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2012

Talvio, M, Lonka, K, Komulainen, E, Kuusela, M & Lintunen, T 2012, ' The development of the Dealing with Challenging Interaction (DCI) method to evaluate teachers social interaction skills ', *Procedia : Social and Behavioral Sciences*, vol. 69, pp. 621-630 . <https://doi.org/10.1016/j.sbspro.2012.11.454>

<http://hdl.handle.net/10138/232982>

<https://doi.org/10.1016/j.sbspro.2012.11.454>

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International Conference on Education and Educational Psychology (ICEEPSY 2012)

The development of the Dealing with Challenging Interaction (DCI) method to evaluate teachers' social interaction skills

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Abstract

The *Dealing with Challenging Interaction* (DCI) method was developed to measure social interaction skills of teacher study groups. The participants were 70 teachers from three schools. The inter-rater agreement, Cohen's kappa, varied between 0.57-1.00. The discriminant validity was supported by a cluster analysis differentiating between the skilful and less skilful teachers. The results of the supplementary instrument were equivalent to the cluster analysis maintaining criterion oriented validity of the method developed. The DCI appeared to be a reliable and valid tool for measuring teachers' social interaction skills.

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Selection and peer-review under responsibility of Dr. Zafer Bekirogullari of Cognitive – Counselling, Research & Conference Services C-crcs.

Keywords: social interaction skills; teacher training; Teacher Effectiveness Training; evaluation method; challenging interaction; Dealing with Challenging Interaction; social and emotional learning; teacher study group; supporting autonomy; global rating

1. Introduction

Over the past ten years increasing attention has been paid to social interaction and social and emotional learning (SEL) at school. Research shows that students benefit from SEL training. They show progress in three major areas: feelings and attitudes, indicators of behavioural adjustment and school achievement (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Payton et al., 2000; Zins, Payton, Weissberg, & O'Brien, 2007).

The teachers' contribution in helping students to participate in learning activities is essential. They need knowledge and skills to help students to collaborate with each other but also to evaluate the social interaction in the

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classroom. In addition, the teacher is a role-model whose knowledge of interaction skills and competence in exploiting them in daily situations at school affect students' learning. By looking at adults, young people determine appropriate and acceptable behaviour as well as identify models in terms of who they want to be. An adult's influence can be both positive and negative for a student's growth (Hurd, Zimmerman, & Xue, 2009). Modern sociocognitive theories, especially self-determination theory (Ryan & Deci 2000), emphasize the importance of need to perceive competence, autonomy and relatedness to others. Within this framework, when teachers support students' autonomy they promote learning. Teachers may, however, in practice lack the strategies for supporting students' autonomy.

According to Collaborative for Academic, Social and Emotional Learning (CASEL) organization, teachers should be provided the opportunity for in-service training in order to implement effective SEL programmes (Collaborative for academic, social and emotional learning, 2008). In spite of good results from interventions and recommendations to teach SEL (i.e. Durlak et al. 2011; Zins, Weissberg, Wang, & Walberg, 2004; Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008), there is not much scientific evidence about the effectiveness of teacher training in SEL. One reason might be the lack of measuring instruments (Lintunen, 2006). Jennings and Greenberg (2009) pointed out that when interventions to improve teachers' social and emotional competence are developed, they should be tested to find out if the programmes result in improvements in teacher-student relationships, classroom management, SEL programme implementation quality and classroom climate. They also recommended that the study protocol includes that the teachers are recruited and assessed before participating in the training and that after the training they should be assessed again to analyze possible changes in the variables of interest. Further, they emphasized the importance of a control condition. However, controlled and randomized interventions are difficult to organise in such a way it would be possible to consider the time it takes for teachers to practise SEL skills before they can effectively implement them in their teaching (Lintunen, 2009).

Interaction in the classroom has mostly been measured by using systematic observation or by analyzing videotapes (Rubie-Davies, 2007). These methods are not, however, practical when the target group is large or if the phenomenon to be studied occurs infrequently in various situations or environments. The intention of the present study was to develop a functional instrument to measure teachers' basic social interaction skills in a school environment.

1.1. Gordon's theory of social interaction skills

The present study is based on Gordon's theory of social interaction. The core skills of Gordon's theory (2003) are *Listening skills*, *I –Messages* and how to avoid *Road blocks*. They cover the core components of SEL: self-awareness, self-management, social awareness, relationship skills and responsible decision making (Elias et al., 1997). Gordon presents a graphic model, namely *the behavioural window*, which helps to decide the right skill in each situation. The behavioural window is divided into three areas: *a problem area owned by the teacher*; *a problem area owned by the student* and *a no problem area*. The goal is to enlarge the *no problem area* by using the interaction skills studied. According to Gordon (2003), "it is only in no problem area of the relationship that teaching and learning can be effective" (p. 39), which is why the no problem area is also called the *Teaching-Learning area*.

Active listening is a central skill in Gordon's theory. It is also widely used in therapy and in counselling in general. It is a method in which the listener reflects back to the speaker his or her understanding of what the speaker has said. This is meant to confirm that the listener has understood the message and to give the speaker a chance to correct the listener if necessary (Ivey, Bradford Ivey, & Zalaquett, 2009). Active listening should be used if a student has a problem, for example, when one of the students comes to ask the teacher after the lesson if the upcoming test will be difficult. Using active listening the teacher would say "You are worried about the upcoming test?" instead of giving a direct answer.

I-Messages are recommended if it is the teacher who is having a problem, for example, when a student is always sending text messages during the lesson and causing some disorder, and the teacher experiences this as a problem.

An I-Message is a statement that describes the teacher's personal feelings and experiences. Since I-Messages express only the inner reality of a sender, they do not contain evaluations, judgments or interpretations of others (Adams, 1989). *Positive* and *Confrontation I-Messages* are special cases of so-called triple-barrelled I-Messages. Basically they consist of three parts: a description of the student's behaviour, the teacher's feeling about this and the tangible effect of the student's behaviour as experienced by the teacher (Gordon, 2003). "I am disturbed by your sending text messages during my lesson, which is why I cannot concentrate on teaching" is an example of a triple-barrelled *Confrontation I-Message*.

Messages that are experienced as damaging fruitful interaction, for example, judging, praising or mockery are called *Road blocks*. They can be either ineffective confrontation messages where it is the teacher that has a problem or ineffective counselling messages where it is the student that has a problem (Gordon, 2003). They tend to label an individual by generalizing their occasional behaviour as part of their personality. "You are lazy, because you have not done your homework" is a typical *Road block*.

Teacher Effectiveness Training (TET) is a four-day training programme that offers teachers communication and conflict-resolution skills, according to the theory of social and emotional learning (Gordon 2003) and the programme (Gordon Training International, 2008) developed by Thomas Gordon. TET includes the value of respecting the autonomy and freedom of an individual. According to Gordon (Gordon, 2003, pp. 107-108), there is a strong drive toward independence and self-responsibility within each of us. By using SEL skills, especially active listening, teachers help students to increase their ability to rely more on their own resources and less on the resources of others. According to Leroy, Bressoux, Sarrazin, and Trouilloud (2007) students' intrinsic motivation may be improved by teachers' using social interaction skills. They showed that it was important that the teachers believed in the students' own capacity and effort. By using interaction skills such as listening, teachers could create a supportive learning environment. In the present study the teachers' various descriptions of supporting students' autonomy and agency are defined as *Messages supporting autonomy*.

The aim of this study was to develop an instrument to measure teachers' SEL skills in school situations and to study the reliability and validity of the *Dealing with Challenging Interaction* (DCI) method.

2. Method

2.1. Participants

The participants of this study were 70 teachers (56 female and 14 male) from one elementary and two secondary schools from different parts of Finland. The teachers from the elementary school (n=21) and one of the secondary schools (n=23) had experience in SEL skills, because they had participated in a TET course. The teachers from the other secondary school (n=26) had not had any TET. However, it may be surmised that all the schools were in principle willing to participate in TET since they were chosen from a waiting list for TET. Most participants (67%) had over ten years working experience while 17% had five to ten years and 16% had less than 5 years working experience. Most of the teachers (70%) participating in this study had not changed schools in more than five years while 17% had worked from only one to five years in the same school and 13 % had done so under one year. Eighty-three per cent of the participants were in permanent employment and 17% of the participants were in temporary employment. Only a few (3%) had a part-time job while 97% of the participants were full-time teachers. Consequently, the participants were a heterogeneous group of teachers, according to their training and experience in SEL skills and teaching experience, hence, ideal for the development of the DCI method (Kerlinger & Lee, 2000).

2.2. Instrument development and measures

To investigate the SEL skills among the participants, three instruments, namely, a *Reactions* questionnaire, a *Knowledge* questionnaire and the *DCI* method were developed. The instruments were developed utilizing the model of Kirkpatrick and Kirkpatrick (2006). The model includes the idea that the information collected from the different levels of evaluation provides useful information regarding the participant's learning process and the validation of the

evaluation process. The four levels are hierarchal: reactions, knowledge, behaviour and results. For example, if results on the behaviour level or readiness to apply knowledge are poor it might be because of inadequate learning facilities, which are measured on the reaction level, or, because of ineffective training with the lack of increased knowledge. Hence, if the focus of the study is to investigate the behaviour level, the previous levels, reactions and knowledge, should also be examined. The fourth of Kirkpatrick and Kirkpatrick's (2006) levels, that is, results, including general and long-term outcomes, did not fall within the scope of this study.

2.2.1. Reactions and Knowledge

With the *Reactions* questionnaire feedback from the TET course was collected which, for example, included evaluations of the applicability of the course or how it was managed. It included ten multiple choice questions with a Likert-type scale with response options ranging from fully disagree to fully agree. *The course fulfilled my expectations* and *I can apply the studied skills at work* were typical statements regarding the content and goals of the course. Opinions concerning the management of the course were collected by asking for responses to the statements *The procedure of the course was clear* and *The trainer was professionally skilled*. In addition, the participants were asked to rate their own energy level and the course as a whole.

In the *Knowledge* questionnaire, participants were asked to define in their own words the central concepts of interaction skills studied in TET. There were eight questions altogether; for example, participants were asked to define what active listening is, to list the components of a positive I-message and explain what the so-called *No-lose method of resolving conflicts* is, that is, a special technique for making responsible decisions (Gordon, 2003).

2.2.2. The Dealing with Challenging Interaction (DCI) method

Behaviour (in this case, readiness to apply knowledge) was measured with the *Dealing with Challenging Interaction (DCI)* method. Teachers were asked to describe how they would act in seven central interaction situations at work. Seven cases were developed that comprised the DCI questionnaire. Each task consisted of a description of a common event at school and a question where the respondent was asked to describe in a few lines their possible reactions to that event. For example, in an event that involves *Confronting the behaviour of a student*, the teacher was asked to describe what he/she would do or say to a student who is sending text messages during the lesson, which is against the rules in that school. Other events were *Thanking the class*, *Getting along with the student's parents*, *Solving a problem between two students*, *Listening to a worried student*, *Confronting the behaviour of a colleague* and *Setting limits*. These situations were created by the authors together with two experienced teachers and an instructor of TET and were then further reviewed with academic colleagues.

2.3. Procedures

2.3.1. Design

The data from the *Knowledge* and *DCI* instruments were collected before and after the TET over a six month period. They were filled in by all the participants at each of the three schools. Feedback using the *Reactions* questionnaire was collected only after the TET course by those participants who attended the training. In addition, background information of the participants was collected. The background variables were: gender, school, sort of employment, years of service in this school, type of service, and teaching experience.

2.3.2. Analyses

2.3.2.1. Quantitative content analysis

Quantitative content analysis (Frey et al. 1992; Weber 1990) was used to create the classification of the DCI instrument. One idea, notion, view or opinion given by the participants was considered as one analysis unit. Thus, one answer could cover several units. Altogether 9800 units (70 participants, 7 cases, 2 tests, 10 categories) were categorized in 16 initial categories and then into ten refined ones. The data were quantified so that an analysis of the incidence of different units was possible. In most categories the possible numerical value of a unit is 0 or 1, which

shows the existence of that category in the unit. However, in the categories of *Confrontation I-messages*, *Positive I-messages* and *Global rating* the numerical value can be 0, 1, or 2, according to the quality of the unit or answer.

The goal of TET is not just to learn the various technical skills of interaction but to have an influence on the holistic attitude to teaching. That is why a holistic classification was also created. Answers were scored according to ideal, or model, answers, according to Gordon's theory (2003). In medicine, it has been found that objective checklists may reward thoroughness and may not allow for the recognition of alternative approaches. Furthermore, checklists do not capture increasing levels of expertise. By providing clear information about the exact type of global rating used, researchers will be able to draw more valid conclusions compared to those derived from checklists (Hodges, Regehr, McNaughton, Tiberius, & Hanson, 1999; Hodges & McIlroy, 2003). Regehr et al. (1998) compared global ratings with checklist scores. They found that the global-rating scores given by expert examiners exhibited a more accurate prediction of the quality of the final product.

2.3.2.2. Statistical methods

Two researchers independently rated the DCI answers. Cohen's kappa was calculated to investigate the chance-adjusted proportion of agreement between these two raters. To compress the information of the DCI instrument, latent class analysis (McCutcheon, 1987; Muthén & Muthén, 2009) was utilized to create clusters of participants. Principal component analysis with promax rotation and regression-estimated factor scores was used to condense and use the data of the DCI categories, the Knowledge test and Course feedback.

The reliability of the component variables was estimated with Cronbach's alpha. Finally, the Pearson correlation, an analysis of variance and cross classification with a chi-square test, were all used to estimate the association between the component variables. Three statistical programmes were used: SPSS for Windows version 18, Mplus version 6 and Survo MM version 3 (Mustonen, 1992).

3. Results

3.1. Development of the categories of DCI

The preliminary content analysis produced 16 categories of which eight were driven from the data. Another eight categories were based on the theory of TET (Gordon 2003). Next, two researchers rated independently half of the material, or 4,900 units, to analyze the inter-rater agreement, Cohen's kappa. After this parallel analysis, the criteria of the *Messages supporting autonomy* category was re-checked because the degree of agreement was only .40. Also, because the degree of agreement on the *Evaluative messages* category was only .45 it was consolidated with the *Solution messages* category and the *Indirect messages* category to form a *Road block* category. The degree of agreement on *Messages supporting autonomy* using the new criteria was 0.57 and on the new *Road blocks* category it was 0.77. Finally, categories under 0.55 were dropped because of their poor reliability. As a result of these changes, a final categorization with ten categories with good inter-rater reliability was established. Five categories, *Listening*, *Positive I-messages*, *Messages supporting autonomy*, *Other I-messages* and *Confrontation I-messages* represented desired messages of interaction based on the course goals. *Road blocks* was the only category of non-desired messages of interaction. Three categories, *I do not compare*, *Orders and conditions* and *Encouraging or predicting* were data driven and neutral from the perspective of the course goals. Finally, the tenth category, *Global rating*, was created for holistic classification. The degree of agreement of the inter-raters in the categories varied between 0.57-1.00 showing passable to excellent reliability of the measure.

To examine the construct validity of all the measuring instruments principal component analyses were conducted. Three components in *Reactions*, two components in *Knowledge* and one component in *DCI* were found (Table 1). Cronbach's alpha varied between .52-.77 showing passable to moderate internal consistency of the produced components.

3.2. Clustering teachers into groups

In order to explore the discriminant validity of the DCI instrument the participants were grouped using latent class analysis into three clusters according to their answers to the DCI questionnaire. The clusters were named *TET ideal* (n= 22), *TET moderate* (n=14) and *TET ignorant* (n=34). The differences between clusters were significant ($p < .001$) in all the Desired ways of interacting categories except in the *Other I-messages* category and in both the *Road blocks* and *Global rating* categories. In the Neutral ways of interacting categories the difference between clusters was not significant in any category (Figure 1). In the *TET ideal* cluster the mean values were higher than in other clusters in the *Global rating* category and in all the Desired ways of interacting categories except in the *Positive I-messages* category. In the *TET ideal* cluster the mean value of the *Road blocks* category was lower than in any other cluster. In the *TET ignorant* cluster, the mean values were lower in the *Global rating* category and in all the Desired ways of interacting categories than in any other cluster, except in the *Confrontation I-message* category. The mean value of the *Road blocks* category was the highest for the participants in this cluster. The mean values in the *TET moderate* cluster (n=13) were generally between those of other clusters except that the mean values were the highest of all in the *Positive I-messages* category and the *I do not compare* category. Figure 1 shows the mean values of DCI variables in each cluster.

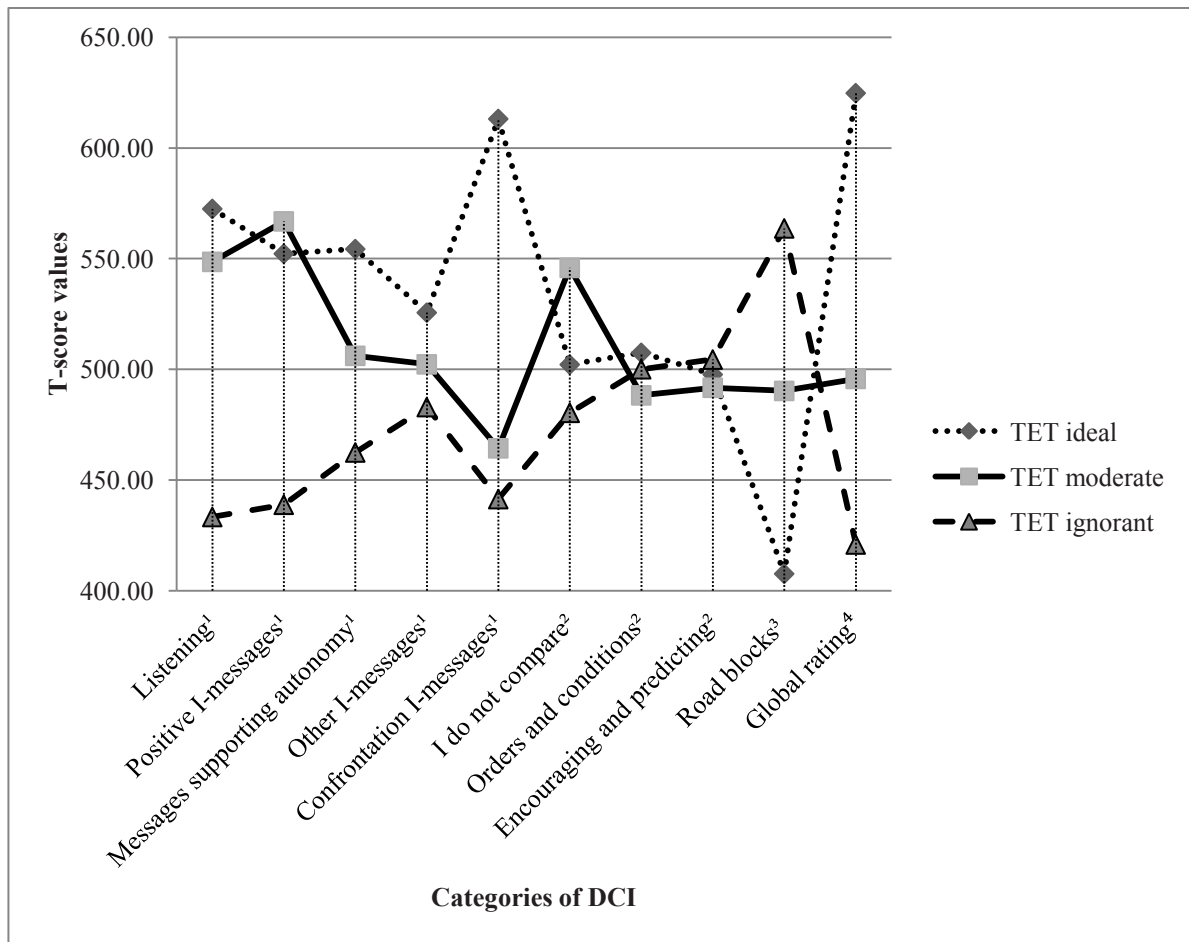


Figure 1. Mean values of DCI variables in each cluster expressed in standardized score ($M = 500, SD = 100$). ¹Desired ways of interacting; ²Neutral ways of interacting; ³Non-desired ways of interacting; ⁴Holistic value.

The differences between the clusters in each component were analysed using the one-way analysis of variance (ANOVA). Table 1 shows that in the component of the *DCI* instrument and in both the components of the

Knowledge instrument the difference between clusters was highly significant ($p < .001$) but no difference could be discovered in any component of the *Reactions* instrument.

Table 1. Difference between clusters in components of the Reactions, Knowledge and Dealing with Challenging Interaction (DCI) instruments expressed in standardized scores ($M = 500$ $SD = 100$).

Instrument	Clusters						$F(df1,df2)$	p	Eta squared
	TET ideal		TET moderate		TET ignorant				
Component	n	$M(SD)$	n	$M(SD)$	n	$M(SD)$			
Reactions questionnaire									
General									
Feedback	22	507 (97)	14	506 (122)	8	469 (63)	0.44 (2,41) ^b	.65	.02
Applicability	22	507 (104)	14	511 (98)	8	461 (96)	0.74 (2,41) ^b	.49	.04
Course management	22	513 (99)	14	506 (103)	8	454 (97)	1.07 (2,41) ^b	.35	.05
Knowledge questionnaire									
Theoretical knowledge	22	566 (51)	14	549 (71)	34	443 (98)	18.32 (2,67)	<.001	.36
Applied knowledge	22	563 (112)	14	522 (84)	34	458 (70)	9.97 (2,67)	<.001	.23
DCI method (Behaviour level)									
TET skills	22	617 (56)	14	519 (50)	34	416 (38)	124.57 (2,67)	<.001	.79 ^a

Note. ^aLatent classes were based on DCI categories. ^bReactions were collected from participants attending TET.

3.3. Associations between clusters and characteristics

Associations between clusters and characteristics were only perceived between schools and clusters where the association was highly significant ($p < .001$). The reason for this was that all the teachers of the comparison group belonged to the TET ignorant cluster ($n=26$). In contrast, only one teacher from the elementary school, where the teachers had received TET, belonged to this ignorant cluster. All other participants from the TET intervention group belonged either to the TET ideal or the TET moderate groups.

The difference between the two schools participating in TET was also significant. The biggest cluster ($n=15$) among the elementary school teachers was the TET ideal, whereas the biggest cluster ($n=9$) among the secondary school teachers was the TET moderate.

4. Discussion

In the present study the *Dealing with Challenging Interaction (DCI)* method was developed to measure teachers' basic interaction skills in common but often challenging situations with students, their parents and colleagues. The parallel analysis of the content analysis scale developed, as well as the result of the principal component analysis showed the high reliability of the DCI instrument. Construct validity was supported by cluster analysis, which placed the teachers into three groups, the TET ideal, the TET moderate and the TET ignorant according to their answers to the *DCI* and *Knowledge* instruments. In addition, their willingness and readiness for training did not seem to determine the results. Only those who had attended the TET course were successful in the tests. It seems that in order to be able to bring social and emotional skills to interaction situations, training is needed. Motivation to attend TET on its own did not affect our results.

Only the Knowledge instrument placed the participants into three clusters, the TET ideal, the TET moderate and the TET ignorant, according to the data of the DCI instrument. Thus, in this study the results of the *Reactions* instrument did not predict success in learning the skills of TET. The reason might be that the data on reactions were collected only from teachers with TET training, and there was not very much variation in the data since most participants were quite pleased with the course. In addition, in interaction training, it may be that the participants' emotions might have affected their ability to assess their learning outcomes dispassionately. For example, if people are made to face their limitations they may feel somewhat uncomfortable. It follows that even when reactions may not be that positive the learning goals may still be reached and vice versa, in spite of positive reactions, the participants might lack the necessary learning.

Holistic value seemed to predict the learning outcomes in this study very well since the difference in units of the desired ways of interacting categories was associated with the difference in units of the holistic value category. Our result supported the conclusions that had been made concerning medicine (Regehr, 1998). To evaluate the *Global rating* category, it was possible to assess the impression of the combination of the units in one answer. Just by analyzing units, some important information about the general view of the impression of the message would obviously have been left without attention.

Despite the favourable results, this study had some limitations. First, the sample is small. Developing the measurement for extensive use would need a wide range of participants from different backgrounds. In this study all the participants were from just three schools and they all were willing to participate in the interaction training. Second, the DCI instrument was tailored to measure the outcomes of the TET. We could not therefore ensure that our instrument could measure the outcomes of any other training system. On the other hand, it could be customised to fit different contexts. Third, the classification of DCI responses can be performed only by researchers with a good knowledge of TET theory. However, trainers and other experts in SEL skills are able to utilize the DCI instrument or a modified version of it. The fourth limitation is that the measurement was based on teachers' expressions and did not measure how teachers act in the field.

The DCI evaluation method, however, has some advantages. Sampling has appeared to be a reliable and valid method for collecting data about students' performance during clinical education (Norman, 2009; Turnbull, MacFadyen, van Barneveld, & Norman, 2000). In medical education, it was found that using a variety of cases in training is a recommended tool in helping students to optimize transfer, that is, utilize their theoretical knowledge effectively in practice (Norman, 2009). Further, assessment may also foster learning (Biggs, 1999). By giving the participants a chance to formulate descriptions of their possible reactions to challenging situations may help them to reflect on real life situations. In our case, the DCI method alone did not promote change among the participants who did not participate in TET, and therefore assessment is only an add-on to effective learning in this case.

In addition, the pre- and post-test design of the DCI method gave the teachers the opportunity to reflect upon their own learning. Typically, in the pre-tests, teachers just left the questions unanswered or only used a few words to answer. In the later test, they used much more time and space in their answers, thus, they had more to say. Moreover, with the DCI method we were able to receive some feedback for the cases developed for the questionnaire. For example, one secondary school teacher instead of describing her response wrote that "it is not necessary to give the students positive feedback for doing what students at school are supposed to do" (i.e. participating enthusiastically, doing homework, and coming on time). By using an observation method, for instance, researchers seldom get feedback about the observed moments under study, or the participants' intentions and thoughts may remain unclear. Using stimulated recall might help, but it would be extremely laborious in contrast to our DCI method.

According to our results, the data-driven categories did not group participants according to their competence in interaction skills, whereas the categories based on TET and Gordon's theory (2003) differentiated between the participants well. However, the category called *Messages supporting autonomy* was an exception. This category was reliable and valid, although the phenomenon "autonomy" itself was not directly addressed in the course. This might be due to the fact that even though autonomy was not yet explicit during the time TET was developed, it was an

implicit notion in the background values of the TET course. In the educational literature, “supporting autonomy” has been theoretically addressed quite recently (Black & Deci, 2000). Hence, our study suggests that learning interaction skills might help teachers to supporting autonomy, although supporting autonomy itself was not explicitly included in the original theoretical background of TET training.

Naturally, we cannot ensure that the challenging situations developed for the DCI questionnaire would be the most central and essential in every school. It is clear that some schools may suffer from students’ “bunking off”, whereas in other schools the biggest problem may be the indifferent attitude of parents. However, the challenging situations of the DCI method produced a large variety of challenging instances in the teachers’ work. It appeared that the teachers in our study recognized such situations, could put their soul into them and imagined what they would say or do.

5. Conclusions

The DCI method might be a useful tool for assessing the outcomes of SEL. However, more research is needed to simplify the interpretation of DCI results for the requirements of SEL trainers and teachers. The DCI method is a practical evaluation tool in the cases where the target group of investigation is large. The variety of challenging interaction situations in teaching practice is huge. The professional practice of the teachers goes way beyond the classroom. Communication skills are required in encounters with parents, colleagues, the administration, and the society. Mere classroom observation, though useful, may be too narrow method to be used in isolation. The DCI method captures the various aspects of interaction situations and it is flexible for modification in different contexts.

Acknowledgements

This research was financially supported by a Finnish Cultural Foundation grant for the first author and partially funded by the project RYM Indoor Environment 462054 The Finnish Funding Agency for Technology and Innovation.

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