A dynamic model for distance learning: evaluation of an online course for hospital teachers' professional development

Un modello dinamico per la formazione a distanza: valutazione di un corso online per lo sviluppo professionale dei docenti ospedalieri

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ABSTRACT Within the hospital school context, teachers training plays a crucial role in addressing the complex issues that characterise education in this environment. This paper describes an online training course that is grounded on the results of a survey into hospital teachers' professional needs. The course, which has a modular structure, represents one of the actions foreseen in DOCC (Dynamic Online Course Community), a model designed specifically for hospital teachers' professional training. This paper sets out to investigate the manner and degree to which the online course satisfied the teachers' professional needs. The results indicate that overall satisfaction was good, however the level differed from module to module. Further training actions based on the results and criticalities that emerged from the present study will be implemented in order to develop increasingly specific competencies.

KEYWORDS Teacher training; Hospital teachers; Online course; Teachers' satisfaction; Professional development.

SOMMARIO Nell'ambito della Scuola in Ospedale la formazione dei docenti gioca un ruolo cruciale per affrontare la complessità di questo particolare contesto formativo. Partendo dai risultati di un'indagine sui bisogni professionali espressi dagli insegnanti ospedalieri, è stato progettato un corso modulare online che rappresenta una delle azioni del modello DOCC (*Dynamic Online Course Community),* ideato per lo sviluppo professionale dei docenti ospedalieri. Lo scopo del presente contributo è indagare quanto il corso online abbia soddisfatto i bisogni professionali espressi dai docenti. I risultati hanno evidenziato un alto livello di soddisfazione pur in presenza di alcune differenze fra le aree tematiche proposte. Sulla base dei risultati e delle criticità emerse sono previste ulteriori azioni formative per lo sviluppo professionale

orientate allo sviluppo di competenze sempre più specifiche.

PAROLE CHIAVE Formazione dei docenti; Docenti ospedalieri; Formazione online; Soddisfazione dei docenti; Sviluppo professionale.

1. INTRODUCTION

Internationally, Hospital Schools (HS) have become quite firmly consolidated institutions, and in the last few decades many countries have legislated to regulate their organization, duties, and resources. HS have special features that distinguish them from traditional schools. As educational contexts, they are particularly complex and thus demand specific teacher skills. One of these is a high capacity for adaptation (Shaw & Brown, 2011). Specifically, HS teachers need to adapt pedagogical activities to fit in with hospital routine and with their students' treatment regimes. Moreover, the physical and emotional state in which hospitalized students find themselves is often non-conducive for learning. The discomfort and pain experienced by patients and families may well place teachers in a position of having to provide strong emotional support. This role falls outside of teachers' mainstream professional practice and so is something for which they are not usually prepared (Massaglia, 2008).

This situation calls for skilled professionals capable of shedding conventional education practices and adopting new forms of work and study that can stimulate and engage young hospitalised learners. In this regard, Capurso and Vecchini (2010) identified six macro-areas of expertise that a hospital teacher is called on to develop: personal-professional, didactic-methodological, organizational, relational-communicative, research, and health care. It is also vital for the learning interventions they implement to be highly individualized and oriented towards the socio-educational inclusion of sick children (Capurso & Dennis, 2017; Hopkins, Green, Henry, Edwards, & Wong, 2014). In this light, digital technologies may prove to be a valuable facilitator and support element (McCarthy, Maor, & McConney 2017; Wadley, Vetere, Hopkins, Green, & Kulik, 2014). A systematic review of empirical research into the use of technology for teaching students with chronic illnesses has highlighted how technologies generally increase learning potential and strengthen pupils' connection with their school (Maor & Mitchem, 2015). Nevertheless, the integration of technological tools in hospital teaching can be complicated for a number of reasons, not least of which is the skills required to use them effectively (Benigno, Fante, & Caruso, 2017; McCarthy et al., 2017).

Although there is awareness that hospital teachers need a specific skills set, no specific educational paths are offered to hospital teachers, therefore they operate in such a clearly defined environment without receiving an appropriate training, as reported by the LeHo Project[1].

This situation highlights the need to promote the education and training of hospital teachers, so that they have the specific skills required to deal with the complexity of hospital school. Bearing in mind the specific nature of the presented context, an integrated model has been developed for teachers' professional growth. Known as DOCC (*Dynamic Online Course Community*; Benigno, Caruso, Fante, & Ravicchio, 2016), it combines basic training in the specific area of hospital teachers' professional activities with lifelong learning actions carried out within a professional community.

This paper describes one of the main phases foreseen in the model, namely an online course in hospital teaching. It explains the motivations for combining a Learner Centered Approach (McCombs, 2015; McCombs & Vakili, 2005) with Instructional Design (Trentin, 2008). Specifically, the study reports the implementation of the online course and examines teacher satisfaction and emergent criticalities.

[1] http://www.lehoproject.eu/en/toolkit/158-the-institutional-environments-of-home-and-hospital-education-hhe-in-europe-1

2. AN INTEGRATED SYSTEM FOR THE PROFESSIONAL DEVELOPMENT OF HOSPITAL TEACHERS

The deployment of innovative learning environments can sometimes require specialized teacher training measures (Pilgrim, Hornby, Everatt, & Mcfarlane, 2016). Today there is a proliferation of attractive learning opportunities made possible by the ready availability of Open Educational Resources (OER), MOOCs, and open learning communities on social networking platforms (Ranieri, Manca, & Fini, 2012). At the same time, there is still a need in some specific areas for specialised, supported training actions carried out in dedicated (online) settings where participants can communicate with ease, sharing their experience and know-how.

The hospital school is one of the contexts that clearly present this need. In response, an integrated system for the professional development of hospital teachers is being implemented in Italy. The DOCC model (*Dynamic Online Course Community* - Figure 1) comprises both formal and informal training conducted via OCC (Open Online Course), and combines this with opportunities for informal learning in virtual communities (Benigno et al., 2016). In this system, exogenous training, promoted via interaction with specific course contents, is integrated with endogenous knowledge generated in the participant community.

The system comprises a recursive Dynamic Process (DY-P) that combines formal training actions with informal training supported by an online community. It starts from an Online Course (OC), which is supplemented by interaction within an online community (Community – COM), giving participants the opportunity to share their working practices. The combination of the OC with the COM has two main effects: on one hand, it fosters the emergence of new training needs (TN) addressed through continuous training; on the other, it promotes continuous, imitative, tutorial, and interpersonal interactions that lead to the generation of Shared Knowledge (SK). Indeed, it is recognised that professional training for teachers should be directed towards a cohort of teachers who work in the same context (Vanderlinde, Aesaert, & van Braak, 2014) that promotes the development of professional competence (Know How – KH). KH is not just an individual mental ability, but also a social construct involving tasks, roles and knowledge within organizational interactions (Cortigiani, 2010). The DOCC model is rooted in an idea of knowledge that is not confined to explicit knowledge, but that also comprises knowledge that is latent in the community (Polany, 1979).

Drawing on the DOCC model, the formal training of hospital teachers began with a structured Online Course. This was designed to promote the acquisition of knowledge and skills in specific areas of interest that are essential for teachers working in a hospital context.

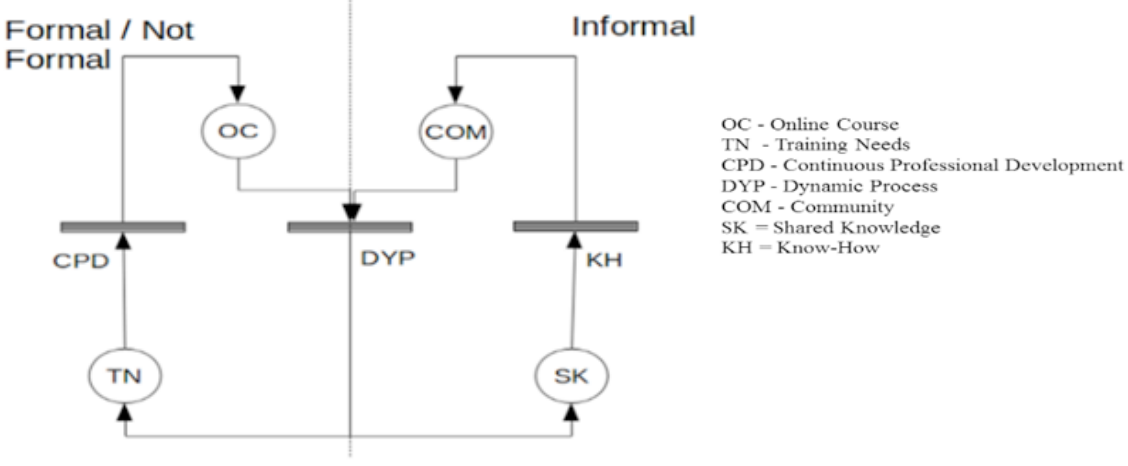

Figure 1. DOCC Integrated System.

3. THE ONLINE COURSE DEVELOPED FOR HOSPITAL TEACHERS

The Online Course (OC) was developed following the Learner Centered Approach (McCombs, 2015; McCombs & Vakili, 2005). It is inspired by the APA learner-centred psychological principles (American Psychological Association, 1997), in combination with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model for pedagogical planning (Andrews & Goodson, 1980).

Learner-centered pedagogy emphasises the cognitive, motivational and social dimensions of learning. It positions learners and their surrounding contexts at the heart of learning environment design and implementation (McCombs, 2015), so that four types of learning result:

1. *Reflective learning*: knowledge transmission models give way to a learning method based upon analysis and reflection on experiences. Schön (1983) described the concept of "reflection-in-action" as consisting of «*on the spot surfacing, criticizing, restructuring and testing of intuitive understanding of experienced phenomena which often takes the form of reflective conversation with the situation*» (pp. 241-242). In this way, self-monitoring and meta-cognitive abilities may emerge.
2. *Active learning*: this joins theoretical learning moments with practical activities. Individuals learn much better through their own personal experience than by being passively filled up with information provided by other people or by technological instruments (Salomon, 1998). When it comes to online learning environments, Johnson and Aragon (2002) suggest promoting active learning through project-based and problem-solving activities.
3. *Contextual learning*: this contextualizes the acquisition of knowledge, which cannot be separated from its context (framework, environment) or from the activities through which it is obtained (Brown, Collins, & Duguid, 1998). Learning occurs only if the new knowledge appears meaningful, that is if a link is found between it and one's own consolidated experiences.
4. *Social learning*: this develops through relational and communication networks established among participants, paving the way for the negotiation of solutions, knowledge processing and experience exchange among peers (Vrieling, Van den Beemt., & De Laat, 2016).
5. In the following subsection, the different phases of the Online Course development are explained.

3.1. *Analysis of teachers' training needs*

As foreseen by the ADDIE model, the planning of the training path was based on an explorative survey of the hospital teachers' specific training needs. The survey was carried out nationally on a broad sample of hospital teachers at various school levels, ranging from infant to high school (Benigno et al., 2017). The needs that emerged from the explorative survey covered several interconnected facets (Table 1). The teachers expressed the need for better understanding of the environment in which they work, and the need for training on how to manage the psycho-relational dimension, both with learners and their families. Furthermore, they expressed the need for training in more practical aspects of their work, such as the development of technological and methodological knowledge and skills. Finally, the need also emerged for training in the use of electronic devices such as personal computers and tablets.

Needs connected with the specific work setting and the psychological/ relational dimension	Training in psychological aspects related to learner illness Training in dealing with emotional aspects and the relationship with families Obtaining information about formal aspects regarding school in hospital Obtaining information about relations with hospital staff
Needs concerning general technological and methodological knowledge	Acquiring broaden competencies related to the use of digital technologies Developing skills in methods and strategies for active learning Gaining experience in peer groups dedicated to didactic and methodological aspects

Table 1. Hospital teachers' training needs.

3.2. *Design and development of the online course*

Drawing on the analysis of training needs, eleven course modules were developed (see Appendix A) and grouped into four main thematic areas:

1. *Organizational*: it addresses the hospital school's specific context of operation. This comprises a single module, the general aim of which is to provide information strictly related to hospital schooling, including institutional and organizational aspects. Moreover, the module addresses basic notions about hygiene and prophylaxis, and analyses contextual aspects regarding multidisciplinary team work.
2. *Psycho-relational***:** it addresses the psychological and relational aspects connected with both student illness and teacher stress management. This area is divided into two modules concerning the impact of illness on the cognitive and emotional functioning of students and their families. Moreover, theoretical elements about interpersonal communication and burnout are presented, with the aim of helping teachers to identify and manage possible negative reactions that could be maladaptive to work related stress.
3. *Methodological*: it regards the planning and management of pedagogical paths to be implemented within the hospital school. This area is divided into three modules that cover various aspects of learning design for hospital schooling. The contents addressed include the effects of hospitalization on regular learning processes and on space and time management within the hospital school.
4. *Technological*: it aims at familiarization with educational technologies to support teaching activities with hospitalized learners. This area is organised differently from the others. It comprises five modules, one of which is an introduction that focuses on the positive role of ICT within the hospital school. The modules present different technological tools linked with learning goals and related activities that teachers can implement.

The eleven modules comprised text documents designed for both regular and supplementary study. They also included activities that followed a learner centered approach (McCombs, 2015):

- *Problem Solving,* to improve the ability to apply the acquired knowledge for solving real problems. For example, the module dealing with the psychological and social mechanisms that animate the hospital school context features simulated problematic situations that teachers may really face in their specific work environments. The aim to is to support them in adopting problem-solving strategies suggested by the e-contents dedicated to understanding and interpretation.
- *Case analysis,* to make it easier for participants to discuss matters with their peers, particularly

about their specific work situations. The teachers have the possibility to act as guides and mentors for their peers, an activity that brings a high degree of professional responsibility and growth. They compare cases, discuss adopted solutions, ask for help, and share good practices. This is a way to meditate around cases linked to teachers' practical experience and to reconstruct these on the basis of the criteria presented in the reference unit.

- *Reflection on topics,* to promote critical analysis of the subjects addressed in the course, so that participants may enrich the presented concepts with observations, comments and reflections connected to their specific working context.
- *Self-analysis activity,* to stimulate reflection on personal competencies concerning the subject discussed in the study section. Activation proposals constitute a tool for focusing on one's own way of acting and one's personal attitudes. The aim is to foster awareness of these and, where necessary, try to improve them.

Moreover, all the technological tools mentioned in the course were stored in a repository for participants to access. This included tutorials and practical examples intended to support the development of technical and practical skills. The repository, which was created using the Moodle resource database, was designed as a toolbox in order to help course participants enhance their know-how regarding digital resources.

3.3. *Implementation of the online course*

The course was implemented in the Moodle platform and no time limits were imposed on participants. Given the amplitude of the training path and the wide range of possibilities it offered, teachers were free to proceed how they wished, whether by completing the entire path or just single modules. This choice was driven by the realisation that one of the factors impeding ICT integration in teaching practice is the lack of time teachers have to learn to teach with technologies (Bingimlas, 2009).

3.4. *Evaluation of the online course*

Teachers attending the online course were issued with certification after passing an assessment test. Given that they could choose which modules and content to complete, two different kinds of certification were foreseen: 1) an attendance certificate was made available upon completion of the entire learning path, and after passing all the assessment tests; 2) four different achievement badges were made available after completion of the assessment related to each of the four abovementioned thematic areas. Empirical evidence in the literature supports the idea that issuing badges helps course participants to personalize their specific learning experience. This is attained by providing the opportunity to blend course attendance with actual professional needs (Gamrat, Zimmerman, Dudek, & Peck, 2014) and by acknowledging each learning achievement (Abramovich, Schunn, & Higashi, 2013; Halavais, 2012).

The combination of these factors - the absence of time constraints and earning badges - allows online course participants to customize and personalize their own learning path (Raffaghelli, 2014). This also facilitates participation: indeed, more than 600 hospital teachers joined the online course. Table 2 reports the distribution of teachers earning each of the available badges. Variation in the numbers of different badges earned and the final attendance certificates issued are a reflection of individual teachers' different interests and needs.

Attendance certificate	Badge: Organizational area	Badge: psycho-relational area	Badge: Methodological area	Badge: technological area
212	247	219	235	219

Table 2. Distribution of badges and final attendance certificates.

4. METHODOLOGY

4.1. *Purpose of this study*

The hospital teachers' satisfaction with the course was measured with the aim of identifying any emerging criticalities that would need to be taken into account for the design and implementation of a subsequent advanced version. Teacher satisfaction was measured in terms of two different factors:

1. Course efficacy and utility: To what extent did the course contents address teachers' training needs? To what extent did they foster reflection on professional activity? To what extent were they perceived as effective for the planning of pedagogical activities? To what extent were they considered interesting and motivating?
2. Course usability: Did characteristics like the absence of time constraints and different types of self-assessment foster course participation and learning?

4.2. *Procedure*

Teachers who had obtained their course completion certificate had the option of responding to a questionnaire. This comprised four different subsections:

1. *Socio–demographic*: gender, age, education, school level taught and years of hospital teaching completed.
2. *Course assessment*: four questions about each of the four course areas (Institutional/organizational, Psycho-relational, Methodological, Technological). These assessed teacher satisfaction with the areas' capacity to address training needs (question 1), foster reflection (question 2), provide a basis for planning new pedagogical activities (question 3), and provide contents that were inspiring and motivating (question 4). Each item was rated on a 5-point agreement Likert-type scale, where 1 = "*totally disagree*" and 5 = "*totally agree*".
3. *Usability satisfaction*: fourteen questions assessing satisfaction with course usability characteristics like accessibility and absence of time constraints. The items were rated on a 5-point agreement Likert-type scale, where 1 = "*totally disagree*" and 5 = "*totally agree*".
4. *Open answers*: teachers were given the opportunity to report what they saw as the strong and weak points of the course.

4.3. *Data analysis*

A non-parametric Friedman test was used to compare satisfaction levels within the four different course areas. The effect size for both the omnibus and the post hoc tests was reported. Since the Bonferroni correction is known to be too conservative and to inflate the probability of committing a Type II Error, it was used the Benjamini–Hochberg (BH) correction for multiple comparison to control for the probability of committing a Type I Error (Benjamini & Hockberg, 1995). To assess the teachers' satisfaction on the usability criteria, it was contrasted the observed satisfaction median of each item with an expected satisfaction median set equal to four, using the non-parametric Wilcoxon test.

5. RESULTS

5.1. *Sample characteristics*

Seventy-two hospital teachers (F = 98,6%) filled in the questionnaire. The mean age was 52.25± 6.62 years, while

years of hospital experience ranged from 1 to 26 (M = 9.28± 6.71 years). The other demographic characteristics, namely education and school level taught, are reported in Table 4. (SSIS: university specialization school for high school teachers, replaced in 2009 by TFA, post-graduate traineeship for secondary teaching accreditation).

Variable	Category	Percentage
Education	High School Diploma	37.50%
	Bachelor Degree	6.90%
	Master Degree	31.90%
	SSIS	4.20%
	Master	11.10%
	PhD	1.40%
	TFA	0.00%
	Other title	6.90%
School level	Nursery	16.70%
	Primary	48.60%
	Lower high	23.60%
	Upper high	11.10%

Table 4. Sample demographic characteristics.

5.2. *Efficacy and utility of the online course*

Table 5 reports the results of the Friedman test for satisfaction level within the four course areas (Q_1-mdn-Q_3: First Quartile – Median– Third quartiles, ***: p<.001, **: p<.010, *: p<.05, r^2: effect size. item01: "The course content addressed my educational needs", item02: "The course content gave me some cause for reflection about my activity", item03: "The course content gave me effective starting points for planning my pedagogical activities", item04: "The course content is interesting and motivating for my professional activity").

	Organizational Q1-mdn -Q3	Psycho-relational Q1-mdn -Q3	Methodological Q1-mdn -Q3	Technological Q1-mdn -Q3	χ 2	r
Item01	4-5-5	4.75-5-5	4-5-5	4-5-5	22.32***	.28
Item02	5-5-5	4-5-5	4-5-5	4-5-5	28,60***	.32
Item03	4-5-5	4.75-5-5	4-5-5	4-5-5	15,06**	.23
Item04	4-5-5	5-5-5	4-5-5	4-5-5	21,37***	.28

Table 5. Friedman results for the satisfaction level within the four course areas.

The Friedman omnibus test highlighted significant differences in the level of satisfaction within the various

[2] r effect size guidelines: r<.10 negligible, .10 < r < .30 small, .30 < r < .50 medium, r>.50 large. All the effect sizes reported in the paper refer to these guidelines.

course areas. A moderate effect size was observed exclusively for the course's capacity to foster teacher reflection (Item02), while all the other effect sizes were small.

Regarding the course's capacity to address the teachers' educational needs, post-hoc tests showed that the psycho-relational area was rated as more satisfying than all the others (methodological: $z = 13.19$, $p < .001$, $r = .78$, technological: $z = 18.36$, $p < .001$, $r = 1.08$, organizational: $z = 3.62$, $p < .001$, $r = .21$). The organizational area, in turn, was rated as more satisfying than the methodological ($z = 9.56$, $p < .001$, $r = .56$) and technological areas ($z = 14.74$, $p < .001$, $r = .87$).

The organizational area was also more satisfying than the others with respect to the course's capacity to foster reflection (methodological: $z = 7.81$, $p < .001$, $r = .46$, psycho-relational: $z = 4.31$, $p < .001$, $r = .25$ technological: 22.35, $p < .001$, $r = 1.32$). For reflection, all the areas were rated as more satisfying than the technological one (methodological: $z = 14.55$, $p < .001$, $r = .86$ psycho-relational: $z = 18.05$, $p < .001$, $r = 1.06$).

The course was rated as satisfying in its capacity to provide effective starting points. Here, the psycho-relational area was significantly more satisfying than all the other areas except the contextual one (methodological: $z = 7.71$, $p < .001$, $r = .45$; technological: $z = 16.70$, $p < .001$, $r = .98$). Furthermore, the methodological ($z = 8.88$, $p < .001$, $r = .53$) and institutional areas ($z = 7.19$, $p < .001$, $r = .42$) proved to be more satisfying than the technological one.

Regarding interest and motivation generated by course contents, the only significant difference in satisfaction levels regarded the technological area. All the other areas returned higher levels (methodological $z = 14.61$, $p < .001$, $r = .86$, institutional: $z = 16.20$, $p < .001$, $r = .95$, psycho-relational: $z = 18.06$, $p < .001$, $r = 1.06$).

5.3. *Usability of the online course*

Teachers' use of and satisfaction with the course's technical functions are reported below in Table 6 (ns: non-significant for $\alpha = .05$, Q_1: first quartiles; mdn: observed median; Q_3: third quartiles).

	Q1-mdn-Q3	p
Content presentation modality is effective	4-5-5	<.001
The course is easy to access from a computer	4-5-5	<.001
The course is easy to access from a mobile device	3-5-5	n.s.
The possibility to access further contents facilitated personal customization of the course	4-5-5	<.001
The possibility to consult contents both online and offline facilitated course use	5-5-5	<.001
The course's organization in modules and submodules facilitated personal customization of the course	4-5-5	<.001
The absence of time constraints fostered participation	5-5-5	<.001
The absence of time constraints facilitated the learning experience	5-5-5	<.001
The absence of time constraints facilitated self-regulation in pursuing training goals	5-5-5	<.001
The evaluation tests are suitable for assessing the achievement of training goals	4-5-5	<.001
The difficulty level of the tests made for effective evaluation of personal learning achievement	4-5-5	<.001
Feedback about mistakes fostered a review of personal learning	4-5-5	<.001
Earning badges boosted use of the course	4-5-5	<.001

Table 6. Results for the one-sample Wilcoxon test for course usability, expected median = 4.

With the sole exception of accessibility via mobile device, satisfaction in all of the course usability criteria was higher than expected. That notwithstanding, the observed median of satisfaction for usability via mobile device was still quite high. These results are consistent with teachers' comments reported in the open answers at the end of the questionnaire. The main strong points they highlighted were the absence of time constraints, the opportunity to combine course attendance with their individual work schedule, autonomy in using the course, ease of use, and the possibility to access course materials offline.

6. DISCUSSION

The present study analysed the teachers' satisfaction with the course in order to verify its soundness as it was the first training action related to the DOCC model. Results indicate overall appreciation of the online course among participating hospital teachers, who also perceived it as effective. The course content area that best addresses teachers' training needs and provides effective starting points for planning pedagogical activities is the psycho-relational area. This area focuses on the psychological and relational aspects related to both student illness and the management of job-related stress. These contents appropriately address the training needs of teachers operating in a complex and sensitive context without professional support.

The course contents most highly appreciated for their capacity to foster reflection were those related to the organizational area. It can be assumed that these contents helped teachers acquire knowledge about their institutional roles in relation to the rules and routines of the hospital environment.

In general, the teachers seem to be less satisfied with the contents of the technological area. Although no further investigation of this finding was conducted, some hypotheses can be made based on what teachers reported in the open answers. Some complained that the approach in this area was overly theoretical; they would have preferred active and practical tutorials. Actually, tutorials and examples of use were provided in the repository of optional supplementary materials. However, it seems that only a few teachers accessed these; indeed, only 6.52% of the more than 600 teachers who joined the OC actually used any of the supplementary materials.

The low satisfaction level reported for the methodological and technological areas points to the need for further training based on imitative and tutorial-style interaction. This could involve knowledge sharing among peers (SK), an aspect foreseen in the DOCC model but not implemented in the course.

Usability characteristic of the OC that were greatly appreciated by the teachers included ease of access to the main contents and the supplementary materials, the opportunity to earn badges, and the possibility to take self-assessment tests. Other aspects that generated a high level of satisfaction among the teachers in our sample were the absence of time constraints and the possibility to access course contents offline. The absence of time constraints grants teachers the possibility to balance course attendance with their teaching duties. Indeed, the lack of time for learning how to teach with technologies is a factor impeding ICT integration into pedagogical activities (Bingimlas, 2009; Inan & Lowther, 2010; Unal & Ozturk, 2012). Furthermore, open and offline access to course materials is of particular importance in dealing with the fluctuating and somewhat confusing environment in which hospital teachers work.

7. CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

Hospital teachers operate in a complex environment that differs from the traditional school setting (Hopkins, Green, Henry, Edwards, & Wong, 2014; Massaglia, 2008; Shaw & Brown, 2011). This requires special competences in order to cope with professional challenges and implement effective educational actions (Capurso & Vecchini, 2010). Despite this, there are no examples in the literature about training paths specifically dedicated to teaching in hospital schools.

These considerations underpinned the implementation of a dynamic online learning model (DOCC) designed to support the development of competences specific to hospital schooling. The first preparatory step in the teachers' professional training was the development of the OC.
The positive response to this wholly online training path confirms that the OC is a suitable strategy for the in-service training of hospital teachers. The overall positive evaluation of the OC suggests that the preparatory analysis of training needs (Benigno et al., 2017) was accurate and that the path adapted well to the teachers' professional requirements, with a lack of temporal constraints. These factors can be considered as key for facilitating teachers' initial and immediate familiarization with hospital school. Implementation of the course represents a first and important step in increasing the confidence of teachers to provide effective education for hospitalized children.
Even though the OC proved to be an effective environment for knowledge acquisition and a significant support for reflection about hospital school teaching, improving teachers' professional development in such a complex context cannot be delegated to the individual teacher's responsibility or limited to participation in a single training course. In this light, the development of a hospital teachers' professional Community of Practice (CoP) could play a strategic role in various ways: by fostering a prosocial attitude that heightens teachers' willingness to share useful resources and solve each other's problems, both emotionally and instrumentally; and also by helping them to obtain potential resources and reliable support (Tseng & Kuo, 2014). Moreover, implementation of the other steps foreseen in the DOCC model should be strongly oriented towards the online development of social relationships among teachers.
One of the major limitations of this study is that completion of the satisfaction questionnaire was not a mandatory requirement. As a result, only the opinions of a limited number of teachers attending the course was collected. Having the opinions of all the participants would have led to better understanding of overall satisfaction and of the strong and weak points within the course.

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APPENDIX A

Module 1 Hospital School context	Module 2 The student's condition
Hospital School: Aims and Organization	Pathologies
Management of the hospitalized student	The student's physical and psychological condition
Cooperation between different professions	The family's psychological condition
Hygiene and protocols	
Module 3 Relational dynamics	Module 4 Schooling in hospital
The teacher's relationship system	Institutional skills
Burnout	Learning process
Learning to communicate	Organizational aspects
	Methodological aspects
Module 5 Introduction to Educational Technologies	Module 6 Learning with technologies: individual level
Emergence and development of educational technologies	Learning based on the individual use of available resources
Educational technologies in the hospital school	Learning based on the individual creation of artifacts
Module 7 Learning with technologies: collaborative approach	Module 8 Management of teaching processes
Learning based on the collaborative use of available resources	Resources supporting pedagogical activities
Learning based on the collaborative creation of artifacts	Resources supporting social interaction processes
Learning centred on resource sharing	
Module 9 Pedagogical methodologies mediated by technologies	Module 10 Design of pedagogical activities
Methodologies supporting individual teaching	A methodological approach to design
Methodologies supporting collaborative teaching	Pedagogical experiences
Module 11 Teachers' lifelong learning	
From formal to informal learning	