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The Development of a Scale on Assessing Peer Mentoring at the College Level

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The purpose of my study was to develop and validate a scale to assess peer mentoring practices that aim to enhance learning. In the development process, 4 focus group interviews were conducted with 10 mentors and 12 mentees who participated in 8 weeks of peer mentoring. In addition to the literature, the findings from interviews were used to develop items. The 11-item form was administered to 126 college students. After the confirmatory factor analysis, the scale took on its final form with 10 items in 3 factors as Contribution to Mentee, Mentor Characteristics, and Peer Relationships. The results of confirmatory analysis were: GFI .92, CFI .99, NNFI .98, RMSEA .080, and Cronbach α coefficient was found to be .954.

Keywords: mentor, mentee, scale development, peer mentoring, scale on assessing peer mentoring

Based on cognitive apprenticeship, mentoring is a method within social constructivism which argues that learning takes place as a result of social interaction (Dennen, 2004; Jacobi, 1991). Mentoring is defined as an expert (or mentor) supporting or advising a novice (or mentee) (Dennen, 2004; Kuzu, Kahraman, & Odabaşı, 2012). In a more detailed version Roberts (2000) defined mentoring as a formal process in which a more knowledgeable and experienced person oversees and encourages the career and personal development of a less experienced and knowledgeable person. Accordingly, he described the three roles of mentors as modeling, sponsoring, and coaching. Similarly, Anderson and Shannon (1988) described five mentoring functions: teaching, sponsoring, encouraging, counseling, and befriending.

Mentoring practices are widely used in the fields of medicine, psychology, and management (Crisp & Cruz, 2009; Jacobi, 1991). Education is another field in which mentoring practices can be frequently encountered. In the educational sciences literature, studies of a wide range of age groups—kids, teens, college students, and teachers—have been conducted (Single & Single, 2005) in fields such as academic advising, counseling services, and teachers guiding pre-service teachers (Bakioğlu, 2011; Cornu, 2005; Hall & Jaugietis, 2011; Langelotz, 2013). Studies of a variety of practices including traditional mentoring, peer mentoring, group/team mentoring, and e-mentoring (Zeeb, 2000) can be found.

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Examining more than 300 articles, Enrich, Hansford, and Tennent (2004) identified the most frequently positive mentor outcomes in the literature as: (a) collegiality, collaboration, networking, sharing ideas, and knowledge; (b) reflection; (c) professional development; and (d) personal satisfaction, rewards, and growth. As positive mentee outcomes, the same study identified: (a) support, empathy, encouragement, counseling, and friendship; (b) help with teaching strategies, subject knowledge, and resources; (c) discussion, sharing ideas, information and problems, and advice from peers; and (d) feedback, positive reinforcement, and constructive criticism. The positive outcomes of mentoring can also be found in the literature review studies conducted by Jacobi (1991) and Crisp and Cruz (2009). It can be argued, based on these results, that mentoring is beneficial both for the mentor and the mentee, and indeed, mentoring can be defined as a *teaching–learning process* (Roberts, 2000).

In addition to benefiting mentors and mentees, mentoring also has a positive effect on instructors and organizations (Douglas, Smith, & Smith, 2013; Enrich et al., 2004; Leidenfrost, Strassnig, Schabmann, Spiel, & Carbon, 2011). The main benefits for organizations are mentoring's contribution to the orientation and adaption of newcomers, increased participation levels and the improvement of student achievement. Even Dennen (2004) claimed that mentoring can also serve as an instructional strategy. Similarly, Garvey, Megginson, and Stokes (2009) defined one of the goals of mentoring as improving skills and transferring knowledge.

Ward, Thomas, and Disch (2014) mentioned the uniqueness of each student and their issues with personal, career, and academic development. They argued that no institutions are capable of meeting students' needs, but that peer mentoring could be a solution. For example, in overcrowded classrooms, teachers cannot consider the needs and assess the work of every single student (Dennen, 2004). Group works can also be used to solve the problem of limited time. However, these groups should also be carefully monitored and guided (Gözütok, 2006). Peer mentoring can be argued to be a solution for this problem. Both Dennen (2004) and Douglas et al. (2013) proposed peer mentoring as a way to give individualized attention to each student. Peer mentoring has the potential to create positive academic outcomes (Douglas et al., 2013). Likewise, Colvin and Ashman (2010) mentioned universities' search for ways to improve traditional classroom learning at no expense. They also describe that peers' powerful influence on one another and educators' efforts to utilize this influence. They proposed peer mentoring as the solution for both of these issues and as an efficient way to use peer relationships to improve learning.

Smith (2013) discussed the goals of peer mentoring in four categories: students' academic achievement, improving students' competencies, the development of mentor students, and positive outcomes for faculty members. Not just traditional mentoring, but also peer mentoring is beneficial for mentees, mentors, instructors, and organizations (Leidenfrost et al., 2011; Smith, 2013).

Ward et al. (2014) grouped peer mentor activity into seven categories: guidance/direction, emotional availability/supportiveness, companionship and mutual enjoyment, insight/artfulness, inspiration/integrity, accountability, and multidimensional responsiveness. Colvin and Ashman (2010) claimed that peer mentors serve as a connecting link, as peer leaders, as learning coaches, as student advocates, and as trusted friends.

The basic element of peer mentoring is a social interaction in which students can easily ask for help (Douglas et al., 2013). Since peer communication is easier, students feel more confident and more comfortable when they have questions. Their opportunities for success increase (Douglas et al., 2013).

In a study of peer mentoring, Douglas et al. (2013) identified 10 characteristics that mentors should have based on a literature review. Mentors should: (a) be knowledgeable, (b) have previously completed the course, (c) have good communication skills, (d) be available, (e) work one-on-one, (f) be supportive, (g) be enthusiastic, (h) have prior mentoring experience, (i) be trustworthy, and (j) be of the same gender. Douglas asked mentors and mentees to rank these characteristics based on their importance. The characteristics were ranked differently by the two groups: however, both mentors and mentees stated that the most important characteristics for an effective mentoring relationship were mentors being knowledgeable and having good communication skills.

Peer mentoring can be defined as a students' (mentors) helping their peers (mentees) so as to facilitate the mentees' learning and contribute to their development. Peer mentoring has a significant potential for contributing to mentees, mentors, teachers, and institutions. Especially in learning in overcrowded classrooms, it can be a solution for teachers who are unable to address every student individually.

Peer mentoring is an essential method which can contribute teaching–learning process. Like any other practice, assessing peer mentoring is a complementary part of this teaching–learning process, as it determines whether or not the goals are met. It provides feedback for both learners and educators. With the help of assessment, peer mentoring practices could be improved. In the literature there are instruments to assess mentoring practices. On the other hand, the dynamics of peer mentoring are different than mentoring. First of all, the basic element in mentoring is interaction and in peer mentoring aforementioned interaction is between peers. As far as it can be found there are no instruments special to peer mentoring that aim to enhance learning. In my study, I aimed to develop and validate a scale for mentees that will contribute to the assessment of peer mentoring practices. This scale can fill the gap in the evaluation of peer mentoring practices.

Method

Yurdugül and Bayrak (2012) approached the scale development process in two steps: the design of the instrument and pilot study. The design focuses on content and face validity, while the pilot study focuses on construct and criterion-related validity. In the design step, the characteristics to be measured should be defined based on the literature, and the item pool should be generated. The item pool and the draft instrument should be structured for content and face validity. In the pilot study step, item analysis should be conducted, psychometric characteristics should be identified for reliability and factorial validity, and the relationship of the construct with other constructs should be investigated for construct validity. For validity in the design step, expert opinion was obtained. The scale development process was carried out according to Yurdugül and Bayrak's (2012) approach.

Defining the Characteristic to be Measured

The instrument assesses the peer mentoring process. Thus, mentoring and peer mentoring were examined in the literature, and a framework for the characteristics to be measured

was formed. The outcomes of the mentoring practice were identified as the elements by which the mentees can assess the process from their own perspective, the mentors' practices, and the relationship between the mentees and the mentors.

Item Pool

In this step, the literature on mentoring and some of the instruments developed in this area were considered. "Mentoring Preservice Teachers of Primary Science" (Hudson, Skamp, & Brooks, 2005) is one of the instruments whose items were examined. Additionally, the Online Graduate Mentoring Scale developed by Crawford, Randolph, and Yob (2014), the Mentoring Profile Inventory developed by Clarke et al. (2012), and the Ideal Mentor Scale developed by Rose (2003) were examined. These instruments were not intended to assess the peer mentoring process, but provided insight for the items without making a direct contribution.

In addition to the literature, the findings from interviews with college students who participated in eight weeks of peer mentoring were used. The aim of this peer mentoring practice was to increase success in an undergraduate course about instructional technology. A total of 68 college students participated in the mentoring program, 58 mentees and 10 mentors. The mentoring program was implemented at a Turkish state university.

Semi-structured focus group interviews were used to obtain the opinions of mentors and mentees. Four focus group interviews were conducted with 22 students, 10 of whom were mentors and 12 were mentees. Due to the small number of mentors, all of them were invited for interviews. Of the mentee group, 20% were selected randomly and invited to be interviewed. Mentor focus groups included five individuals each, while mentee focus groups included six. Questions for semi-structured interviews were prepared, and the opinions of two experts were consulted to check the content validity of the interview questions (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2008). The questions concerned the management of peer mentoring, its advantages and disadvantages, the roles of mentee and mentor, the relationship between mentee and mentor, issues that should be considered when selecting a mentor, and issues that should be considered when pairing mentors and mentees.

Since some of the students wanted neither video nor voice recording, notes were taken in the interviews. Afterward, the notes were transcribed and presented to the students for their confirmation for reliability.

The descriptive analysis of the interviews resulted in three dimensions and seven sub-dimensions, including: (a) the contribution of mentoring process to the mentee, (b) characteristics of the mentor (i) being competent, (ii) being objective, (iii) having effective communication skills, and (c) the effect of the mentor being a peer on the mentoring process (i) taking the mentor seriously, (ii) perceiving the mentor as effective as the teacher, (iii) communicating with a peer being easier, and (iv) mentors perceiving themselves better than their peers.

The results of the analysis are summarized below:

The contribution of mentoring process to the mentee. The main issue mentioned by both the mentors and the mentees was the contribution of the mentors to the mentees. The mentors thought that they contributed to the mentees by helping them solve the

problems with which they had difficulty, providing feedback on their work or about mentoring and motivating those who believed that they could not succeed or somehow did not start their studies. The mentees also stated that the mentors made these contributions.

Characteristics of the mentor. Being competent in the subject, being objective, and having effective communication skills were highlighted.

Being competent. One of the characteristics mentioned by both the mentors and the mentees was that mentors should be competent in the subject and be able to provide adequate answers to the mentees' questions. The mentees asserted that they relied more on the mentors who they thought were competent in the subject. The mentors pointed out the importance of having an adequate level of knowledge in the subject in selecting a mentor.

Being objective. Another characteristic that was mentioned by both the mentors and the mentees was objectivity. Mentors favoring mentees because they are peers seems to be an issue that causes concern. This issue was perceived by the mentees both as a benefit and a complaint. The mentors also emphasized the importance of being fair for effective mentoring.

Having effective communication skills. That the mentors' communication skills should be effective was mentioned both by the mentors and the mentees. It was pointed out that feedback should be constructive. Another point mentioned was that effective mentoring was only possible through effective communication. Otherwise, neither competence in the subject nor objectivity would be useful.

The effect of the mentor being a peer on the mentoring process. Taking the mentor seriously, perceiving the mentor as effective as the teacher, communicating with a peer being easier, mentors perceiving themselves better than their peers were highlighted.

Taking the mentor seriously. The issue of not being taken seriously by the peer mentees was mentioned by the mentors. The mentors felt that the mentees did not care about them in some cases. They encountered situations such as the mentees not attending a planned meeting or missing deadlines. On the other hand, there were mentees who said that they took their mentors as seriously as they did their teachers so that they could benefit from the process.

Perceiving the mentor as effective as the teacher. This was mentioned by the mentees. Some mentees argued that peer mentors could not be as effective as the teacher. This view was emphasized, although it does not result from a comparison. Even though there were no concrete indicators, a group of students were observed to believe this. This could be an obstacle to the process.

Communicating with a peer being easier. This was said by the mentees. They asserted that they could easily ask questions and get help since they were communicating with peers.

Mentors perceiving themselves better than their peers. Another issue stated by the mentees was that some mentors perceived themselves as better than the mentees. Mentees said that the mentors supposed they were very powerful and thought of themselves as teachers. This was disturbing for the mentees.

Triangulation, studying with multiple researchers, peer and expert reviews, participant confirmation, and an audit trail (detailed explanations about data collection and analyzing process) are some of the methods by Merriam (2002) mentions for ensuring the trustworthiness of qualitative research. For trustworthiness in this study, interview transcripts and the themes derived from those transcripts, are shared with participants for participant confirmation. The opinions of two experts were consulted about the coding themes. After their confirmation, a colleague coded a randomly chosen focus group interview transcript according to these themes. The consistency between the coding of researcher and the colleague was examined, and no conflict between coders was found.

In the interview results, the dimensions of (a) the contribution of the process to the mentee and (b) the characteristics of the mentor were consistent with the literature and frequently mentioned (Douglas et al., 2013; Terrion & Leonard, 2007). There are many researchers that have focused on the positive contributions of mentoring and mentors' characteristics. There is an exception, (c) the effect of the mentor being a peer on the mentoring process is not directly addressed in the literature. This dimension is unique to peer mentoring, while the other two dimensions concern mentoring in general. In the literature, it is mentioned that the primary element of the mentoring process is the relationship between the mentor and the mentee (Douglas et al., 2013). It is obvious that the conditions of this relationship will change when mentor and mentees are peers. Mentees should show respect to their mentors and take them seriously. Mentors should not forget that they are communicating with their peers and not behave as if they are superior. The third dimension reflects this peer relationship issue. It also exposes why traditional mentoring instruments are not proper for peer practices and the need for a tool for evaluating peer mentoring.

Structuring of the Item Pool

A total of 18 items were formed for the scale's item pool after review of the literature and considering the results of four focus group interviews. These 18 items were reviewed by two experts. The experts were asked to evaluate each item's ability to measure the identified characteristics, to suggest changes and to propose new items if they thought it necessary. Based on the experts' opinions, seven redundant items were excluded, and two items that could cause confusion were revised. The Turkish draft of the scale with 11 items was administered to five students to get feedback regarding the comprehensibility of the items and instructions and the time allotted. It was observed that the students did not have any problem with any of the items. It was decided to include these 11 items on the peer mentoring assessing scale:

Contribution to the mentee

(1) My mentor helped me better understand the topic I was studying.
(2) My mentor helped me solve the problems I encountered.
(3) My mentor gave me constructive feedback.
(4) My mentor motivated me.

Mentor characteristics

(5) My mentor was competent in the subject I was studying.
(6) My mentor had strong communication skills.
(7) My mentor was objective.

Peer relationship

(8) Since my mentor was my peer, I was able to communicate with him/her easier.
(9) I took my mentor as seriously as I did my teacher.
(10) My mentor's support was as effective as my teacher's.
(11) My mentor exceeded his/her responsibility and perceived him/herself as the teacher.

Constructing the Draft Instrument

The form was finalized by preparing the instructions and the choices. A seven-point Likert-type grading scale with choices ranging from *strongly disagree* to *strongly agree* was used. A high score on the scale indicates a positive attitude toward peer mentoring.

The form was administered to 126 college students who participated in peer mentoring in three different departments at a Turkish state university. 26 of the students were in the Department of Computer and Instructional Technologies Education, 48 in the Department of English Language Teaching, and 52 in the Department of Elementary Education.

Findings

The Cronbach α reliability coefficient was calculated and found to be $\alpha = .937$. The reliability coefficient of the contribution to the mentee dimension was $\alpha = .954$. the mentor characteristics dimension was $\alpha = .933$, and the peer relationship dimension $\alpha = .679$. A Cronbach α reliability coefficient of .60 of higher is accepted as sufficient (Kayış, 2010). The third dimension having a coefficient of $\alpha = .679$ which is relatively low, was revised. Examining item-total score correlations, the correlation value of item 11 was

Table 1
Cronbach α *Reliability Coefficients*

Dimensions	Items	Number of items	Cronbach α
1. Contribution to the mentee	1–4	4	.933
2. Mentor characteristics	5–7	3	.895
3. Peer relationship	8–10	3	.814
Total		10	.954

found to be .176, and if this item were deleted, the coefficient of dimension three would go up to $\alpha = 814$, and the coefficient of the entire scale would rise to $\alpha = .954$ (Table 1). Therefore, it was decided to exclude item 11 from the scale. The item-total score correlations of the remaining 10 items ranged between .653 and .905. In general, items with an item-total score correlation of .25 or higher are accepted as differentiating individuals (Kayış, 2010). The high values show that the items measure the same behavior.

The p value calculated in the test of normal distribution was higher than .05. The scores did not show significant deviation from a normal distribution (Büyüköztürk, 2008). According to the Kolmogorov Smirnov (K–S) test, all three dimensions had a normal distribution ($p > .05$) (Table 2).

To test the suitability of the data for factor analysis, Kaiser–Meyer–Olkin (KMO) and the Bartlett test of Sphericity were used. A KMO value higher than .60 is significant, and the Bartlett Sphericity result must be significant to show that the data are suitable for factor analysis. A KMO greater than .90 is accepted as optimal. The analysis found a KMO value of .948 and the Bartlett test was significant ($p < .01$) (Table 3). Consequently, the data collected were suitable for factor analysis based on the KMO and Bartlett test results.

The model was structured on 10 items in three dimensions, and confirmatory factor analysis (CFA) was conducted. The analysis was done using multidimensionally correlated three-dimensional model as well as unidimensionally and multidimensionally uncorrelated three-dimensional models. For the RMSEA .08 and below is accepted (Stevens, 2012), and .90 and over is accepted for the GFI, the CFI, and the NNFI (Hooper, Coughlan, & Mullen, 2008). When the fit indices of the three models were compared (Table 4), it was found that the correlated three-dimensional model yielded the best values.

In the correlated three-dimensional model, the three dimensions were relatively independent, but related. When second-order CFA was conducted, the components of peer mentoring were the latent variable (Şimşek, 2007). Since peer mentoring was structured on three dimensions theoretically, the second-order model connecting peer mentoring to the three dimensions was more meaningful than first-order model. For that reason, second order CFA was carried out. The values regarding this hierarchical model were good.

Table 2
Kolmogorov–Smirnov Test

	Contribution to the mentee	Mentor characteristics	Peer relationship
Kolmogorov–Smirnov Z	1.040	1.118	1.278
Asymp. Sig. (2-tailed)	.230	.164	.076

Table 3
KMO and Bartlett's Test

KMO measure of sampling adequacy		.948
Bartlett's test of sphericity	Approx. χ^2	1172.917
	df	45
	Sig.	.000

Table 4
Models and Fit Indices

Models	GFI	RMSEA	CFI	NNFI
Correlated three-dimensional model	.92	.080	.99	.98
Uncorrelated three-dimensional model	.67	.25	.85	.81
Unidimension	.89	.097	.98	.98

Table 5
Fit Indices of Hierarchical Model

Model	GFI	RMSEA	CFI	NNFI
Hierarchical model	.92	.080	.99	.98

The GFI was .92. The RMSEA was .080. The CFI was .99, and the NNFI was .98 (Table 5). The *t* values and standardized solution of CFA are shown in Figures 1 and 2.

Results

Peer mentoring can be defined as a student's (mentors) helping peers (mentees) so as to facilitate their learning and contribute to their development. Peer mentoring is an

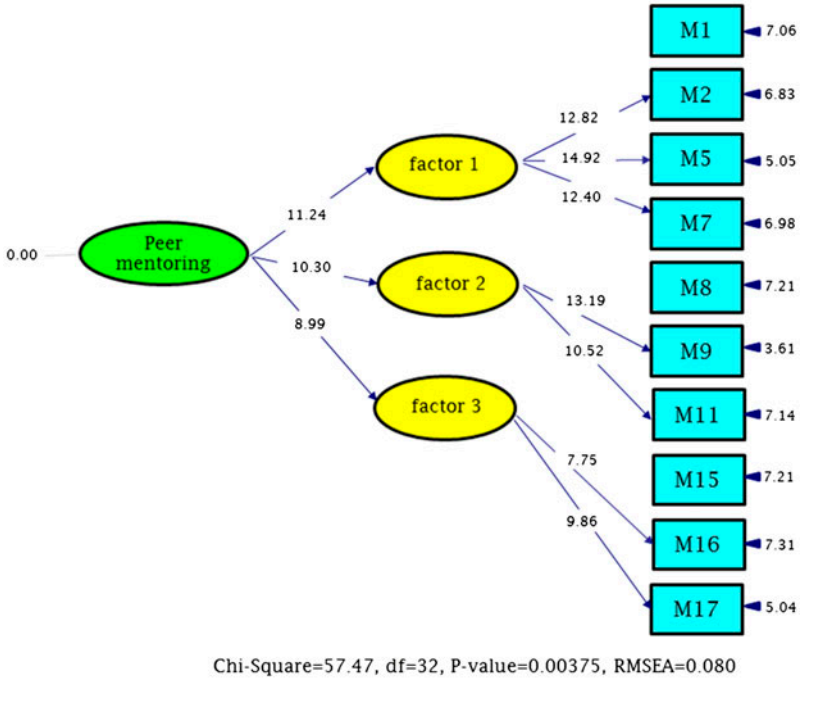

Figure 1. *t* values of CFA for peer mentoring assessing scale.

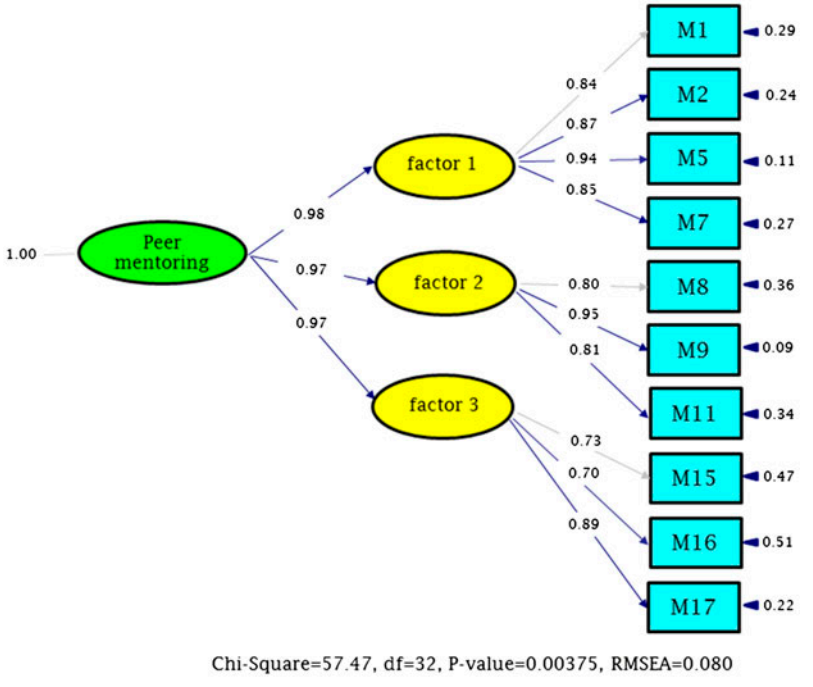

Figure 2. Standardized solution of CFA for peer mentoring assessing scale.

essential method which can contribute teaching–learning process. It can significantly benefit not only mentees, but mentors, teachers, and institutions. With the help of a valid assessment, peer mentoring practices could be improved. In the literature there are instruments to assess mentoring practices. On the other hand, as far as it can be found there is no instrument special to peer mentoring that aim to enhance learning. Because of the primary element in mentoring is interaction and in peer mentoring interaction is between peers, the dynamics of peer mentoring are different than mentoring. In my study, I aimed to develop a scale which can fill the gap in the evaluation of peer mentoring practices to improve learning.

The scale development process was carried out according to Yurdugül and Bayrak's (2012) approach, which has two steps: design of the instrument and pilot study. The item pool of the scale was derived from the results of interviews and the available literature. Four focus group interviews with two mentor groups of five students and two mentee groups of six students were conducted to generate the item pool. The results of the interviews revealed the importance of three dimensions in peer mentoring: (a) the contribution of mentoring process to the mentee, (b) characteristics of the mentor (being competent, being objective, having effective communication skills), and (c) the effect of the mentor being a peer on the mentoring process (taking the mentor seriously, perceiving the mentor as effective as the teacher, communicating with a peer being easier, mentors perceiving themselves as better than their peers).

While the first two dimensions concern mentoring in general, the third dimension focuses on peer to peer relationships and is unique to peer mentoring. The most

remarkable element of the mentoring process is the relationship between the mentor and the mentee. It is clear that this relationship will change when the mentors and mentees are peers. The third dimension reflects this issue. It is an indicator of the need for a tool for evaluating peer mentoring.

The instrument was structured on the three factors that derived from the interview results: (a) contribution to the mentee, (b) mentor characteristics, and (c) peer relationships. The seven-point Likert-type instrument with 11 items was administered to 126 college students. The reverse-scale item, "My mentor exceeded his/her authority and perceived him/herself as the teacher," was excluded from the scale since its item-total score correlation (.176) was lower than .25. The interviews revealed that there could be problems in the practice if the mentors exhibited this characteristic. When the assessment result is high, the values for this item are expected to be low and vice versa. However, in a weak peer mentoring process, the mentors may not have exceeded their authority. In other words, a low value can be obtained on other items as well as this item. It is thought that the item did not work well for this reason. Although in this case this item did not remain on the scale, it may be considered in the mentoring process. It can be regarded as something to caution mentors about during their training. Mentors should be encouraged to establish a balanced relationship with their peers. The coordinator may want to limit the authority of the mentor students.

After one item was excluded from the scale, CFA was conducted with the remaining 10 items. The second-order CFA results of the scale were found to be .92 for GFI, .99 for CFI, .98 for NNFI, and .080 for RMSEA. It's Cronbach α coefficient was .954. Thus, the suitability indices of the scale were high.

The scale was prepared to enable mentees to assess peer mentoring. The scale can be used by either calculating a score for each dimension separately, or a total score for the entire scale. It could be used to oversee peer mentoring processes. The reliability and validity study of the scale was conducted with Turkish college students. Adaptation studies for the scale can be carried out for online mentoring, other educational levels and different languages.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

Selay Arkün Kocadere is an assistant professor of Computer Education and Instructional Technology at Hacettepe University. Her BS is from Hacettepe University, Mathematics Education. MS and PhD is from Hacettepe University, Computer Education and Instructional Technology. She is the co-author of a recent chapter on mentoring. Besides mentoring, her research focuses on teacher education, ICT integration, ICT in mathematics education, game-based learning, and gamification.

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