Dimensions and Levels of Mentoring: Empirical Findings of the First German Inventory and Implications for Future Practice

Johannes Brandau
Catholic University College of Education Graz, Austria

Peter Studencnik
Catholic University College of Education Graz, Austria

Silvia Kopp-Sixt
University College of Teacher Education Styria, Austria

Abstract

The lack of evidence-based quantitative studies prevents further progress in mentoring research. In particular, standardized diagnostic instruments facilitating the exploration, evaluation and production of structured feedback for mentors and mentees are urgently needed. The purpose of this study was to investigate the factors and levels that are crucial to the process of mentoring. The study has two objectives: First, to expand the present empirical knowledge of basic dimensions and mentoring styles by developing the first German-language inventory, and second, to examine how the dimensions of the inventory are related to other qualities in the mentoring process.

The data were collected at three universities in Austria during and after the school practice periods (student teaching) of advanced student teachers who were under the guidance of mentor teachers. Over the course of the study, 405 mentees (future teachers) evaluated 205 mentors. In order to gather information on mentoring dimensions, a specially designed German-language questionnaire with 53 items was utilized to assess how often certain mentoring behaviors were experienced. Five factors, some of which were validated by independent variables, were identified through an exploratory factor analysis: "Professional Support", "Collegiality", "Working Levels", "Directiveness" and "Confidence". The resulting inventory promoted two objectives: a theory-focused goal to encourage further research on the complexity of mentoring processes; and a practical goal, the creation of a tool for collaborative reflection between mentor and mentee. The results indicated that mentoring must be conceptualized as a professional practice that should entail specific resources and guidelines.

Keywords

Mentoring, mentoring styles, mentoring-style inventory, teacher education, professional teacher development

Introduction

Researchers have recently begun to investigate possible styles of mentoring. However, previous studies and the literature in general have rarely gone beyond observational and vague conceptual research. The outcomes of mentoring programs have often been discussed (Hobson, Ashby, Malderez & Tomlinson, 2009), but individual differences in the implementation of mentoring (or mentoring styles) are rarely considered. On

Corresponding Author:
Silvia Kopp-Sixt, University College of Teacher Education Styria, Austria
Email: silvia.kopp@phst.at

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the basis of an extensive review, Hobson et al. (2009) concluded that the flexibility to address mentees' learning needs plays an important role in the success of mentoring, as no one mentoring approach is effective for all mentees. Consequently, mentors need to ensure that the roles and functions they perform and the strategies they employ correspond to their mentees' needs, concerns, individual contexts and current stages of professional development. The aim of the present study was therefore to develop a mentoring style inventory that would enable mentees and mentors to describe and analyze mentoring processes and provide a tool for reflection and feedback in mentoring dialogues.

There is a considerable gap in the research with regard to empirical data on identifying different mentoring styles. Among the reasons for this lack of adequate data might be the complexity and dynamics of the personal context involved and the need for intimacy and trust as the foundation for mentoring. Mentoring relationships can be evaluated in terms of two major types of mentoring functions, namely performance/career-related functions and psychosocial-related functions. Mentors differ in their preferences regarding coaching, protecting, role-modeling, challenging, counseling, and so on. To the best of our knowledge, there has been no previous study thus far in a German-language context that has focused on mentoring styles and developed a standardized inventory to compare the assessments of mentees and mentors. Following an analysis of the literature in mentoring research and practice, we compared existing inventories of mentoring styles. On that basis, specific items were constructed and (after a pilot study was implemented) tested in a larger sample. The aim of the study was to examine how the mentoring styles identified in the sample correspond to other empirically grounded concepts and how different mentoring styles affect the estimation of learning efficiency and satisfaction with mentoring on the part of mentees.

Literature Review

Over the last three decades, mentoring has become an important part of professional development in a wide variety of fields, especially in teacher education and the induction period of beginning teachers. With the rediscovery of the immense significance of emotional relationships for the learning process, based largely on the concepts of Vygotsky (1978) and the latest findings in brain research indicating that the human brain is primarily a relationship-oriented organ (Fuchs, 2009), the historical tradition of mentoring has come to be seen as an essential tool for nurturing knowledge and competence transfer. In recent years, mentoring in teacher education has experienced a paradigm shift that has altered priorities in mentoring practice from an apprenticeship style toward a reflective approach. Hargreaves and Fullan (2000) described this process of change in teacher professionalism and the implications for changing roles in mentoring. Mentoring has thus become an integral part of school development, creating systemic links from initial teacher education to the induction phase and continuing professional development. Collaboration, learning partnerships and communities of practice (Fischer, van Andel, Cain, Zarkovic-Adlesic & van Lakerfeld, 2008; Howley & Trube, 2008, p. 21) are essential aspects of this development. There are also forms of co-planning and co-teaching involved (Staub & Kreis, 2013). Gallo-Fox and Scantlebury (2016) reported on findings from a longitudinal study in which cooperating teachers co-taught science classes with student teachers: "Through co-teaching student teachers, teachers expanded their teaching practice and developed new insights about their teaching" (Gallo-Fox & Scantlebury, 2016, p. 202). Similarly, the Swiss intervention study "Partner Schools" focused on problem-based learning in an intense year-long cooperation between prospective teachers and mentor teachers in the context of co-planning and co-teaching (Fraefel, Bernhardsson-Laros & Bäuerlein, 2016, p. 205). The findings

Table 1
Changes in the culture of mentoring

Apprenticeship Approach	Reflective-explorative Approach
Instruction/instructor	Coaching/facilitator/partner
Hierarchy	Collaboration/mutual partnership
Individualistic focus ("I and my class")/ teaching development	Systemic focus ("I and my school")/ school development
Classical form of mentoring (mentor-mentee)	Variety of forms (peer-/team-/e-mentoring, etc.)
Mentoring before or after student-teaching sessions/classes	Mentoring during student-teaching sessions/classes (co-planning/co-teaching)
Face-to-face mentoring	Professional learning communities
Modeling (learning by role model)	Dialogical learning

suggested that cooperation involving a mutual partnership (mentor teachers collaborate as equals with student teachers) enhanced the commitment to student learning and resulted in more successful concentration on school goals. Currently, pre-service teacher education is in a state of transition from a training model that emphasizes the acquisition of skills and mastery of competencies to a practice-based model that stresses participation, engagement and reflection (Hoffman et al., 2015, p. 100).

This shift in emphasis does not imply that the traditional approach will not continue to play a role in specific contexts in the current practice of mentoring. Table 1 describes the essential changes in the main focus of mentoring for teachers.

As an integrative representation of these changes in priorities, a more inclusive definition of mentoring must have a broader focus than one-on-one support: *Mentoring is a trustful space for the transfer of knowledge and competence in a specific learning context*. This definition forms the foundation for our conception of the inventory. In this context, based on their qualitative research findings, Trube and Wan (2015, p. 57) formulated a concise and synoptic description of the essence of a mentoring relationship: "Such a relationship is characterized by commitment and follow through, mutual respect in a climate of trust, and the provision of appropriate resources to support the mentees learning."

Similarly, in a qualitative study which investigated the influence of mentor teachers on preservice teachers (Izadinia, 2015), the author concluded that when the mentoring relationship was experienced positively by pre-service teachers, their confidence level grew. In addition, various studies have demonstrated how important mentoring is to new teacher development (Ingersoll & Smith, 2004; Ingersoll & Strong, 2011; Richter, Kunter, Klusman, Lüdtke & Baumert, 2011; Langdon, Alexander, Ryde & Baggetta, 2014). As Langdon et al. (2014) stated (referring to Hobson et al., 2009), "Nonetheless, there is still insufficient attention in the research to the degree to which the mentor-mentee relationship sparks concern for professional growth and development, not just for mentees bur for mentors as well" (Langdon et al., 2014, p. 93). In a recent review of 46 studies that have examined the mentoring/coaching interactions of mentor teachers and pre-service teachers, the authors concluded that teacher education as a whole requires more proactive preparation of mentor teachers, as they are largely unprepared for the coaching role (Hoffman et al., 2015). Overall, the mentors' interactions emphasized the planning or instructional actions of the pre-service teachers rather than fostering reflective coaching conversations.

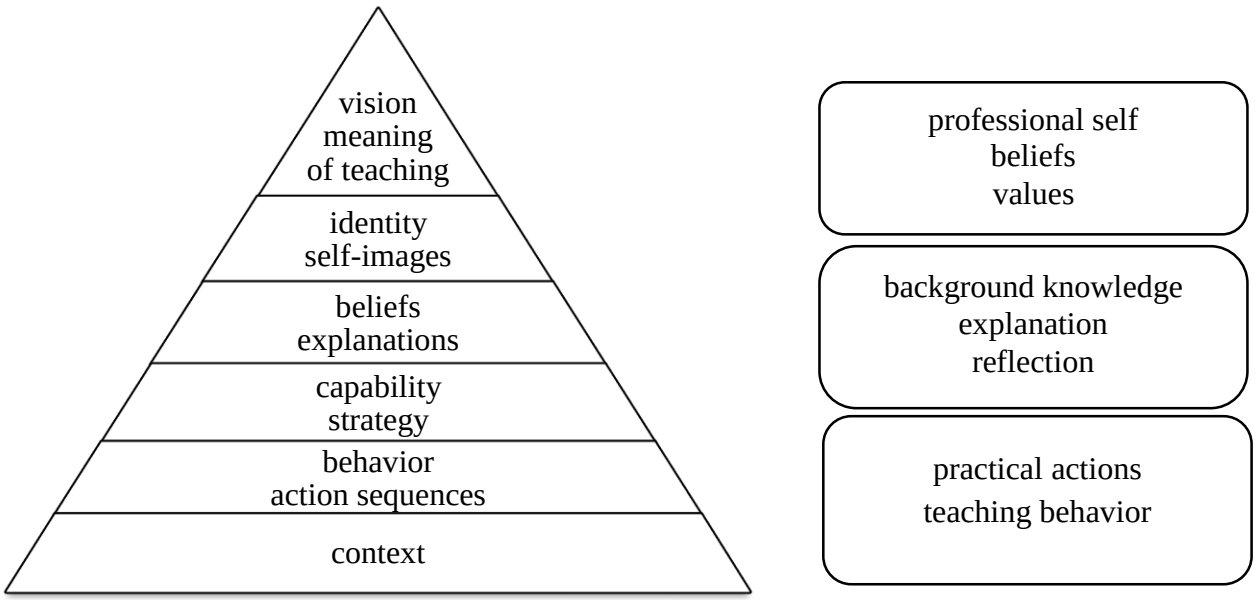
An overview of research on teacher mentoring (Hobson et al., 2009) indicated that there is a lack of representative, long-term

studies exploring the influence of certain essential factors of mentoring on the mentee's successful performance. Lynch and Madden (2015) investigating a school strategy for improving teacher performance, found that a special "coaching, mentoring and feedback regime" yielded improvement in teaching (Lynch & Madden, 2015, p. 117). However, relatively little is known about mentors' professional knowledge, needs and professional development. By means of a qualitative meta-study, Aspfors and Fransson (2015, p. 75) sought to enhance the understanding of research on education for mentors. The authors' synthesis of ten studies stressed the importance of systematic, long-term, research-informed mentor education. In their research article, "Opportunities and pitfalls in the turn toward clinical experience in U.S. teacher education," Zeichner and Bier (2015, p. 23) asserted that the quality of mentoring of teacher candidates in school and community placements is highly variable; more often than not, very little preparation and continuing support are provided for mentor teachers. Hobson, Maxwell, Stevens, Doyle and Malderez (2015, p. 99) reporting on mentoring in England, made the following recommendations for policy workers: establish a professional status for mentors/coaches, recognize the value of this work, encourage professional expectations for mentor/coach training and development and conduct further research to evaluate the specific impacts of mentoring/coaching on learners. The development of our inventory should support this last aspect of more specific and representative research.

There have been a few previous attempts to create inventories of mentoring styles and dimensions, with varying degrees of success and empirical support. Fischer, van Andel, Cain, Zarkovic-Adlesic and van Lakerfeld (2008) developed a concept involving five possible school-based mentoring styles using 25 items rated on a scale ranging from "strongly disagree" to "strongly agree". Specifically, the styles they defined were "Letting Go", "Active Listening", "Advisory", "Prescribing" and "Cooperative." However, this questionnaire has no empirical foundation, as there have been no studies on its use or standardization. With regard to peer-mentoring in the context of academic studies, the Mentor Functions Scale (Noe, 1988) consists of 14 items assessing psychosocial functions and seven items assessing career-related functions. Langhout, Rhodes and Osborne (2004) identified four different mentoring styles in an exploratory study in the context of youth mentoring focusing on the mentoring relationship's support, structure and activity. In a study by Leidenfrost, Strassnig, Schabmann, Spiel and Carbon (2011), three mentoring styles were found in a sample of 49 mentors who supported 376 first-year students in small groups. Using cluster analysis, these styles were described as "Motivating Master Mentoring", "Informatory Standard Mentoring", and "Negative Minimalist Mentoring;" the motivating master mentors subgroup was shown to have a positive influence on success (Leidenfrost et al., 2011, p. 347). Returning to the context of teacher professionalism, Crasborn, Hennisson, Brouwer, Korthagen and Bergen (2011) analyzed five aspects of mentoring dialogues using transcriptions in which 112 topics were discussed and 440 mentor teacher utterances emerged. A two-dimensional model of mentor-teacher roles derived from a theoretical analysis of the literature, MERID – Mentor Teacher Roles in Dialogues (Hennissen, Crasborn, Brouwer, Korthagen & Bergen, 2008), has also been explored empirically; meaningful differences have been reported with regard to the aspects of mentor teachers' input and directiveness. The combination of these two dimensions resulted in four mentor roles: The "Initiator" role (25% of the sample) introduces topics and uses non-directive skills, the "Encourager" role (10%) does not introduce topics and uses non-directive skills, the "Imperator" role (45%) introduces topics and uses directive skills and the "Advisor" role (20%) does not introduce topics and uses directive skills. The authors did not issue any judgment on the best mentor role, agreeing with the assertion by Williams et al. (1988) that a mentor whose approach matches the mentee's needs will be the most effective. Howley, Dudek, Williams

and Trube (2015) developed an instrument for measuring the mentoring styles of cooperating teachers. The final version of their inventory assessed four styles represented by the following continua: directive to non-directive mentoring, collaborative to non-collaborative mentoring, convergent to divergent mentoring and mentoring that is more or less open to instructional experimentation (Howley & Trube, 2012, p. 67). The convergence dimension describes the extent to which mentors give teachers opportunities to solve problems, either by tried-and-true methods or in more novel fashions. However, there is a lack of data on how these scales correlate to learning efficiency and other desired outcomes of mentoring.

In light of this prior research, it is evident that no instrument to date has considered the dimension of working or the reflection levels of mentoring. Mentoring perspectives are rooted in the concepts and myths of learning to teach, such as learning-through-apprenticeship or learning-by-reflecting, which have roots in Dewey (1933) and Schön (1987). Richter, Kunter, Lüdtke, Klusmann, Anders and Baumert (2013) investigated a sample of 700 German beginning mathematic teachers who participated in a pre- and post-test study over the course of one year. The authors' findings indicated that the quality – not the quantity – of mentoring explained the success of the participants' early careers; moreover, mentoring following constructivist principles rather than transmission-based apprenticeship principles fostered the growth of teacher efficacy and enthusiasm. Korthagen and Vasalos (2005) viewed reflection as an inward journey on various levels, particularly in the case of core reflection, which occurred when a mentee had a problem that could be easily solved. The authors therefore examined limiting factors at the levels of competencies and strategies, beliefs and implicit theories, identity and the vision of one's teaching. These levels were first conceptualized by Dilts (2010) in the context of neurolinguistic programming. A simpler model of levels is the 3-Level Mentoring framework of Niggli (2004): The first level of mentoring is related to executing practical tasks in a certain context (requiring specific feedback), followed by the epistemological level with explanations and background knowledge (requiring reflection) and the accomplishing level, or the personal self (requiring coaching). This is shown in Figure 1.



Dilts' Conceptualization **Niggli 3-Level Model**

Figure 1. Comparison of working-levels in mentoring based on Dilts (2010) versus Niggli (2004)

Thus, in the development of our inventory, the consideration of working levels in mentoring was essential. Based on the literature on teacher mentoring and existing inventories, the following research questions were formulated:

1. How many mentoring dimensions can be extracted from the data of the inventory, and what are they?
2. What is the correlation between these dimensions and estimations of learning effectiveness and satisfaction on the part of mentees?
3. How can the style dimensions be validated with other independent measures?
4. How do the mentoring styles identified in this research correspond to other empirically supported styles?

Method

Study setting and data sources

The first version of the inventory was constructed on the basis of a literature analysis and the adaption of some of the items from the inventory of Fischer et al. (2008), in combination with items generated through expert interviews with experienced mentors. An initial pilot test with 30 mentees and 15 mentors showed that the rating of mentoring functions and aspects on a scale ranging from "I agree completely" to "I don't agree at all" yielded high estimations on the items. To manage this ceiling effect, the phrasing of questions and possible answers were altered. The focus was redirected to concrete actions; for example, the question: "As a mentor, I take a lot of time to give solutions to the mentee." was changed to: "How often have you presented a solution to your mentee in the last three months?" and was to be answered on a scale from never (= 1) to always (= 6). It also turned out to be important to maintain an unconditional anonymous context, as some mentors refused to participate if they knew their mentees would be evaluating the process along with them.

Because the estimations of mentors and mentees were subsequently analyzed with the intent to create a more complete description of mentoring processes, the wording of the items had to be especially precise. Mentors were asked about their own mentoring practices, whereas mentees were asked about their perceptions of their mentor teachers as mentors. This difference in perspective had to be considered with every item created. For example, item 2 was phrased as "Ich lasse meine Mentees auch in kritischen Situationen selbstständig agieren." (I let my mentees act independently in critical situations.) for the mentors; mentees were instead asked to evaluate the statement "Meine Mentorin/ Mein Mentor ließ mich auch in kritischen Situationen selbstständig agieren" (My mentor allowed me to act independently in critical situations). Further research is needed to verify that the phrasing of items had no impact on the results. Our efforts resulted in 33 items that could be answered from both points of view, that of the mentors and that of the mentees. Five additional items were added to the mentee inventory to facilitate an understanding of the mentees' satisfaction with the mentoring process and its estimated benefits for their teaching practices.

Independent variables included in the survey were the mentees' semester in school and the format of their student-teaching program (a single weekly training session vs. a continuous three-week training period), and (for mentor teachers) their students' semester in school. Mentors were asked about their background, including age and years of experience as a teacher and as a mentor teacher. In addition, the questionnaire inquired about any previous mentor training or seminar participation. Both groups answered questions on gender and the type of school involved (primary school, lower secondary school, etc.). The instrument also asked both groups to estimate the overall duration of their mentoring meetings and the relative amount of mentors' and mentees' talking time during meetings before and after the mentees' student-teaching sessions.

The importance of field experience and the value of learning in the workplace for teacher students are not in doubt. All participating

mentees did their practical student-teaching experience over half a year with the same mentor or engaged in an intensive program over multiple weeks with the same mentor. The mentors were matched to the mentees by a central manager responsible for the mentoring program at the respective university. However, in this study, it was not possible to identify which mentor was evaluated by which mentee. As noted above, in the pilot test, most mentors clearly expressed their desire to remain anonymous.

Sample

Three university colleges of teacher education (two located in the Austrian province of Styria, one in the province of Burgenland) supported the EMSI project and allowed the questioning of mentors and mentees (survey period: 01/2015 – 04/2015). The mentees completed their questionnaires during lectures, as this was the only way to avoid interfering with their free time. All participating mentees were in their third or fifth semester. Their ages ranged from 20 to 30 years, with a mean of 21.7 years. Those who were absent during the lectures in which questionnaires were filled out were asked to return the forms in a closed envelope to the administration of their respective college. A response rate of 85% for the mentee sample was achieved. All mentors received the questionnaire along with an envelope from their mentees. The filled-out questionnaires were returned directly to the administration of their respective colleges to guarantee anonymity. Six of the returned questionnaires had to be eliminated because of missing data (e.g., only the first page was filled out). Despite the assurance of anonymity, the response rate of the mentors was just 74%. The original sample consisted of 772 individuals: 205 mentor teachers and 567 mentees (see Table 2). As the survey was planned as a census for semesters 3 and 5, the representativeness of the data is not in question. Of the 205 mentor teachers, 186 (90.7%) were female and 19 (9.3%) were male. Of the mentees, 476 (84.0%) were female and 86 (15.2%) were male; the remaining five (0.9%) mentees represent missing data points. The mentors' age ranged from 26 to 63 years, and their reported experience in mentoring ranged from 1 to 25 years.

To remedy the high estimations that occurred in the pilot test, the wording of the items was changed, as previously noted. Unfortunately, the data from the main survey also exhibited high mean values and small variances. Thanks to our collaboration with highly experienced mentors during the planning phase of the survey, we had some information on the different kinds of mentorship found in continuous practice settings. An analysis of the data showed that the students working in a continuous three-week training period exhibited mean values that were much higher than the group working in the single weekly setting. This led us to conclude that the groups would have to be treated as different samples. We consequently decided to separate out the students working on the continuous three-week schedule. Further analysis was then carried out on the data acquired from the remaining 397 mentees.

Table 2

Statistics of the sample

		Semester		Total
		3	5	
Group	Mentors	110	95	205
	Mentees	270	297	567
Total		380	392	772

Results and Interpretation

Based on the stated goals of the survey, defining mentoring style dimensions had to be the first step in analyzing the data.

Style Dimensions

One of the main objectives of this project was description of mentoring styles or dimensions of mentoring styles, with any assumptions supported by empirical data. For this reason, factor-analytical methods were given priority.

Exploratory factor analysis using principal component analysis resulted in the extraction of five style dimensions. We used the eigenvalue criteria to assess the number of extracted factors and the varimax procedure to ensure orthogonal factor rotation. Required assumptions about data eligibility with respect to the method were checked and deemed acceptable (e.g., KMO: 0.95). The analysis yielded a five-factor structure accounting for 62% of the total variance. Reliability scores between .61 and .91 (Cronbach's alpha) indicated adequately reliable scales. The five derived scales were labelled "Professional Support", "Collegiality", "Working Levels", "Confidence" and "Directiveness". "Professional Support" (α= .91, 10 items) reflects the resources that a mentor uses to support a mentee in an expert way; for example,"Meine Mentorin/Mein Mentor zeigte mir aufgrund meiner Stärken und Schwächen nötige Entwicklungsschritte auf" (My mentor showed me necessary development steps specific to my strengths and weaknesses). "Collegiality" (α= .89, 10 items) represents the personal support that a mentee receives from a mentor; for example, "Meine Mentorin/ Mein Mentor behandelte mich als gleichberechtigte Partnerin/als gleichberechtigten Partner" (My mentor treated me as an equal partner). "Working Levels" (α= .92, 9 items) is directly linked to the concepts of Dilts (2010) and Niggli (2004) concerning working levels in mentoring practice; for example, "Durch die Besprechungen mit meiner Mentorin/meinem Mentor wurde mir ermöglicht, meine zukünftige professionelle Rolle als Lehrkraft zu reflektieren" (Through the meetings with my mentor, I was able to reflect my future professional role as a teacher). "Confidence" (α= .75, 3 items) measures the amount of confidence a mentor shows in the abilities of the mentee; "Meine Mentorin/Mein Mentor ließ mich auch in kritischen Situationen selbstständig agieren" (My mentor allowed me to act independently in critical situations). The last dimension of "Directiveness" (α= .61, 3 items) reflects the rules and guidelines that mentors propose to mentees; for example, "Meine Mentorin/Mein Mentor machte mir schon bei der Vorbereitung etliche Vorgaben" (My mentor has already given me guidelines during the preparation). This measure reflects the degree of freedom with which mentees are allowed to practice their lessons in student-teaching practice. This final scale is not nearly as reliable as the other four extracted factors, but its high construct validity induced us to accept it as a measure.

A second explorative factor analysis was conducted with five items designed to measure the mentees' satisfaction with the mentoring process and its outcome. The items all met the required criteria with regard to data eligibility, and the extraction showed a single factor that had been the preferred outcome (e.g., KMO: 0.81) and accounted for 68% of the total variance. This five-item scale consisting of items about satisfaction with mentoring and the learning outcome was entitled "Evaluation" (α= .88) because of the thematic correspondence in all of its items (examples: "Insgesamt waren die Besprechungen für meine Zukunft als Lehrperson sehr lehrreich", "Meine Mentorin/Meinen Mentor im Praktikum schätze ich als sehr kompetent ein").

Table 3
The five style dimensions of the inventory

		1) Professional Support	2) Collegiality	3) Working Levels	4) Confidence	5) Directivness	Evaluation
Mentees	N	397	397	397	397	397	-
	mean	4.43	4.83	4.45	4.43	2.73	4.69
	variance	1.12	0.99	1.23	1.32	1.28	1.58

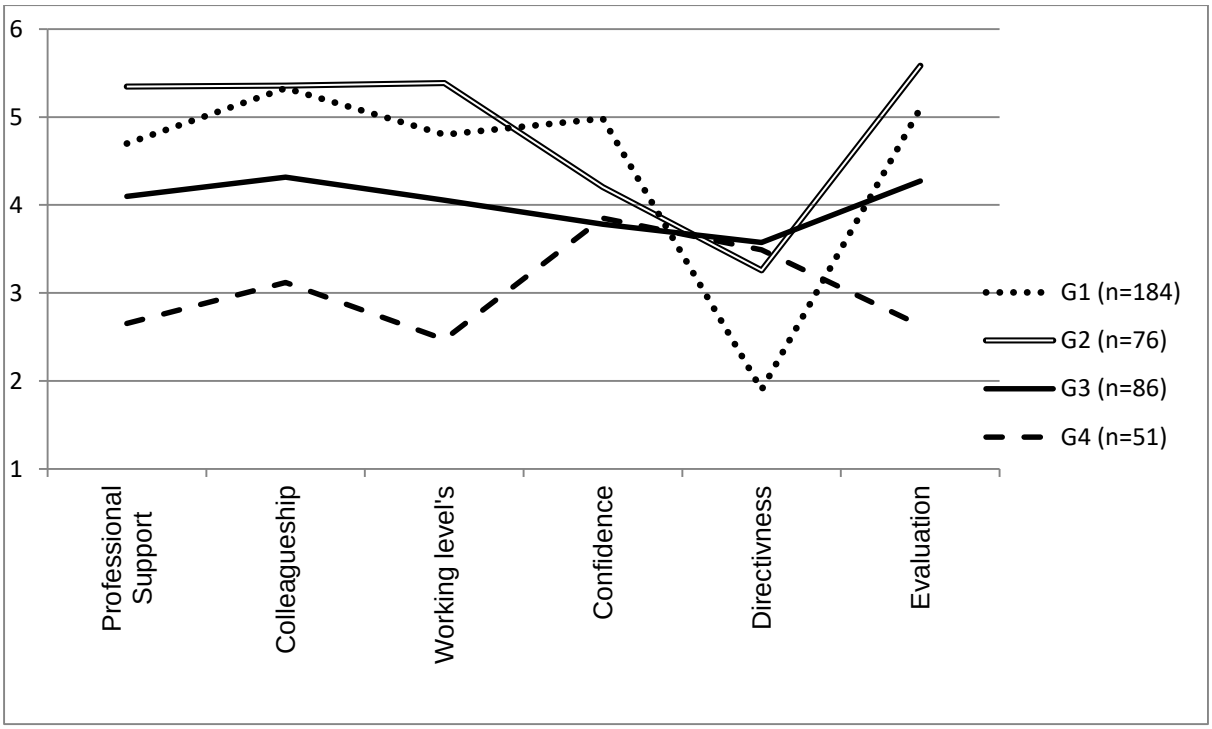
Five Style Dimensions and The Evaluation Scale

The items constituting the evaluation scale were inserted into the questionnaire to measure the mentees' satisfaction with the mentorship and the learning outcome. Their inclusion can be validated through an analysis of the correlative connections with the style dimensions. Correlation coefficients between r = .66 and r = .79 indicate a significant statistical connection between "Professional Support," "Collegiality," "Working Levels," and "Evaluation." In contrast, the negative value of r = -.27 for "Directiveness" demonstrated the importance of allowing mentees to practice teaching methods without too many restrictions. With respect to the experience level of the mentees, there was no significant difference in means between the third and fifth semester regarding four of the dimensions of mentoring. For "Working Levels," this outcome is not as surprising as it is for "Directiveness" or "Collegiality," as the scale measures facets of the competence level of the mentor. In contrast the other two scales measure characteristics that might be expected to change as the student teacher gains experience with more practice. One possible explanation is that the number of objectives assigned by the mentor to the mentee may decrease in the fifth semester as mentees reach the end of their education. It was also expected that the level of "Collegiality" would increase over time, as we believed that there would be greater acceptance of more experienced mentees than less experienced mentees by mentors . In fact, only "Confidence" showed a correlative trend ($t(395) = -1.82$, $p = .07$) whereby more experienced students (i.e., in their fifth semester) exhibited higher levels of confidence due to the mentors' handling of their mistakes.

Cluster Analysis and Analysis of Subgroups of Mentees

To further examine these relationships, a cluster analysis was conducted using Ward's minimum variance method. The number of clusters was determined by a visual inspection of the structogram. The means of the four clustered groups can be seen in Table 4.

Table 4
The four clustered groups of mentees



The clustering of groups suggests a possible explanation for the considerably lower correlation coefficient (r = -.27) for "Directiveness" with "Evaluation". Especially interesting is the role of Group 2 (G2): This group exhibited higher means for "Professional Support" and "Working Levels" and possessed the highest "Evaluation" rating, but its assessment in terms of "Directiveness" did not differ from the lower-rated Groups 3 and 4 (G3 and G4). Thus, moderate to high means for "Directiveness" did not necessary correlate with lower ratings in the "Evaluation" dimension, but a considerable number of mentees preferred fewer requirements and more freedom in teaching. With the significantly lowest mean in "Directiveness" ($F(3, 393) = 115.23$, $p < .01$), Group 1 (G1) was clearly differentiated from the other groups, although the remaining rankings showed no significant divergence. This biggest cluster of students (G1, n = 184) also experienced the most confidence in their relationships with their mentors. Although most mentees seemed to be satisfied with mentoring, Group 4 (n = 51) did not exhibit the same high means across all dimensions. High levels of "Directiveness" may explain this finding, but as Group 2 indicates, there may be other reasons as well.

Validation of The Five Style Dimensions

In order to further investigate the relationship between mentor and mentee, the study investigated how the two addressed each other (i.e., informal "du" or formal "Sie"). Mentees who addressed their mentors (and were addressed) with "du" experienced significantly higher levels of "Collegiality" ($t(394) = 4.57$, $p < .01$) and "Evaluation" ($t(394) = 2.20$, $p = .03$), while the level of "Directivity" was lower ($t(190,06) = -3.58$, $p < .01$). Because overall empathy for each other is an important factor in mentoring, it is not overly surprising that a more reserved relationship between mentor and mentee would result in less favorable estimations in certain dimensions. What can be stated, however, is that a less than ideal relationship did not change the mentees' perceptions of their mentors' competence and support. This finding reinforced the validation of our mentoring style dimensions; moreover, it demonstrated the willingness of mentees to

assess their mentor fairly without taking their personal connection with the mentor into account.

A second measure used to validate the proposed mentoring style dimensions was the relative proportion of speaking time in conversations between mentors and mentees. Mentees were asked to estimate their share of speaking time (in percentages) in preliminary and debriefing meetings with their mentors before and after teaching sessions. This proportion may be especially important, as there are significant correlations with "Evaluation" (preliminary: r = .23; debriefing: r = .34). More talking on the part of mentees was also correlated with higher levels of "Professional Support" (preliminary: r = .26; debriefing: r = .37) and "Collegiality" (preliminary: r = .32; debriefing: r = .31).

Discussion and Implications For The Future

The focus of this study was an empirical exploration of the styles of mentoring. Based on a factor analysis, five factors were identified, constituting the following style dimensions: "Professional Support" (10 items), "Collegiality" (10 items), "Working Levels" (9 items), "Confidence" (3 items) and "Directiveness" (3 items). Alpha reliabilities of .91, .89, .92, .75 and (the weakest alpha for "Directiveness") .61 suggest that four of the scales had adequate reliability. Because the construct validity of the short scale for "Directiveness" is empirically based, and because the data for the measure were found to differ significantly between subgroups in the cluster analysis, the low reliability (Cronbach's alpha) of this style dimension was tolerated. Nonetheless, the three items of this scale must be expanded in the next version of the inventory in order to obtain a better characteristic value. Furthermore, Glickman's model (1981) suggests that non-directive (directive) mentoring will be more effective with mentees who have more (less) experience. Our empirical work identified no significant differences in "Directiveness" between participants in their third and fifth semesters but did find significant differences in the style dimension "Confidence", which was higher for those in later semesters. "Professional Support" was higher for the lower semesters, which makes intuitive sense. The significant influence of the forms of address (the informal second person pronoun "du" vs. the formal second person pronoun "Sie") as an expression of personal distance in communication also confirms the validity of the dimensions.

"Collegiality" and "Directiveness" are dimensions that have been previously confirmed by the studies of Crasborn et al. (2011) and Howley et al. (2015): "Openness to Experimentation" in the instrument developed by Howley et al. (2015) is equivalent to our "Confidence" factor, and "Professional Support" can be related to the "Active-reactive" dimension proposed by Crasborn et al. (2011). In addition, "Professional Support", "Collegiality" and the factor of "Evaluation" are significantly correlated with the self-estimated individual speaking time in conversations before and after teaching sessions; this would appear to validate the style dimensions developed through our analysis. It is interesting to note that, in contrast to the perceived individual role in mentoring conversations, the estimated duration of these conversations did not exhibit any influence.

Additional work is still needed to establish the construct validity of the five mentoring styles identified in this study. Future research should seek to enhance our understanding of the meaning of scale scores. For instance, the dimension of "Professional Support" could have two aspects: support for personal and socio-emotional factors, and support related to teaching and expertise. Richter et al. (2011) demonstrate that only personal support has a positive effect on professional self-efficacy, but the other aspects reduced the stress experience of mentees. Notably, the style dimension of "Professional Support" was not directly represented in any of the other instruments considered here (Howley et al., 2015; Noe, 1988;

Crasborn et al., 2011). Unfortunately, the instrument developed by Howley et al. (2015) could not be integrated into this research, as our inventory had already been completed at the time of its publication.

One success of this study was the very strong alpha (.92) exhibited by the style dimension, "Working Levels". Our study marks the first time that this dimension has been considered in an inventory, and so its impact is all the more decisive. However, to encourage the inventory's use as a basis for feedback and reflection about preferred mentoring styles, it must be further developed using larger samples of mentors and mentees.

Limitations

Several limitations to this study should also be noted. The study was conducted in a particular setting with a special subgroup of the complete sample. The estimations of this subgroup were not markedly impaired by the ceiling effect, which was observed in the sample of mentors and mentees in a more intensive practical training program. This ceiling effect was also found in a sample utilized by Hascher (2006), who stated that this idealization of mentors and mentees would be more realistic and relative in the context of longer student-teaching programs.

Hence, further research is needed to replicate our results in broader settings and specific contexts. Similar factor structures were found in the sample of mentors and mentees in the intensive practicum, but the ceiling effects were statistically problematic, especially for the sample of mentors. A questionnaire employing an eight-point or ten-point Likert scale could perhaps enable more differentiation. Further verification of the scales by means of a confirmatory factor analysis with other representative samples of mentees in specific contexts (two mentors with one mentee, long-term mentoring over months, group-mentoring, etc.) is also necessary. A factor analysis of second order may be of interest for a comparison of our second-order dimensions with the two-dimensional model of mentoring developed by Crasborn et al. (2011). Furthermore, a confirmatory factor analysis of a larger sample of mentors will be necessary to replicate the style dimensions.

In an additional limitation, only the characteristics and behavioural data of mentors were considered for estimation by mentors and mentees. It would be interesting to observe how mentors perceive their mentees in terms of their individual competencies and resources.

In a further application of the inventory, future research could potentially ascertain whether the anonymous approach applied here can be altered to allow transparent feedback between mentor-mentee systems. It is possible that in such a context, the estimations would be more variable.

Questions and Implications for The Future

1. Can an objective inventory improve the culture of feedback in mentoring?

It is our hope that mentors will learn about themselves by completing the inventory, comparing their answers with the norms and reflecting critically on the resulting profile. Mentors could then ask themselves whether their style and approach address mentees' individual needs as an important factor in the success of mentoring. Furthermore, there are likely to be behavioral "tendencies that are unconscious or function in a mentor's "blind spot" (Luft & Ingham, 1955).

The inventory developed in this study can play an important role in professional training, the preparation of mentors and quality assurance for mentors. In order to provide mentors with feedback on their mentoring behavior, the perceptions of both mentors and mentees should be taken into account. According to Martin (1996), the effectiveness of mentors' behavior is largely determined by the subjective perception of their mentees. Consequently, the subjective perception is much more important than the behavior itself.

In a kind of meta-communication, mentees and mentors could periodically converse explicitly about their perceptions and expectations based on their results in the inventory. The culture of feedback would be reinforced by a team of peers and the systematic use of video-based feedback (Christ et al., 2017). However, the effects of feedback would be strengthened by participation in professional learning communities and reflection teams of peers with the use of concrete video analysis. A study conducted by Hattie (2013, p. 134) found strong effect sizes with regard to the achievements of pupils for peer-tutoring (d = 0.55) and microteaching with video-feedback (d = 0.88). Consequently, a combination of meta-communication based on an inventory and focused video-reflection in teams of peers and mentors, followed by specific microteaching, could represent an effective means of establishing a feedback culture for mentees with a direct influence on pupils' achievements. So the chance for a peripheral vision (Bateson, 1994) to the mentoring system is possible. Future research on effective feedback cultures for mentees must combine the best instruments and evaluate them. The 2007 McKinsey Report (Barber & Mourshed, 2007) demonstrated that the responsible leaders of the best school systems stress the meaningfulness of mentoring and coaching for teachers. School quality is much improved when mutual support and feedback are valued principles of school development.

The next version of the inventory developed in this research must consider in greater depth the new trends in mentoring, such as mentoring during a lesson (not merely before or after) and the development of mentoring in the context of learning communities (Darling-Hammond & Bransford, 2005; Fischer et al., 2009; Fraefel et al, 2016). The construction is a challenge because context-sensitive mentoring is not a style by itself, but rather an empathic use of various styles in different contexts, according to the divergent needs of mentees. The further development of the inventory should strive to create a better balance between precision and the necessary flexibility.

2. Can a standardized objective inventory improve research on mentoring?

Research should compare the effectiveness of mentoring programs in a long-term perspective in representative settings. In order to establish standards to promote effective mentoring, more evidence-based research must be conducted. Standardized inventories can support the analytical comparison of the effectiveness of mentoring programs and enhance our understanding of the complexity and dynamics of the process of mentoring. More empirical evidence of the positive effects of mentoring is a goal that policy-makers, teacher educators, school leaders, mentees, and the mentors themselves, should all aspire to achieve.

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About the Author(s)

Johannes Brandau, Ph.D., is professor at the Catholic University College of Education Graz and at the University of Graz. He was clinical teacher, mentor, clinical psychologist, psychotherapist and coach for over 35 years. His research and publications focus on special education and inclusion, especially ADHD, professional work with parents and supervision.

Peter Studencnik, Mag., earned his degree in pedagogy and further education at the University of Graz. He works in Organizational Development for Rhomberg Bau GmbH in Bregenz. Prior to assuming his current position with Rhomberg Bau GmbH he was a staff member and scientific assistant at the Catholic University College of Education Graz.

Silvia Kopp-Sixt, M.A., is University College Lecturer, Study Programme Coordinator and Deputy Head of the Institute of Professionalisation in Early Childhood and Primary Teacher Education at the University College of Teacher Education Styria (PHSt). She is a former teacher enrolled in special education and inclusive education as well as practical school training and advanced teacher education. Her current research focuses on mentoring and inclusive education.