RELATIONAL COORDINATION IN ONLINE EDUCATION

Maria del Carmen Gallego Sánchez, Carmen De Pablos Heredero and José Amelio Medina Merodio

SUMMARY

Online education is an alternative methodology to traditional education, overcoming schedule problems and providing flexibility, among other features. Relational coordination (RC) is a validated tool for measuring and analyzing communication networks and relationships, considering functional organizational boundaries. The application of ICT in higher education online systems produces higher degrees of coordination and integration of processes by improving the competitiveness and research capacity of the institutions. RC can capture coordination among lecturers (RC) and students (relational coproduction) in online education. The goal is to study the relationship between the relational coordination and the quality of online education at universities. This situation can be diagnosed through a series of questions distributed and answered by the participants (students and lecturers) of the organizations. A questionnaire was designed and applied, consisting of the following blocks: coordination, general quality and methodology, technical quality on design and ease of use, technical quality of multimedia resources. The questionnaires were distributed in two Spanish universities and one American university. Comparative factor analysis was carried out. The results show that RC is relevant to achieve better quality and efficiency in online university education.

Introduction

E-learning programs are increasing in higher education. Online education is consolidating with a growth of 30% on average (Euroinnova, 2013). The application of information and communication technologies (ICTs) in higher education e-learning systems can lead to higher degrees of coordination and processes integration, improving the competitiveness and research capacity of the institutions. A good coordination of the processes involved in teaching and learning practices reinforces the enabling role of the technology and allows to reach dynamic capabilities that can improve the position of universities in their competitive environments (De Pablos et al., 2012c). At the university level, when implementing a suitable model of online education, apart from the technology itself, three factors should be taken into account: education and educational models, technology and technological models, and organization and organizational models (De Pablos et al., 2012b).

The quality and efficiency of data management services is very important in the so-called ‘knowledge society’. Organizations have understood that ICTs are tools that facilitate and permit the efficient management of little resources; thus, their influence has been extended to practically all areas of business and all kinds of relationships (De Pablos et al., 2014). Gittell (2002) developed a model of relational coordination that emphasizes the importance of coordinating the relationships and dynamics of communication in organizations to achieve better results.

In addition, a number of critical success factors in the design and implementation of online methodology must be considered, such as: the participant’s motivation, learning methodologies, instructional design, graphic design and multimedia, tracking online courses, the e-learning technology platform and content. E-learning standards can make the best of the ICT implementation per se.

Besides, relational coordination is defined as a process of mutual reinforcement of the interaction between communication and relationships conducted with the purpose of integrating tasks (Gittell, 2009). It is the coordination of work across functional and organizational boundaries, through relationships of shared goals, shared knowledge and mutual respect, supporting frequent, timely, accurate and problem solving communication.

The aim of this paper is to analyze whether relational coordination is relevant in online education quality. A questionnaire was designed, to be completed by students and lecturers in online learning. Finally, the data obtained through the questionnaires was analyzed. Taking into consideration the arguments supported by different authors, it is apparent that efficient mechanisms of communication and relationships may lead to higher levels of quality in higher education.

Literature Review

Gittell (2009, 2010) and De Pablos et al., (2012a, b, c, 2013, 2014) have demonstrated that relational coordination is an important factor to reach the best organizational results and, therefore, it appears to be the most appropriate model for online education. Relational coordination ensures the quality of online education in the university educational system.

Online education

E-learning is presented as an alternative to traditional learning (MECD, 2013) for those who want to study at a distance, for training people who want to upgrade their

KEYWORDS / Higher Education / Online Education / Quality / Relational Coordination /

Received: 11/25/2014. Modified: 11/04/2015. Accepted: 11/05/2015.

María del Carmen Gallego Sánchez. Telecommunications Engineer and Ph.D. student in Engineering Information and Knowledge, Polytechnic School, Universidad de Alcalá, Spain. Address: Department of Business Economics, Universidad Rey Juan Carlos. Paseo de los Artilleros s/n, 28032 Madrid, Spain. e-mail: mcar-men.gallego@edu.uah.es

Carmen De Pablos Heredero. Ph.D. in Economics and Business Administration, Universidad Complutense de Madrid, Spain. Professor, Universidad Rey Juan Carlos, España. e-mail: carmen.depablos@urjc.es

José Amelio Medina Merodio. Professor, Universidad de Alcalá, Spain. e-mail: josea.medina@uah.es

869
COORDENACIÓN RELACIONAL EN LA EDUCACIÓN EN LÍNEA
María del Carmen Gallego Sánchez, Carmen De Pablos Heredero y José Amelio Medina Merodio

RESUMEN

La educación en línea (online) es una metodología alternativa a la educación tradicional, que resuelve problemas de horario y proporciona flexibilidad, entre otras características. La coordinación relacional (CR) es una herramienta validada para la medición y análisis de las redes de comunicación y relaciones considerando los límites organizacionales funcionales. La aplicación de las TIC en los sistemas de educación superior online produce un mayor grado de coordinación e integración de los procesos de mejora de la competitividad y capacidad de investigación de las instituciones. La CR puede capturar la coordinación entre profesores (CR) y estudiantes (coproducción relacional) en la educación online. Se estudió la relación entre la CR y la calidad de la educación online en la Universidad. El modelo de CR implica incluir elementos que enriquecen el trabajo en equipo a través de metas y conocimiento compartidos y el respeto mutuo, el apoyo comunicativo frecuente, oportuno, preciso y orientado a la solución a problemas. Algunas organizaciones presentan un estado más consolidado de CR que otras. Esto se aprecia con una serie de preguntas distribuidas y contestadas por los participantes (alumnos y profesores). Se aplicó un cuestionario compuesto por los siguientes bloques: coordinación, calidad, metodología general, calidad técnica en el diseño y facilidad de uso, y calidad técnica de recursos multimedia. Se distribuyeron cuestionarios en dos universidades españolas y una norteamericana, y se llevó a cabo un análisis factorial comparativo. Los resultados muestran que la coordinación relacional es relevante para tener mejor calidad y eficiencia en la educación online universitaria.

COORDENACIÓN RELACIONAL DE EDUCAÇÃO EM LÍNEA
Maria del Carmen Gallego Sánchez, Carmen De Pablos Heredero e José Amelio Medina Merodio

RESUMO

Educação em linha (online) é uma alternativa à metodologia de ensino tradicional, completando problemas de agendamento e fornecendo flexibilidade e outras características. A coordenação relacional (CR) é um instrumento validado para medição, análise de redes de comunicação e relações, tendo em conta as fronteiras organizacionais funcionais. A aplicação das TIC nos sistemas de ensino superior agora produzem um maior grau de coordenação e integração dos processos de melhoria da capacidade de competitividade e pesquisa das instituições. A CR pode capturar a coordenação entre professores (CR) e estudantes (coprodução relacional) na educação online. O objetivo foi estudar a relação entre a CR e qualidade da educação online relacional na Universidade. A coordenação envolve modelo relacional incluir alguns elementos que melhoram o trabalho em equipe através de objetivos comuns, conhecimentos partilhados e respeito mútuo, suporte de comunicação frequente, oportuno, preciso, e orientados a resolver problemas. Almas organizações têm se consolidado uma CR mais consolidadas. Esta situação pode ser visto através de uma série de perguntas distribuídas e respondidas pelos participantes (alunos e professores). O questionário é composto dos seguintes grupos: coordenação, qualidade e metodologia geral, qualidade técnica em design e usabilidade, e qualidade técnica de recursos multimídia. A distribuição dos questionários foi em duas universidades espanholas e uma norteamericana. Realizou-se uma análise fatorial comparativa. Os resultados mostram que a CR é relevante para ter melhor qualidade e eficiência na educação online universitaria.

profession in the knowledge society, constantly updating itself via ICTs tools. It also implies, apart from evolution, saving money and time, and it may be useful for all subjects that can be taught in college.

The integration of ICTs by the institutions of higher education increases the competitive results. The alignment of strategic with technological possibilities can position educational institutions in more competitive standards in a global context.

E-learning implies the provision of educational programs and learning systems through electronic media. It covers a broad suite of applications and processes, such as web-based learning, computer-based training, virtual classrooms and digital collaboration (González et al., 2011).

Online learning is supported by e-learning platforms. Some of them, which are of free distribution (virtual campus free software) are: Moodle, Sakai, Claroline, Docebo, Dokeos. Software is necessary in online learning. Some private software for e-learning practices are: Ecollege, Edocoo, Desire2Learn, Blackboard, Prometheus, WebCT.

University level, for a suitable model of e-learning to be implemented, three factors should be taken into account (De Pablos et al., 2012a, b, c, 2013, 2014; Salinas, 2014):

a) Education and educational models. One dimension that determines the quality of education and should consequently be evaluated is the educational model that is developed in response to an educational policy, on the basis of social needs (Socarras et al., 2008).

b) Technology and technological models. Morin and Searat (1998) show that innovation is not only the result of research, but it is the assimilation of a technology developed, dominated and eventually applied in other fields of activity, but whose implementation in their organizational, cultural, technical or commercial context is new.

c) Organization and organizational models. Morgan (1986), Von Bertalanffy (1993) and Nonaka et al. (1996) are organizational theorists that have shown how conflicts are more likely to occur in the presence of high levels of interdependence or tasks and when there are high degrees of diversity among participants.

In addition, a number of critical success factors influence in the design and implementation of e-learning, such as: participant’s motivation, learning methodologies, instructional design, graphic design and multimedia, tracking online courses, the e-learning technology platform and contents on e-learning standards.

Relational coordination and its importance in online education

Relational coordination provides quality performance and
efficiency, as well as customer's and employee's satisfaction (Gittell, 2009). The relational model of coordination is of interest for achieving good results at universities or processes that require a high degree of organization (Nonaka and Takeuchi, 1995). Several authors have studied the role of relational coordination in different areas, such as in final teacher satisfaction in e-learning (Margalina et al., 2014) or healthcare management in lung cancer (Vinagre et al., 2014).

A different topic pertains to business outcomes: the application of relational coordination to practices of cloud computing (De Pablos et al., 2014), or to the Spanish system of transplants, a system of excellence, where part of its success is a quality coordination between a volunteer's organization and hospital coordinators (De Pablos et al., 2012a).

Coordinating work takes place across functional and organizational boundaries, through relationships of shared goals, shared knowledge and mutual respect, frequent, timely, accurate and troubleshooting communication. Figure 1 shows the two groups of elements that compose relational coordination: relationships and communication (Gittell, 2009).

In general terms, the present work attempts to demonstrate how relational coordination makes a difference in online education at universities. In other words, an organization that shows high degrees of relational coordination, offers better quality in education than one that lacks them.

Relational coordination is a validated tool for measuring and analyzing communication networks and relationships through which work is coordinated considering functional and organizational boundaries. In this research it is shown that coordination can capture relational coordination among teachers (relational coordination) and between students (relational coproduction) in the online education model of e-learning. The relational coordination model implies the putting into practice of some elements that enrich teamwork.

Methodology

A model has been developed from the review of the literature, the hypotheses proposed, tabulating and analyzing data from a questionnaire that was designed to test the following hypotheses: a) Relational coordination is good; the best results are achieved in terms of university quality. b) People share objectives and knowledge; the best results are achieved in teaching. c) If there is mutual respect between teachers and students, better results will be achieved. d) There are mechanisms that make information flow on time and properly, the best results are achieved when taking correct decisions.

The questionnaire was used to collect anonymous data. Its design was laborious and based on a mixed quantitative and qualitative methodology, in accord to relevant criteria of online education. The questions included pertained to relational coordination, general quality and teaching methodology, technical quality in terms of navigation, design and multimedia, including personal and professional data. The part about relational coordination was based on Gitell's original questionnaire (Gittell, 2009). The empirical study was mcarried out at three universities, two Spanish ones located in Madrid, Universidad Alcalá de Henares (UAH) and Universidad Rey Juan Carlos University (URJC) and one institution in the USA, Norwich University.

The questionnaire were distributed to students and lecturers. Of the students, 24% were from URJC, 33% from UAH, and 43% from Norwich University. Of the lecturers, 30% were from each of the two former institutions and 40% from Norwich University. A Likert scale from 1 to 5 was used for the answers: 1 (never), 2 (rarely), 3 (occasionally), 4 (often) and 5 (constantly). This scale has been considered the most appropriated for this study (William, 2006).

The questions included in the questionnaire are those considered to be relevant to the feature variables, characteristics or the object of study (Walter, 2000). They were of the following five types:

a) Questions about relational coordination, centered on the mechanisms involved in the practices in the respective organization (P1_1), lecturer’s selection (P1_2), measuring the performance of teachers (P1_3), reward of teaching optimal performance (P1_4), proactive conflict resolution (P1_5), teacher training (P1_6), goal oriented job design (P1_7), exchange jobs (P1_8), information sharing (P1_9), on sharing information with outsiders (P2), communication (P3), conflict resolution (P4), sharing knowledge (P5), mutual respect (P6), and shared goals (P7).

b) Questions about quality in general (P8, P9): Is attention given to the process of teaching and learning on line provided? Does the quality of the course compensate for the economic investment? Is divergent thinking used? Is there discussion and debate? Teachers motivate students? Are students involved in activities individually or in groups? Is communication appropriate? The course provides a comprehensive content for development with introduction, objectives, schemes, development of themes, activities, summary, glossary, suggestions for work and participation in forums, expanded content? The course presents accuracy and clarity in the content, uses assessment tools, didactic quality, positive activities? and evaluation of the university in the last 5 years.

c) Questions that refer to the technical quality and multimedia resources (P11): Does the course present a variety of integrated multimedia resources and combines different types of information, educational multimedia adequacy, videoconference sessions and other utilities on line? Applications offer the students and lecturers contents and experiences based on the real world?

Results

Analysis of relational coordination

Figure 2 shows the evaluation of relational coordination mechanisms established at the three universities, making use of the χ² test with the SPSS program. The areas of study at the three institutions were: engineering (UAH), social and legal science (URJC) and MBA (Norwich University).

The different mechanisms described above were evaluated
using the percentages of the results obtained in the \( \chi^2 \) test. The relational coordination varies greatly between organizations; some have a strong, steady process in terms of relational coordination, while others are weaker. Norwich University shows the higher scores in all mechanisms, it is exceeded only in the performance of lecturers (P1_2) by URJC.

**Factorial analysis**

An empirical analysis was based on observation of the different data obtained from the factorial analysis performed with the program SPSS 15.0. The Bartlett test of sphericity and the Kaiser-Meyer-Olkin rate were used to show that these tests are suitable in the case of students (0.631 about relational coordination and 0.922 for general quality, technical quality: navigation, design and tools, types of media assets), as well as in the case of lecturers (0.566 about relational coordination and 0.503 for general quality, technical quality: navigation, design and tools, types of media assets).

**Students questionnaires**

Table I shows factors and variances about relational coordination and general quality in students questionnaires. Norwich University presents the highest levels in all of these factors. The different factors dealing with general quality are 1) General quality (environment and methodology); this factor explains 58.194% of the variance. 2) Technical quality: navigation, design and tools; this factor explains 9.632% of the variance. 3) Types of media assets (video, animations, simulations...); this factor explains 6.932% of variance.

Table II shows the component matrix about students questionnaires. The different components are 1: Teamwork, 2: Shared goals, 3: Information, 4: Motivation, 5: Self confidence, 6: Mutual respect, 7: Solving skills, and 8: Interrelation.

**Professors questionnaires**

The different factors that have been obtained in the case of professors about relational coordination are 1: Teamwork; this factor explains 41.442% of the variance. 2: Teaching-learning process; this factor explains 26.362% of the variance. 3: Objectives sharing; this factor explains 15.394% of the variance. Some variables were eliminated so as to obtain a determinant different from zero. Norwich University stands in all of these factors.

**Discussion**

Based on the results derived from the processing of information obtained from the questionnaires about relational coordination, it can be confirmed that three components are extracted.

Table V shows component matrix about relational coordination in professors questionnaires. The variables are grouped into three main groups, 1: Teamwork, 2: Teaching-learning process, 3: Sharing goals.

Table VI shows component matrix about quality in general in professors questionnaires. The variables are grouped into three main groups, 1: Technical quality, 2: Methodological quality, and 3: Whether the online course is enough good to pay the cost.
TABLE IV
FACTORS AND VARIANCES ABOUT RELATIONAL COORDINATION AND QUALITY IN PROFESSIONS QUESTIONNAIRES

<table>
<thead>
<tr>
<th>Factors and variances about relational coordination</th>
<th>Variance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teamwork</td>
<td>41.442%</td>
</tr>
<tr>
<td>Teaching-learning process</td>
<td>26.362%</td>
</tr>
<tr>
<td>Objectives sharing</td>
<td>15.394%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factors and variances about quality</th>
<th>Variance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical quality</td>
<td>58.418%</td>
</tr>
<tr>
<td>Quality and methodology</td>
<td>14.025%</td>
</tr>
<tr>
<td>Considering quality in front of the cost of the course</td>
<td>9.643%</td>
</tr>
</tbody>
</table>

TABLE V
COMPONENT MATRIX ABOUT RELATIONAL COORDINATION IN PROFESSIONS QUESTIONNAIRES

<table>
<thead>
<tr>
<th>Components</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2_3</td>
<td>0.727</td>
<td>0.055</td>
<td>0.539</td>
</tr>
<tr>
<td>P2_2</td>
<td>0.564</td>
<td>0.605</td>
<td>-0.015</td>
</tr>
<tr>
<td>P3_1</td>
<td>0.487</td>
<td>0.766</td>
<td>0.285</td>
</tr>
<tr>
<td>P4_1</td>
<td>0.574</td>
<td>0.643</td>
<td>-0.329</td>
</tr>
<tr>
<td>P5_1</td>
<td>-0.827</td>
<td>0.356</td>
<td>0.311</td>
</tr>
<tr>
<td>P6_1</td>
<td>-0.867</td>
<td>0.299</td>
<td>0.197</td>
</tr>
<tr>
<td>P7_5</td>
<td>0.030</td>
<td>0.797</td>
<td>-0.447</td>
</tr>
<tr>
<td>P4_5</td>
<td>0.057</td>
<td>-0.368</td>
<td>-0.747</td>
</tr>
<tr>
<td>P3_3</td>
<td>0.702</td>
<td>-0.426</td>
<td>0.380</td>
</tr>
<tr>
<td>P7_1</td>
<td>0.894</td>
<td>-0.315</td>
<td>-0.146</td>
</tr>
</tbody>
</table>

TABLE VI
COMPONENT MATRIX ABOUT QUALITY IN GENERAL IN PROFESSIONS QUESTIONNAIRES

<table>
<thead>
<tr>
<th>Components</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>P9_4</td>
<td>0.832</td>
<td>0.210</td>
<td>0.075</td>
</tr>
<tr>
<td>P9_2</td>
<td>0.662</td>
<td>0.262</td>
<td>0.667</td>
</tr>
<tr>
<td>P9_4</td>
<td>0.105</td>
<td>0.876</td>
<td>0.042</td>
</tr>
<tr>
<td>P9_7</td>
<td>0.156</td>
<td>0.837</td>
<td>-0.052</td>
</tr>
<tr>
<td>P10_1</td>
<td>0.864</td>
<td>0.156</td>
<td>0.306</td>
</tr>
<tr>
<td>P10_2</td>
<td>0.734</td>
<td>0.078</td>
<td>-0.359</td>
</tr>
<tr>
<td>P11_1</td>
<td>0.786</td>
<td>0.463</td>
<td>-0.156</td>
</tr>
<tr>
<td>P11_2</td>
<td>0.701</td>
<td>0.506</td>
<td>-0.142</td>
</tr>
<tr>
<td>P10_4</td>
<td>0.758</td>
<td>0.110</td>
<td>0.113</td>
</tr>
<tr>
<td>P11_4</td>
<td>0.190</td>
<td>0.881</td>
<td>0.036</td>
</tr>
<tr>
<td>P9_8</td>
<td>0.282</td>
<td>0.825</td>
<td>0.130</td>
</tr>
<tr>
<td>P11_3</td>
<td>0.587</td>
<td>0.713</td>
<td>0.301</td>
</tr>
<tr>
<td>P10_3</td>
<td>0.847</td>
<td>0.256</td>
<td>-0.349</td>
</tr>
<tr>
<td>P9_3</td>
<td>0.162</td>
<td>0.797</td>
<td>-0.257</td>
</tr>
<tr>
<td>P9_5</td>
<td>0.340</td>
<td>0.506</td>
<td>0.084</td>
</tr>
</tbody>
</table>

that a quality and efficiency performance, as well as customer and employee satisfaction, in this case student and lecturers, have been reached. Besides, there is a process of mutual reinforcement in the interaction between communication and relationships carried out for the purpose of integrating tasks, which is consistent with the work of Gittell (2009).

Education is a very complex phenomenon because of its multipurpose character and dependence on the cultural and social context in which it occurs. According to the results obtained, education permits the exchange of knowledge between generations, and people teach values and attitudes, and learn them, in society. This fact reinforces Flores Crespo (2004) arguments.

Conclusion

As it is shown throughout the article, relational coordination is very important to reach a better performance and efficiency in a methodology based on online education or e-learning. That is, relational coordination leads to quality and efficiency in online education. Higher levels of relational coordination improve the efficiency and quality at University standards. Some educational organizations have a more consolidated situation in terms of relational coordination than others; this can be seen through the distribution of the previously developed quantitative study by obtaining the key information from the questionnaires distributed to the participants of the organizations and developing a quantitative study with the information obtained.

The American university (Norwich) presents the best relational coordination, this point is reflected in the quality of the environment, teaching methods, technical quality navigation and design, technical quality multimedia online education resources.

There are more coordination mechanisms in Norwich University than in the two Spanish Universities because Norwich University implemented online education many years ago and online education is more recent in Alcalá and Rey Juan Carlos universities. For this reason, participants are more motivated in Norwich. The three universities have been restructured, they are consolidated, have new buildings and facilities and online education new platforms.

REFERENCES


