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The role of relational coordination in final teacher satisfaction in e-learning

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Abstract

Relational coordination model has been applied to different sectors reaching positive results in terms of performance. In this research, the relational coordination model has been applied to prove high levels of teacher satisfaction in e-learning. According to the model, organizations can achieve performance by providing frequent, timely and problem solving communication mechanisms to support shared knowledge, in a context of shared goals and mutual respect. We have surveyed teachers who teach online courses in Spanish universities and companies, on these particular issues. By using Structural Equation Model analysis we have shown that higher standards in terms of relational coordination among teachers in e-learning explain higher degrees of satisfaction. The conclusions should be considered by policy makers and managers when they evaluate alternatives for the improvement of performance in online education.

Keywords: relational coordination e-learning, communication, coordination, shared knowledge, teacher satisfaction

1. Introduction

ICT has become part of the working and personal life for a large number of people in the experience economy. People are using Internet for entertainment, leisure activities, shopping and information searching and sharing. Both, the increasing use of ICT and globalization, have led to changes in society [1].

But the area where technology has brought a more radical change is distance education and e-learning. Students in United States, taking at least one online course in the fall 2012, reached the total number of 7,1 million [2]. A report [3] indicates that at the individual level, in 2006, 20% of Internet users declared to have benefited from some sort of formal educational activity through the Internet in the United Kingdom, Turkey, Greece, Hungary and

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Netherlands. At firm level, 25% of enterprises in OECD used e-learning applications for both employee and training.

E-learning strategies for both distance and campus based education have tended to be technology-driven [4] or concentring on the preparation of educational materials to achieve economies of scale [5, 6], separating them form the processes of teaching and learning. Human factors related to the attitude of teacher towards e-learning, the level of collaboration and interaction between the learner and the teacher have been found to be critical success factors in e-learning [7-9]. Soong et al. [7] showed that critical success factors in e-learning should be considered in a holistic fashion. These studies show that the role of teacher is essential, and that teaching and learning in online education are highly interdependent.

The literature on e-learning includes many articles on technical issues, course design, studies comparing online and traditional courses and factors affecting learners' satisfaction. However, little cover about teacher's job satisfaction in e-learning has been found. Moore [10] identifies faculty satisfaction as a critical factor for quality in online education and it is important to investigate further how high levels of satisfaction can be achieved. It is important to inquire about student and teachers perceptions in order to assist policy makers in their attempts to improve teaching and learning conditions [11].

Many studies have found that there is a positive relationship between job satisfaction and performance [12-14]. Gittell [15] proposed a model of relational coordination that can help organisations to improve performance outcomes and job satisfaction. De Pablos et al. [16] found this model suitable to be applied to those contexts where high levels of task interdependence, uncertainty, time restrictions and tacit knowledge are required, to improve performance outcomes and job satisfaction. Gittell [15] indicates that best results are reached taking into consideration communication (frequent, timely, accurate and problem solving) and relationships (shared goals, shared knowledge and mutual respect). For these reasons, in this research the relational coordination model has been applied to explain high level of satisfaction in e-learning for teachers.

1. Teacher's satisfaction and performance in e-learning

The relationship between job satisfaction and performance has been studied in different analysis, especially for the industrial sector. Cummings [12] found that satisfaction causes performance. Kornhauser and Sharp [13] have conducted more than thirty studies in order to determinate the relationship and performance in the industrial sector. Mirvis and Lawer [14] identified that satisfied tellers were less likely to show shortages and less likely to leave their jobs.

Empirical studies [17, 18] established that students' attitude to learning is influenced by teaching approaches used by teachers. Teacher attitude was found to be a critical success factor in e-learning too [19, 8,9]. Therefore, lecturer's satisfaction can affect teacher's motivation and it can have an impact on student's motivation.

Based on the definition of faculty satisfaction given by ADEC, we can define teacher's satisfaction as the perception teaching in the online environment is effective and professionally beneficial [20]. Faculty satisfaction is one of the five pillars of quality, together with student satisfaction, learning effectiveness, access and institutional cost-effectiveness [10] in online education. The success of e-learning programs is related with teacher's personal and professional satisfaction [20, 21]. Therefore, teacher's satisfaction should be taken into account by any institution that wants to deliver e-learning education and training.

2. The importance o relational coordination in e-learning

As it was mentioned before, teaching and learning are highly interdependent. In the presence of strong interdependencies the process can not be optimized by separately optimizing each element it is made of [22]. The success of e-learning depends on the ability to establish coordination amongst interdependently tasks, to properly coordinate different agents, making them sharing ideas, knowledge, objectives and to have relationships based on mutual respect.

The importance of coordination in organizations has been previously studied. Thompson [23] describes how the effective coordination amongst highly interdependent tasks is characterized by the mutual adjustment amongst the participants. Later on, Faraj and Xiao [24] observed that the mutual adjustments performs a little role at

organizations since it produces high costs, and we must consider that coordination takes place through mechanisms such as routines, timetables, previous planning and task normalization. Studies performed by Argote [25] and Brandts and Cooper [26] found a positive relationship between coordination and organizational results.

The importance of properly coordinating processes in teaching and researching activities has already been discussed in the academic literature [27, 16] and has been positively related to quality in Higher Education [28, 29].

Gittell [15, 30] has presented a model that puts emphasis on understanding the importance of coordinating the relationships and the dynamics of communication in organizations to reach best results. Medlin [31], Gittell [15], López et al. [32], De Pablos et al. [16, 33] have applied models of relational coordination in different sectors; as airline industry, health care and long-term care industries, teaching and learning, etc. The model proved to be a power driven for both quality and efficiency outcomes

This model proposes a relationship between two dimensions: communication and relationships. The model affirms that relational coordination is produced by a communication of high quality, supported in shared goals and knowledge and mutual respect. This kind of coordination, shown in figure 1, helps organization to achieve performance in any setting with high information-processing demands driven by characteristics such as task interdependence, uncertainty and time constraints.
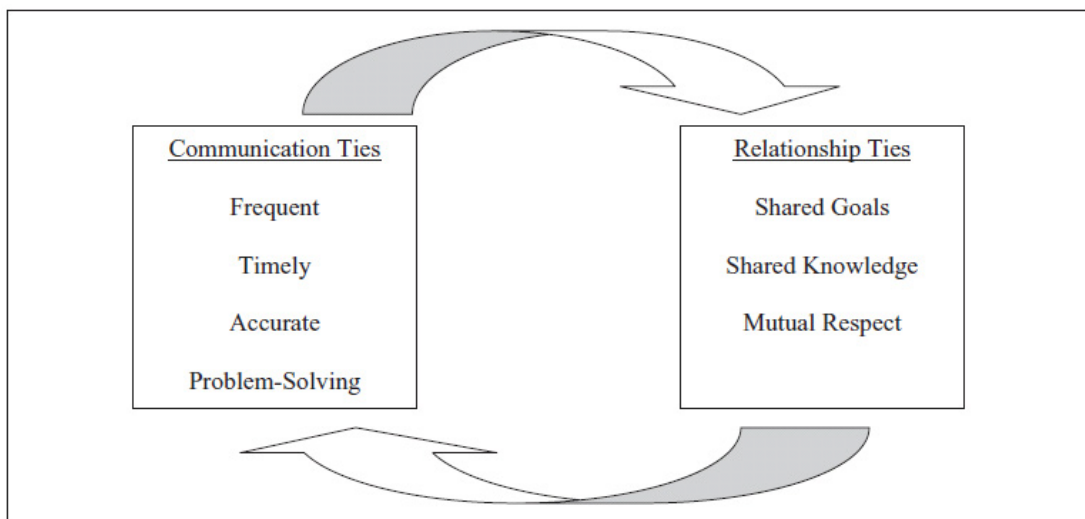

Fig 1. Dimensions of relational coordination. Source: [34]

Based on previous analysis [23, 24, 35] in corporate environments of high/low interdependence, uncertainty and time constraints, Gittell [15] offers a model to conceptualize the relational dynamics of coordination. Therefore, the model is defined as "a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration" [36].

The relational dimensions of relational coordination are conceptualized as ties between work roles, rather than relationships that some profiles maintain in their daily functions [37-39]. Relational coordination improves performance of a work process with task interdependencies, uncertainty and time constraints, by improving the work relationships between people who perform the tasks in that work, reinforced by a high-quality communication [15, 37].

The model is shaped around relational dimensions (shared goals, shared knowledge and mutual respect) and communication dimensions (frequent, timely, accurate and problem solving communication.

Relationships based on shared goals, shared knowledge and mutual respect enable employees to coordinate more effectively the work process in which they are engaged [36]. Shared goals play a key role in coordination of highly interdependent tasks [40]. Relationships based on shared goals motivate employees to move beyond sub-goal optimization and to obtain best results for the overall process [36]. Shared knowledge enables participants to communicate with each other with accuracy, as they know not only their tasks but also how their work is related

with the work of other participants in the process [37]. Mutual respect generates an effective coordination, as participants value the contribution of others and consider the impact of their actions in others [36].

Frequent communication improves the coordination of roles by the closeness generated as a consequence of a repetitive interaction [30]. A fluent communication is important in the precise moment to achieve best results [41]. Lee [42] has proved that teacher response timeliness in e-learning improves learning satisfaction. Accurate communication plays a critical role in the performance of group tasks [43]. Problem solving communication leads to the optimization of the overall process, as the communication between the persons who perfume certain tasks will be oriented to solve problems that appear in a group performance characterized for a high interdependence, rather than on blaming when things go wrong [37].

Relational coordination is particularly important for achieving performance in organizations or organizational processes where high level of task interdependence [23], uncertainty [25], time restrictions [44] and tacit knowledge [45] are required. In e-learning teaching these circumstances appear:

- *Task interdependence:* two tasks are considered independent for this model if each of them depends on the other for final purposes. In e-learning, the final purpose for learners is to understand and assimilate certain knowledge. The teacher must prepare the educational material in a way that it is easy for the learner to understand it, but the final result also depends on student's efforts and the communication between them.
- Uncertainty: relational coordination is important when task and/or input uncertainty is high, enabling participants to adjust their activities with each, as information emerges in the process [37]. E-learning presents today a group of obstacles, for example there is high uncertainty about learner's knowledge and skills on the technology used to deliver the educational material.
- *Time restrictions:* exacerbate the effect of both interdependence and uncertainty [37], so the relational coordination will have a higher impact as time restrictions become wider. An online course takes place in a predetermined period of time, which leads to time restrictions in the performance of tasks. E-learning institutions need to establish mechanisms to control time restrictions.
- *Tacit knowledge:* in the teaching processes, the instructor maintains certain degrees of tacit knowledge that is difficult to make explicit.

These circumstances, together with the results of studies that have shown the importance of the quality of communication [42], the knowledge sharing [46] and social respect [47] in e-learning, make us think that relational coordination can provide good results. In this study we applied the relational coordination model to evaluate teacher's satisfaction with online teaching.

3. Research methodology and hypotheses

With the main objective of knowing the influence of relational coordination in final teacher satisfaction with their teaching work in e-learning, we have performed an empirical analysis over a representative sample of teachers that are teaching online courses in universities and private companies from Spain.

For the empirical study, we have applied SEM analysis, structural equations containing latent variables and errors of measurement. In the proposed model we consider that teachers' satisfaction with their teaching work (WS) is achieved through the relational dimensions of relational coordination, shared goals (SG), shared knowledge (SK) and mutual respect (MR); supported by communication dimensions, frequent (FC), timely (TC) and problem solving (PS) communication and technology (SP).

As it has been previously mentioned, this study supports that the application of relational coordination mechanisms in e-learning teaching processes produce benefits. The three dimensions of communication (frequent, timely and problem solving) reinforce the relational dimensions (shared goals, shared knowledge and mutual respect). Relationships, based on shared goals, shared knowledge and mutual respect, have a positive impact on teacher satisfaction with the work of others participants in the e-learning process. These high-quality relationships have as final result higher degrees of teacher satisfaction with his job. With the purpose of evaluating the impact of relational coordination on teacher's satisfaction with their teaching work in online courses, we propose the following hypotheses:

H1: the three dimensions of communication will positively influence shared goals (SG), shared knowledge (SK) and mutual respect (MR).

For this hypothesis, the communication channel (Channel) has been taken into account as a variable that can have an impact on the quality of communication. We tested the following relationships between the variables: frequent communication (FC) increases relationships based on mutual respect; timely (TC) and problem solving (PS) communication has a positive impact on shared knowledge (SK). As an effective communication in e-learning depends on its frequency and timeliness [48], we also analyzed if frequent communication (FC) increases timely communication (FC) and if timely communication has a positive impact on problem solving (PS) communication.

H2: *the three dimensions of relationships have a positive impact on teacher's perceived satisfaction with the work of other participants (SR) in the e-learning process.*

Relational coordination improves the performance of a work process by improving the work relationships [37]. The model analyses if shared goals (SG) and shared knowledge (SK) increases teacher satisfaction with the work of others (SR). For this hypothesis we have also tested the relations between the three relational dimensions: the impact of mutual respect (MR) on shared goals (SG) and shared knowledge (SK) and of shared goals on shared knowledge.

H3*: High quality relationships (SR) in the e-learning process will positively influence teacher's perceived satisfaction with the online platform (SP) used for teaching.*

Johnson et al. [49] and Zhan and Mey [50] affirm that e-learning quality is not depending so much on technology, but on the quality of student-teacher interaction. The aim of this analysis is to determinate if high-quality relationships could overcome the use of a lower quality technology.

H4: *Teacher's perceived satisfaction with the online platform (SP) used in the teaching process will positively influence his satisfaction with his teaching work (WS).*

As technology quality is considered to be an important factor in e-learning [51, 10] we considered important to analyze its impact on teacher satisfaction with his teaching in e-learning. The second reason for this analysis was to see if the technology or the relational coordination has a major impact on teacher final satisfaction (WS).

H5: *High quality relationships (SR) in the e-learning process will positively influence final teacher satisfaction with his teaching work (WS).*

For this analysis, we have taken into account the profiles with which the teacher usually communicates and shares knowledge and the tasks that take place during the teaching process in e-learning: students, his boss, his colleagues, the administration staff of the institution and the technical support staff. Figure 2 shows in a graphical way the proposed model and hypothesis.
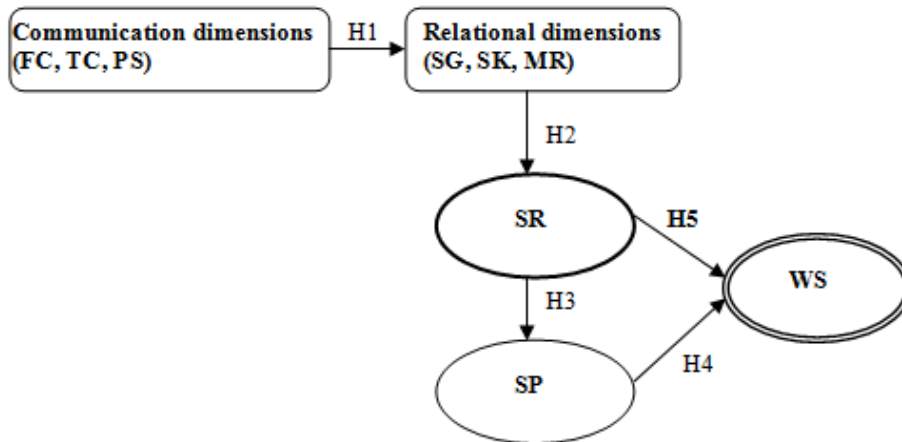
Fig. 2. The proposed model and hypotheses. Source: own elaborated (2014).

4.1. Methodology used in the empirical study

In this analysis, we are working with characteristics of organizational behavior. We did not find structured data bases to collect this information and therefore the questionnaire is the best methodology to collect the data we need to validate the hypotheses.

The questionnaire was sent to a representative sample of 38 online teachers from Spain, from 29 of them were teaching online course in universities and 9 in e-learning companies. We collected the data via a web-based survey from each teacher. The sample error is +/-10% (P=Q=50) and the level of trust is 95,5% (2 sigma). The answers were collected from February to May 2013.

In the questionnaire, questions related to the following variables are included:

- *General information:* type of e-learning institution
- *Technology:* the learning management system or the online platform used in the teaching process.
- *Communication channels:* the channels used to communicate with the participants in the e-learning process.
- *Communication mechanisms:* the frequency of communication with the different profiles involved in the process; the real need that different profiles have to offer information at certain times and the frequency of communication for the solving of problems.
- *Shared knowledge:* the need that different profiles involved in the process have to share information and knowledge.
- *Sharing of goals:* the perception that teacher's have about sharing goals with the different profiles they are working with.
- *Mutual respect:* the perceptions that teachers have about how other respect their work.

4. Results

In order to evaluate the model and validate the hypotheses, a structural equation model has been applied (SEM). The model was estimated via Partial Least Squares (PLS) procedures by using the Smart 2.0.M3 Software [52].

The decision to estimate the model using PLS was made according to the following criteria: the phenomenon investigated is relatively new and its modeling is in a developing stage, minimal recommendation exist concerning

sample size (the PLS algorithm converges in most of the cases achieving statistical power even with reduced sample sizes and is robust against missing data) prediction accuracy, and data soft multinormality requirements [53, 54].

Discriminant validity was evaluated according to the [55] criterion. Correlations between the latent variables should be lower than the square root of the corresponding AVE (table 1). As it can be observed in the main diagonal of table1, where they have been inserted, this is the case for all variables.

Table 1. Latent Variable Correlations

	Channel	FC	MR	PS	SG	SK	SP	SR	TC	WS
Channel	**0,65**									
FC	0,51	**0,71**								
MR	0,45	0,61	**0,85**							
PS	0,17	0,42	0,31	**0,67**						
SG	0,33	0,53	0,67	0,34	**0,73**					
SK	0,35	0,51	0,76	0,24	0,68	**0,84**				
SP	0,06	0,35	0,39	-0,06	0,42	0,38	**0,78**			
SR	0,21	0,52	0,65	0,21	0,44	0,59	0,47	**0,75**		
TC	0,38	0,59	0,38	0,63	0,31	0,44	0,06	0,38	**0,69**	
WS	0,09	0,25	0,27	-0,01	0,08	0,22	0,14	0,31	0,18	**1,00**

Internal consistency was measured by Cronbach's Alpha and by Composite Reliability (Table 2). Cronbachs Alpha exceed the 0,5 required value [56], except for the case of communication channel (Channel), problem solving (PS) and timely communication (TC), most probably because of the differences between the internal organization of the institutions in which these teachers are working. The internal organization of the institution determinate the communication channels used and the nature of communication between its workers. Composite Reliability values are all higher than the recommended 0,7 threshold. Finally, AVE values exceed 0,5 as recommended by [55], with the exception of Channel (0,42), problem solving (PS; 0,45) and timely communication (TC; 0,47).

Table 2. Quality criteria overview

	AVE	Composite Reliability	R. Square	Cronbachs Alpha	Communality	Redundancy
Channel	0,420047	0,804913		0,726908	0,420047	
FC	0,506504	0,798833	0,263362	0,678776	0,506504	0,134808
MR	0,725154	0,929142	0,376601	0,904425	0,725154	0,260557
PS	0,451857	0,784690	0,397524	0,645702	0,451857	0,176853
SG	0,533083	0,846778	0,448016	0,771843	0,533083	0,235832
SK	0,707857	0,923499	0,685157	0,896047	0,707857	0,359861
SP	0,615801	0,866668	0,219531	0,760529	0,615801	0,126648
SR	0,560697	0,864321	0,445385	0,806951	0,560697	0,210767
TC	0,477832	0,806362	0,345431	0,755829	0,477831	0,131252
WS	1,000000	1,000000	0,097414	1,000000	1,000000	0,000401

Statistical significance was sized up by means of 500 resampling bootstrap (table 3) to minimize the estimator standard errors [57, 58].

All the hypothesized relationships between the latent variables (table 3) are, statistically, significant (path value > 0,20), with the exceptions of the relationships between teacher's perceived satisfaction with the platform and teacher's perceived satisfaction with his work (H4: SP → WS), with a t=0,005 and a path value of -0,001. Problem

solving communication (PS) has, in this case, a negative impact on share knowledge (H1, path value>-0,20 t=1,676), maybe because if a teacher can not solve a problem in the first moments of the communication process, he needs to share more knowledge.

Table 3. Total Effects (Mean, STDEC, T-Values)

	Original sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Channel -> FC	0,513188	0,559793	0,104628	0,104628	4,904880
FC -> MR	0,613678	0,616002	0,125618	0,125618	4,885257
FC -> TC	0,587734	0,596448	0,141151	0,141151	4,163850
MR -> SG	0,669340	0,683182	0,065460	0,065460	10,225128
MR -> SK	0,717973	0,732539	0,083579	0,083579	8,590386
MR -> SR	0,640070	0,650184	0,078198	0,078198	8,185259
PS -> SK	-0,200712	-0,200632	0,119725	0,119725	1,676438
SG -> SK	0,329310	0,318563	0,129530	0,129530	2,542339
SK -> SR	0,233555	0,242807	0,162428	0,162428	1,437897
SP -> WS	-0,001373	0,010131	0,253846	0,253846	0,005409
SR -> SP	0,468541	0,482697	0,147435	0,147435	3,177956
SR -> WS	0,312110	0,328389	0,123940	0,123940	2,518238
TC -> PS	0,630495	0,657785	0,078771	0,078771	8,004181

5. Conclusions and further research areas

Internet and new technologies have brought a radical change in distance education and e-learning. Institutions must adapt educational materials and teaching methods to the virtual environment and to face the changes in teacher's jobs. Empirical studies have found a relation between teacher's attitude towards e-learning and learner's satisfaction [19, 8, 9] and that job satisfaction is positively related with performance [20, 21]. But e-learning, also, presents several circumstances that promote de use of the relational coordination model, such as, task interdependence, time restrictions, uncertainty and tacit knowledge. As a consequence, institutions that offer online education must develop mechanisms in order to achieve an education of quality. Teacher's satisfaction in e-learning is met if teaching methods are supported by mechanisms that allow the sharing of goals, knowledge and mutual respecting others work; supported by frequent, timely and problem solving mechanisms.

In this research, the relational coordination model has been applied in the e-learning context at a teacher level. Our research tries to empirically validate if the use of relational coordination mechanisms in e-learning practices explains a better performance in terms of teacher's final satisfaction.

We have built an exploratory model that tries to offer an explanation of best results in the case of e-learning practices. This study contributes to the evaluation of the coordination mechanisms in e-learning. This kind of analysis is important, since there are few empirical studies that put into relation and validate the effects of relational coordination in e-learning.

The results of the analysis in this research support empirically the hypotheses related with the different dimensions of relational coordination model, shared goals, shared knowledge and mutual respect and frequent and timely communication.

The results of this research are important for institutions that want to implement e-learning based education or training or want to improve performance of their actual e-learning system, since they support and justify the complementary of human beings when searching to achieve better performance.

The basic conclusions of this research, from the tested hypotheses, are the following ones:

- Shared knowledge and mutual respect increases the perceived degree of satisfaction of teacher with the work of students, boss, administration and technical support staff (H1)
- It is confirmed the importance of a frequent and timely communication in e-learning [48], as it increases the sharing of knowledge and mutual respect (H1).
- The communication channel has an impact on the frequency of communication (H1).
- High quality relationships increase the degree of satisfaction of teacher with his work (H5) and they also increase the degree of satisfaction with the learning management system or the online platform (H3).

However, in our empirical research we could not validate that problem solving communication has a positive impact on relational dimensions of relational coordination. Also, there was not a statistically significant the relation between the degree of satisfaction with the online platform and the degree of teacher's satisfaction with his work (H4). But, the relation between high-quality relationships (SR) on technology (SP) proved to be statistically significant. Therefore, by implementing relational coordination mechanisms, Institutions can achieve performance also in the use of technology. We will go deeper in these particular issues in further researches and we will try to measure the impact of problem solving of communication and technology in other samples.

Although the findings of this research are relevant for the improvement of e-learning education, the study presents some limitations. First, the study should be extended to a higher sample of teachers to see if other factors have an impact in relational coordination, such as the personal context of the teacher. Secondly, we should analyze and compare different samples, where we previously know the internal organization of institutions. In the e-learning market, there is great diversity on terms of internal organization of institutions or businesses. As a consequence, we can find differences between the existent working profiles and their tasks at institutions. Third, the research has been conducted in a geographic context and it should be extended to a wider area.

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