functioning as role models, giving suitable instructions and communicating information. They can also arrange learning situations in which deeper learning at an individually adjusted tempo is possible, to which they can give well thought-out, personal feedback (Purcell, Renzulli, McCoach, & Spottiswoode, 2001).

The functions of the mentor are, however, not limited to the creation of environments focused on learning needs. Often they can also directly facilitate the progress of the mentee. For example, mentors often work in key positions and can thus be decisive factors in the careers of their protégés (Merriam, 1983). One usually finds that a mentor was involved in successful (learning) careers, as Winner (1996) highlights in examples of Westinghouse Winners and Nobel laureates.

A useful concept for better understanding the possible ways that mentors affect the environment of the gifted mentee is the "sociotope" concept (Ziegler, 2008, 2009). Sociotopes are considered relatively stable environments that make certain opportunities for action accessible and normatively regulated. Thus, they consist of an *objective action space* (all actions that can be carried out in a specific environmental setting) and a *normative action space* (all actions that are usually expected to be carried out in a specific environmental setting). For example, a television can receive many channels that can all be watched (objective action space). However, parents may want their child to choose more educational TV programs (normative action space). At the same time, the child's peers exercise normative pressure in favor of viewing certain other programs, in order to be "in the know." This example shows that there can be divergent expectations in the normative action space.

Sociotopes can be classified in various ways. From a mentoring perspective, the following distinction is useful:

- (1) *Learning sociotopes*: Learning, education and competencies are made possible and valued (e.g., classrooms, occupational seminars, universities).
- (2) *Infrastructural sociotopes*: Learning, education, and competencies are possible but there is no normative pressure in this direction (e.g., a park bench, where one can peacefully read a book; the neighborhood bowling alley where one can improve one's own bowling skill).
- (3) *Thematic sociotopes*: Learning, education and competency acquisition are not possible but are esteemed (e.g., an interested husband inquires at the dinner table about his wife's day; a stranger on the train is interested in chess and gets into a discussion over the next likely World Champion; during school lunch break, pupils discuss excitedly the results of an experiment conducted in physics class).
- (4) *Competing sociotopes*: Learning, education and competency acquisition are not possible; alternative actions are normatively preferred (e.g., dancing at a disco, watching a film).³
- (5) *Antagonistic sociotopes*: Learning, education, and competency acquisition are not possible, and learning behavior is normatively rejected (e.g., a peer group mobs a very able pupil at school because the pupil is "too good"; a husband disagrees with his wife's attempt to get additional job qualifications).
- (6) *Professional sociotopes*: Expertise can be used occupationally.

In many respects, mentors can exercise a positive influence on the sociotopes of their mentee. As mentioned, if they occupy, as they often do, key positions in a field, they can arrange access to professional sociotopes (Merriam, 1983). They can also enable mentees to enter (better) infrastructural, thematic and learning sociotopes and, in so doing, significantly facilitate mentees' individual learning advances. They can advise or sometimes even directly intervene to minimize negative influences from other – competing or antagonistic – sociotopes. In interactions with their mentee, they can themselves constitute a thematic sociotope.

4.2.1.4 The subjective action space. Measures to develop and promote the action repertoire (learning and competence development), goals, and the environment deal with single components of the actiotope, which, however, cannot be kept separate in carrying out a specific action. That is, in practice the mentee must always choose to carry out an action from their (1) action repertoire in a particular (2) environment to reach a particular (3) goal. But how effective are they actually, when having to choose, each time and in specific environments, the best action from the action repertoire to reach specific goals?

Examples suggest that people show deficits in choosing appropriate actions. Many talented girls underestimate, in the "STEM" subjects (Science; Technology; Engineering; Mathematics), their own action repertoire and believe, for example, that they must – despite objectively equal ability – "do more" than boys to attain the same learning goals. By contrast, many boys overestimate their abilities in STEM and do not put enough effort into their learning as a consequence.

To analyze such processes, the construct of *subjective action space* was introduced in the Actiotope Model of Giftedness. In it, one's own possibilities for action based on the individual action repertoire and the environment are connected with adaptive goals. In their studies, Ziegler and Stoeger (2008) have been able to show that an effective subjective action space permits a much better prognosis for successful learning than does the intelligence quotient.

An experienced mentor can give worthwhile help with the question, *which* actions, to attain *which* goals, and in *which* situations especially promise success. Typical examples thus could be mentors' suggestions of the following kind:

- On the last test, you overlooked two questions and lost by that many points. On the next test (component: environment), you'll mark all the questions you've finished (component: action repertoire) so that you'll not overlook any more (component: goal).
- If during your presentation at the conference someone should ask you about the growth curves (component: environment), you can simply answer that the database is quite narrow (component: action repertoire). Speaking openly prevents a lot of unpleasant questions later (component: goal).

4.2.2 *Dynamic perspective*

The ultimate goal of mentoring gifted individuals is constructively to develop further the actiotope of the mentee to enable actions of excellence. For example, the ultimate goal of the mythical Mentor was that Telemachus should at some future point be a wise leader of the Ithacan people. However, every mentoring effort has, to a certain extent, its own concerns and indicators of the point at which excellence can be considered achieved. A crucial question is whether there are criteria for quality by which each single further development in the actiotope can be evaluated in terms of mentoring goals. Criteria for quality are essential; not every new competence is useful (and may even be harmful) and not every development is positive. In the following, four requisite standards of validity are proposed to assess the overall further development of an actiotope:

- goal validity
- ecological validity
- anticipatory validity
- replacement validity

4.2.2.1 *Goal validity.* People act in order to reach goals. It seems at first trivial to remark that this requires the ability to determine if and when a goal has been reached. But in fact this determination is not so simple.

Individuals make many decisions that they later question. This applies even to those decisions they very carefully thought about and the consequences of which they tried to trace out with special care. Who knows, even after decades in an occupation, whether they really chose the best career option? Who knows whether the advice given years ago to a friend in need was really the best? Experienced, competent persons also often have great difficulty diagnosing goal validity. Has a project leader really succeeded in sufficiently motivating the team? Is the new instructional method that the coach introduced really better than the old method, and in what way? The most elementary progress in learning cannot be achieved if goal validity is uncertain. A young violinist who doesn't notice that he plays imprecisely will never be a great musician. The young footballer, ecstatic over a goal but unaware of a less-than-optimal kicking form, will never become a great player.

One of the great strengths of mentors is that, because of their rich store of experience, they can, much more easily than their mentee, tell whether an action is

likely to lead to the goal. Only the kinds of action that can do that should get further consideration in the subjective action space of the mentee.

4.2.2.2 Ecological validity. Although individuals first learn an action in a specific situation, their actions are as a rule flexibly applicable in other situations. But it is often a problem to determine the precise area of application and to act in a way adequate to the situation:

- A speech at a family festivity need not be rhetorically polished; a more natural demeanor would be more appropriate.
- The jovial behavior that was suitable for the company outing is inappropriate in a discussion over a raise in pay.
- One must prepare differently for an oral examination than for a written one.

These examples are based on the recognition that actions can be employed in more than one situation with success, but not randomly. A mentor can spare the mentee trying out actions in different areas of application in order to find the right one. The protégé can be advised, instructed, and, if necessary, provided a role model. The mentor will ensure the mentee has representative experiences that make it easier to estimate the ecological validity of actions in unfamiliar situations.

4.2.2.3 Anticipatory validity. Additions to the action repertoire in pedagogical settings are largely undertaken for later use. For example, many school pupils study foreign languages, often for many years, without having ever conversed with a native speaker or visited a country where the language is spoken. Mathematically talented students attain mathematical competencies that they use only in university studies. When it comes to such material it is right to ask whether students in fact need most of it at all, and whether they should use the time spent learning it more sensibly. However, learning ideally takes place proactively. Mentors are, on the basis of experience, much better able to judge what action repertoire mentees should have at the ready in the future than are mentees themselves.

4.2.2.4 Replacement validity. The development of competencies is in no way linear and regular. It is characterized by many jumps, phases of inertia and often regression, particularly whenever environmental demands change. Therefore, development of an effective action repertoire includes, widening it and the replacement of less effective with more effective actions:

- In mathematics, counting is replaced with arithmetic, and arithmetic in turn, with algebra.
- Beginners at tennis are satisfied with getting the ball back over the net with some certainty. With increasing strength of play, they strike the same ball with full force into the opponent's field.
- Three-year-olds in preschool, teenagers in the disco, and adults on holiday make social contact in very different ways.

These examples of the necessary replacement of parts of action repertoires with more effective actions should not deceive one as to people's clear tendency to retain once-successful actions. However, the extended learning times of eminent persons make it

necessary to constantly replace less effective with more effective actions. An important task for mentors is therefore recognizing when earlier successful actions ought to be replaced by new, more successful ones – a path the mentor has usually already traveled him/herself.

4.3 System perspective

The mentor–mentee dyad should be analyzed from the perspective of systems theory (e.g., Bischof, 1998) for two reasons. First, the mentor–mentee dyad itself is a system. Second, further development of the actiotope of the mentee – which is the aim of mentoring – can be adequately considered only as systemic development characterized by *co-evolution*.

4.3.1 Mentor–mentee dyads

Mentor and mentee are often thought of as acting individuals. However, analyzing them as a system characterized by various interactions offers many advantages. First, this analysis helps overcome the view that mentoring is an interaction process controlled one-sidedly by the mentor. Studies inspired by parent–child interaction have shown convincingly that influence emanating in the reverse direction – from the mentee to the mentor – plays an essential role. This is also true for the imitation of actions. Indeed, mentors seem to *more often* imitate their mentees, or parents their children, than the other way around (Chishol, 2003; Uzgiris, Benson, Kruper, & Vasek, 1989).

Second, a systemic approach offers a better basis for the investigation of the question of the criteria that determine successful mentor–mentee matches. Successful mentors can indeed thoroughly differ in various ways from the mentee, for example in gender, interests, or socioeconomic status (Blake-Beard, 1999). Mentees, however, prefer mentors similar to themselves, and there are multiple indications that similarity is an important empathy criterion (e.g., Frierson, Hargrove, & Lewis, 1994).

Third, a systemic perspective on the dyad is shown to be very fruitful in the analysis of the relation between mentor and mentee. As a rule, it will be a mixture of bond types, whereby types differ according to the action context (e.g., strategic bond, affective bond, normative bond, role-bond).

4.3.2 Systemic perspective on the actiotope of the mentee

Mentors of the gifted have to ask two different questions:

- (1) What developmental possibilities are apparent in the mentee's actiotope? (*Modifiability of the actiotope*)
- (2) At the same time how can the stability of the developing actiotope be safeguarded? (*Stability of the actiotope*)

There are no patent solutions to either question. But the questions *must* be addressed by the mentor, since the further development of an actiotope component affects the other components. In the following, the essential points are illustrated by a real case.

Figure 3 is a somewhat generalized résumé of the typical weekly afternoon and evening activities of a 15-year-old mentee talented in physics based on notes made by

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
12–2 pm	Midday meal	School	Midday meal	School	Midday meal
2–4 pm	Homework/school lessons		Meets best girlfriend, together homework & study for test, evening meal together		Homework/study for test
	Meets best girlfriend	Theater group		TV, evening meal with family	
6–8 pm	TV, evening meal with family	Homework, evening meal with famil	TV, evening meal together	TV, evening meal with family	TV, evening meal with family
8–10 pm	TV, with family	TV, with family	TV, with family	Reading	Meets friends
10–12 pm	Bedtime	Bedtime	Bedtime	Bedtime	

Figure 3. Typical weekly afternoon schedule of 15-year-old mentee.

her mentor. She attended the eighth grade of a (German) *Gymnasium* (secondary school) and took part at her own request in a mentoring program to support her physics interests.

Figure 3 shows no clearly physics related activities outside of school time. All occupations relating to physics interests take place during school, homework, preparation for lessons, or tests. The part of the *action repertoire* that is then actually carried out outside of school time is therefore describable as nonphysics-related.

According to her mentor, in her free time the mentee was not present in thematic, infrastructural, or learning sociotopes. In fact, the mentee indicated that her best girlfriend and her friends, with whom she got together regularly on Fridays, would take a rather dim view of physics interests (antagonistic sociotope). Her parents considered her attainments in physics to be sufficient, as long as her passing at year's end was not threatened. TV viewing was a competing sociotope, during which she was probably also not occupied with physics. In sum, one could actually assert that the mentee's *environment* at the time was not physics supportive.

As to her *goals* in physics, the mentee was unspecific, saying only that she definitely was interested and wanted to intensify her activity. But the suspicion is warranted that the mentee could not manage to generate in her *subjective action space* the [necessary] motivation for working in physics. She simply didn't know, in spite of her "interest," what to do.

The mentor correctly determined that the *modification of the actiotope* was possible. The mentee had time on every single weekday, particularly if her TV time was used differently. The family wanted to support the mentee in various ways, including financially by buying books, materials, etc. The mentee's nonspecific goal of becoming more active in physics also included a number of fairly easy activities, such as reading a physics-oriented book, visiting a museum or taking part in a project group. The mentor thus had several possibilities for supporting her mentee's interests.

From the standpoint of the *stability of the actiotope*, it was noticeable that the mentee – aside from homework and study-time – was always with other people. The mentor assumed that further development of the actiotope would have to take into account the mentee’s social needs. One idea was, therefore, to form a physics project group with interested friends. Regular get-togethers would be part of the group’s activities, but choosing a suitable weekday was anything but easy. For example, Tuesdays and Thursdays were impossible because of afternoon classes. The mentor made the risky suggestion of Mondays at 4 p.m.; the mentee had up to then always had a regular date with her best girlfriend, who had no interest in physics topics. A potential conflict with the girlfriend could threaten the stability of the developing actiotope. The mentor’s plan was therefore to win over the girlfriend as an ally. The physics project was then first discussed among the three of them.

Important aspects of the modifiability and stability analysis can be made clear from this brief case. To judge modifiability, the actions of the mentee, the action repertoire, goals, environment, and subjective action space must all be precisely analyzed. Intended steps for development or broadening of competence must consider all actiotope components and relate them meaningfully to one another. This should be done under the assumption that a mentee’s current actiotope is *their* best solution to reaching *their* goals in *their* environment and with *their* action repertoire. Viewed objectively, these solutions are seldom optimal. But the actiotopes are usually fairly stable, and modifications often disturb such near-equilibrium states.

In the modifiability and stability analysis, the principle of *co-evolution* of the actiotope plays a crucial role. When a mentee has mastered an intended developmental step, he/she must then represent the extended action repertoire in his/her subjective action space. Then new goals can be reached and new environmental factors utilized. If, for example, an employee in a firm has taken a course in team leadership, it probably included the ability to motivate people. Now many situations that s/he didn’t notice earlier can be occasions for using his/her now wider action repertoire. For that, s/he must set corresponding goals. In his/her subjective action space, s/he must generate possibilities for action that fit these goals. This can also fail, as shown in studies on so-called “inert knowledge” (Mandl & Gerstenmaier, 2000; Renkl, 1994). These first applications of his/her knowledge will provide the mentee with new experiences, so that s/he can [more] precisely apply his/her strengths and work on his/her weaknesses. For that, s/he must in turn set corresponding goals, generate precise possibilities for action in the subjective action space to be able to reach these goals in his/her environment, etc. The reactions of the persons in his/her learning environment (parents, training partners, peers, etc.) will also be influenced by his/her wider action repertoire, so that they will behave differently. Thus his/her environment changes, which again can present occasions for new additions to the action repertoire, etc.

5. Conclusion

For around 30 years, mentoring programs have been instituted widely, documented and scientifically analyzed. In the intervening years, thousands of publications have appeared which have made at least three things clear:

- There is not one type of mentoring, but many different types carried out in different disciplines and various forms, with each one positing specific goals.

- A common concept or binding definition of mentoring or mentoring of gifted individuals is not foreseeable and probably not even desirable. Instead, the concept or definition lends itself to proceed from an ideal type of mentoring and characterize individual ways of applying it.
- Mentoring of gifted individuals can be highly effective, even the most effective pedagogical measure, but effect sizes, because of various weaknesses of mentoring application, are typically low to moderate.

With regard to raising effect sizes of future mentoring programs, analyses of their effect mechanisms are helpful. First, under general pedagogical criteria, it has been shown that mentoring programs can permit the full utilization of the *Learning Triad*, as well as fulfill the *Big Four*. Further analyses based on the *actiotope model* led to the result that mentors are in an excellent position to support the four components of the actiotope: action repertoire, goals, environment, and subjective action space. Further developments of the actiotope should, however, be undertaken from a systemic perspective, and equally take into account the modifiability and the stability of the actiotope of the gifted individual. Further developments in the actiotope initiated in the mentoring dyad can be considered with respect to four validity standpoints: goal validity, ecological validity, anticipatory validity, and replacement validity. The suitability of mentors can be measured via pedagogical abilities and according to how well they can assess these four validities. These skills are also essential to assist co-evolution of the components of the actiotope.

Mentoring – if applied properly – can be a highly effective pedagogical method. Analyses of the lives of eminent persons show that it is probably the most effective method (e.g., Bloom, 1984, 1985b). Our review has also shown that mentoring is a theoretically sound form of gifted education. It can and should be based on a systemic approach, which can maintain all the advantages of individualistic promotion.

Notes

1. “Ideal type” means not an ideal of mentoring, but rather describes the conceptual core of a *typical* mentoring.
2. The name “Big Four” is justified in as far as they must be realized in all learning processes that are to lead to substantial knowledge and competence increases. To put it the other way round: Mentoring that does not consider these four aspects of successful learning loses effectiveness.
3. Naturally, in the disco example competence acquisition in dancing, or in the cinema example, the knowledge acquisition of a film-lover could be of primary importance, and then competing sociotopes would become learning sociotopes. These examples make clearer how the classification of a sociotope is dependent on the specific action goals of a person.

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