

# Supporting the Online Tutoring Process through a Personalized Learning Environment

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## Abstract

*Introduction: This paper deals with the key elements that should be included in a personalized learning environment (PLE) to assist tutors in the effective development of online tutoring.*

*Materials and methods: Key elements are defined from a quality management perspective and applied within the context of an action-research study, to develop a tutoring model supported on a personalized learning environment for tutors. PLE includes the training and assessment of the tutoring process based on management quality indicators (planning, performance and results of tutoring).*

*Results: The paper also shows the results of the partial implementation of PLE in a training course for physicians in the field of nephrology. The average among all indicators (8.5) is over the minimum (7), just like the global indicator for all tutors. The tasks with the best indicators are progress monitoring, with 9.9 points, and the evaluation of results, with 8.9 points.*

*Conclusions: According to these results it may be concluded that PLE's impact on tutoring quality is positive and that it is necessary to implement the full model to obtain more information and establish cause-effect relations between the involved variables.*

*Keywords: Personalized learning environment, tutoring, quality management, quality indicators*

## 1. Introduction

Students, teachers and contents are the main players in the teaching-learning process (Ally, 2004). In the traditional learning environment, contents are generated, taught and evaluated by teachers in a unidirectional fashion. This type of learning is centered on the teacher's experience in a specific area of knowledge. With the boom in the use of information and communication technologies (ICT) in the teaching-learning process, the paradigm stands out because it is centered on the student and underscores the role of the learning environment. The underlying idea in personalized learning environment (PLE) is to support students to take control and manage their own learning (Attwell G. 2007).

Another assumption that could be inferred from the above is that ICTs pose major challenges, because the aim is not translating on-site teaching methods and strategies to electronic environment. Ubiquity, interactive potential and immediate nature of ICTs lead online teachers to be different from and more demanding than on-site teachers (Tomei, 2006). Teachers thus face the challenge of knowing, using and managing communication and interactive environment tools.

A systematic search for papers on PLE through the web of knowledge shows that most works reported over recent years are centered on presenting the experience of creating this kind of learning space and on its impact on students. However, there is not enough empirical evidence of the impact of those environments on the tutoring process. This paper describes an *ad hoc* tutoring model created for a distance learning environment in a community of nephrologists (e-fren) and the PLE defined to support tutors to manage tutoring process in an efficient manner.

## 2. Description of the e-fren learning environment

The e-fren learning environment is addressed to Spanish and Spanish-American specialists and interns in nephrology. The environment emerges as a response to the need to integrate knowledge of expert nephrologists in Spain and convey it to new generations in a structured fashion. To attain this goal, a course was designed that is asynchronously transmitted on the Internet under tutoring of the expert contents author. e-fren consists of 4 modules with an average of 10 topics each, which will be taught over 2 years. The instructional design allocates 15 days to each subject, during which the tutor performs a series of activities to support students' learning. During this 15-day period, students must devote 9 hours to learning activities. Figure 1 shows the course's structure, the students' activities and their dedication.

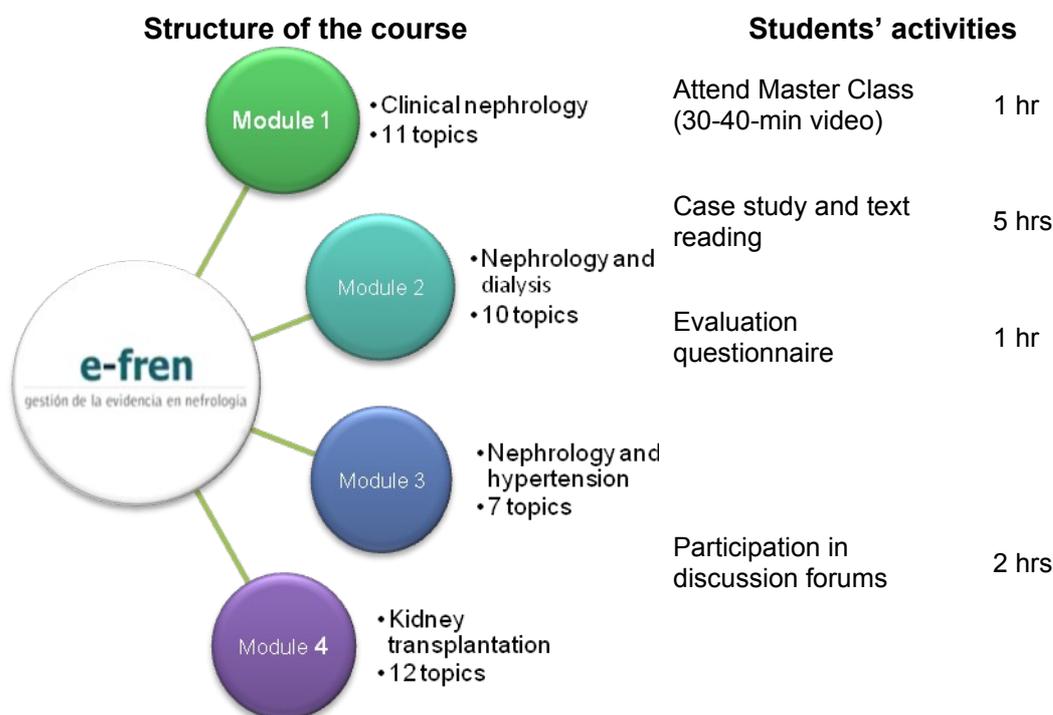


Figure 1. e-fren environment structure

### 3. Description of the tutoring model used in e-fren

The model that has been used in this environment includes tutoring activities and tools to develop said activities, as well as instruments to measure effectiveness in the performance of activities and the use of tools. People involved in e-fren tutoring are: (1) tutors-authors, as content experts that possess on-site teaching experience, and (2) the Administration, as a support in progress follow-up tasks and in the consultation on technical aspects of the learning environment. Figure 2 represents the relation among these persons and the tasks each one of them performs.

Tutors plan tutoring activities to assure their presence at each one of them. As experts in the topic, tutors are responsible for guiding discussions on the topic and answering questions related to contents, such as: case study, scientific papers, books, clinical practice, etc. Furthermore, they evaluate the answer to a determined clinical case and have a follow-up tool that allows them to detect students' progress. In coordination with the administration, tutors communicate with students through messages on the forum or via email.

The administration clarifies doubts concerning access to and browsing through the environment and carries the most significant weight in relation to follow-up and coordination of activities so as to guarantee that they are completed within the set deadlines. In addition, the administration, through a computer tool especially designed for this purpose, estimates indicators that evaluate the tutor's tutoring management.

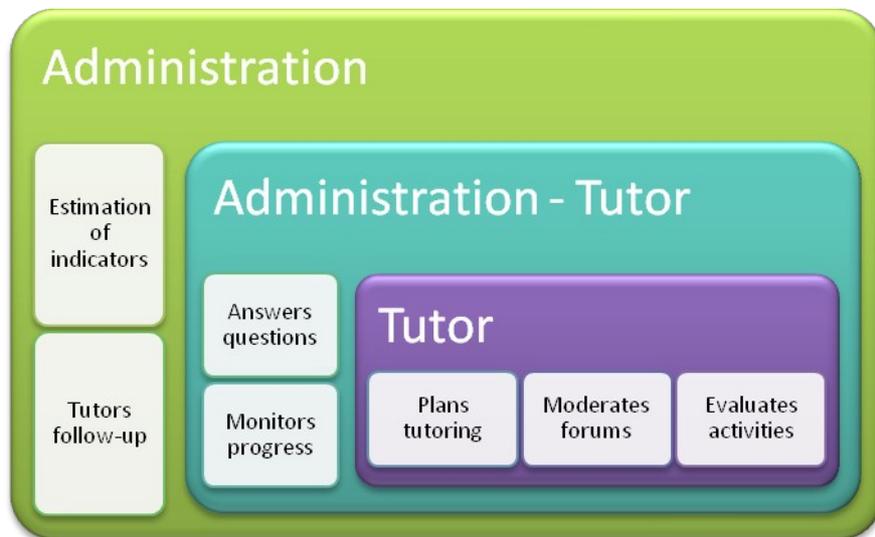


Figure 2. e-fren tutoring model

Elements of the e-fren tutoring model are described below.

### 3.1 Tutoring activities

Tutoring activities can be grouped into three stages: Preparation, Performance and Results (Institute of IT Training, 2007; D. Hilty et al., 2006; D. Clark, 2006). Figure 3 shows activities associated with each stage of the e-fren environment.



Figure 3. e-fren environment tutoring activities

Variables representative of the process, used to measure effectiveness (attainment of concrete results) and efficiency (results achieved over a concrete period of time) are defined in each stage.

### 3.2 Tutoring Tools

With regard to the preparation stage, the following variables are defined:

- Tutoring estimated time – in hours;
- Open case grade average (0-10);
- Final grade average (0-10); and
- Compliance with assignments (% of students that deliver the open case within the two weeks corresponding to the subject).

Furthermore, it is interesting to gather information related to the number of tutoring tasks and tools that the tutor knows and manages. Data will be collected through an e-fren environment page. See Figure 4.

e-fren | gestión de la evidencia en nefrología mi inicio | home | novedades | agenda | faqs | finalizar sesión

participantes | temario | actividades | bibliografía | progreso | gestión

actividades > Módulo 1: Nefrología Clínica > Tema I: Plan de tutoría

### Tema 1. Plan de tutoría

	Inicio	Finalización	
Cronograma tema	dd-mm-aaaa	dd-mm-aaaa	
Nº Estudiantes	N		Para ver los expedientes haga clic: <a href="#">aquí</a>
Horario Consulta	Día(s) Lu-Ma-Ju	Hora 16:00-17:00	Fije una franja horaria para mostrarla en los Foros
Tiempo de tutoría-horas	2		Tiempo que estima dedicar a la tutoría en horas
Notas Caso Abierto (0-10)	100		Promedio de notas del caso abierto de todos los estudiantes en el tema
Nota Final (0-10)	10		Promedio de notas final de todos los estudiantes en el tema
Cumplimiento de Tareas %	70		Porcentaje de alumnos que entregan las respuestas del caso abierto dentro de las dos semanas del tema
Abandono %	10		Porcentaje de alumnos que no inicia o no terminan el tema
Conozco todas herramientas para la tutoría del curso e-fren			
E-mail <input type="checkbox"/> Foros <input type="checkbox"/> Progreso <input type="checkbox"/> Plan tutoría <input type="checkbox"/>			
Conozco las actividades de tutoría			
Planificación <input type="checkbox"/> Moderar Foros <input type="checkbox"/> Responder Consultas <input type="checkbox"/> Monitorizar avances <input type="checkbox"/> Evaluar Caso Abierto <input type="checkbox"/>			

Guardar datos

requerimientos:

acreditación:

soporte:

desarrollo:

Figure 4. Tutoring planning page

Concerning the performance stage, some authors (McPherson & Nunes, 2008/2006; Gerrot et al., 2007; Van Berkel & Dolmans, 2006; Barker, 2002; Bennet & Marsh, 2002; Goodyear et al., 2001) agree on the significance of training tutors to effectively and efficiently perform tutoring. e-fren offers a series of elements to cover this important stage of tutoring management. Before starting the course, tutors receive a guide via email, which details the scope of tutoring activities that should be developed during the course. This guide explains in a detailed and personalized way how to access the e-fren environment, tutoring activities, tools to perform these activities and examples and tips for good tutoring practices. In addition, contents of the guide are detailed and more thoroughly described at the website of the course by means of a task and tool page (see Figure 5).

**e-fren** | gestión de la evidencia en nefrología

mi inicio | home | novedades | agenda | faqs | finalizar sesión

participantes | temario | actividades | bibliografía | progreso | gestión

actividades > Módulo 1: Nefrología Clínica > Tema 1: Actividades de tutoría

### Tema 1. Actividades de tutoría

Actividad(es) de tutoría

documento(s)	<b>Plan de tutoría</b>	✘
	El tutor planifica la tutoría en términos de porcentajes de aprendizajes, de cumplimiento de cursos, promedio de notas, etc.	n
documento(s)	<b>Moderar foros</b>	✘
	El foro de debate es una de las herramientas más utilizadas y versátiles para discutir y profundizar sobre un tema. Es importante moderar de manera adecuada un foro para alcanzar los objetivos propuestos.	n
documento(s)	<b>Dar consultas/Responder preguntas</b>	✘
	El proceso de consultas y respuesta de preguntas está ligado a la pertinencia de los contenidos con los contenidos del curso. Es importante mantener el enfoque sobre el tema consultado/prepreguntado.	n
documento(s)	<b>Monitoreo de Avances</b>	✘
	El seguimiento de las actividades realizadas por los estudiantes asegura que se cumplan los hitos dentro del tiempo programado.	n
documento(s)	<b>Evaluar actividades</b>	✘
	Se califican las respuestas y la participación del estudiante en el foro del caso abierto con una nota entre 0 y 10.	n

Herramientas de tutoría

video(s)	<b>Foro de debate</b>	✘
video(s)	<b>Foro de Consulta</b>	✘
video(s)	<b>Correo electrónico</b>	✘
video(s)	<b>Progreso Estudiantes/Tutores</b>	✘
video(s)	<b>Plan de tutoría</b>	✘

requerimientos

acreditación

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Figure 5. Tutoring activities page

This page describes each tutoring activity and is linked to a document that explains the activity in detail and how to take the most advantage of its potential through practical tips and examples. This page also contains videos that show how to access and use tools supporting tutoring activities: forums, email, progress page, and tutoring plan. This page is currently being implemented.

The results stage represents the quantitative verification of the attainment of the academic objectives in terms of grade average and terminal efficiency. Each tutoring activity is evaluated through a management indicator that is calculated based on variables related to each activity. The values of the variables are established within a minimum and maximum quality range.

Terminal efficiency refers to the number of students that complete the topic within the deadline set for it (15 days). Within the higher-education context, a terminal efficiency value over 60% is considered a high index (Univ. Autónoma de Tabasco, 2005). In the case of e-fren, the average terminal efficiency of each completed topic is calculated and used as the minimum quality level of the indicator for the next topic. A reference value of 60% is taken for the first topic.

The fulfillment of tutoring activities and the evaluation of each indicator is shown to the tutor through a progress page (Figure 6). This page is currently being implemented.

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progreso > Módulo 1: Nefrología Clínica > Tema 1: Actividades de tutoría

**Tema 1. Actividades de tutoría**

Actividades	Planificación	Moderar foros	Consultas	Monitoreo de Avances	Evaluación actividades	Resultados
Instructivos actividades y herramientas	[0] x	[0] x	[0] x	[0] x	[0] x	----
Conocimiento de tareas/herramientas	[0] x	----	----	----	----	----
Plan de tutoría	[0] x	----	----	----	----	----
Mensaje de inicio	----	[0] x	[0] x	----	----	----
Participación estudiantes foro	----	[0] x	[0] x	----	----	----
Participación tutor foro	----	[0] x	[0] x	----	----	----
Tiempo de respuesta	----	[0] x	[0] x	----	----	----
Visitas página de progreso	----	----	----	[0] x	----	----
Participación estudiantes en actividades del curso	----	----	----	[0] x	----	----
Promedio notas cuestionario	----	----	----	----	[0] x	----
Promedio notas caso para resolver	----	----	----	----	[0] x	----
Eficiencia terminal	----	----	----	----	----	[0]
Promedio evaluación final	----	----	----	----	----	[0]
Valor Indicador: $I_1 + I_2 + I_3$	$I_1$	$I_2$			$I_3$	

Requerimientos: Get ADOBE® READER®, Get ADOBE® FLASH® PLAYER

acreditación: CGCOM, UZEMES, SEAFORMIC

soporte: Sociedad Española de Nefrología

desarrollo: esda, SICTA, laboratorio de aplicaciones multimedia

Figure 6. Tutor progress page

Based on the values of the variables and the minimum and maximum quality range, the system computes management indicators for each tutoring stage: preparation, performance and results. Furthermore, according to the impact of the variable on the activity performance, weights are assigned in the indicator calculation. The global management indicator of tutoring results from the average among indicators for each stage.

#### 4. Personalizing Elements

Tools designed in the e-fren environment to support tutors in the performance of their tasks contain personal elements that allow tutors to adjust and select the most appropriate options according to their individual needs. Furthermore, each tutor was provided with guides for the creation of contents. Furthermore, contents were managed through a website leader in project management and collaboration tools (Basecamp). Each tutor is assigned specific tasks that have to be developed to prepare the contents of the course and the respective delivery dates. Tutors could manage their respective list of tasks by completing the assigned ones and adding the ones they considered convenient to supplement contents. File uploading and messaging tools were very useful to manage the about 160 pieces of content of the environment.

Another personalized element is a final report that was delivered to each tutor and contained a summary of the performance of each one of them. The report also contains the numeric results of each one of the tutoring activities, as compared with

the average result of the group of tutors in the module, as well as the results of the opinion survey among the students concerning the quantity and quality of contents and the tutoring quality in terms of quality perception of the tutor's answers, response time and the global evaluation of the tutor's performance. Figure 7 shows part of the tutor's report.

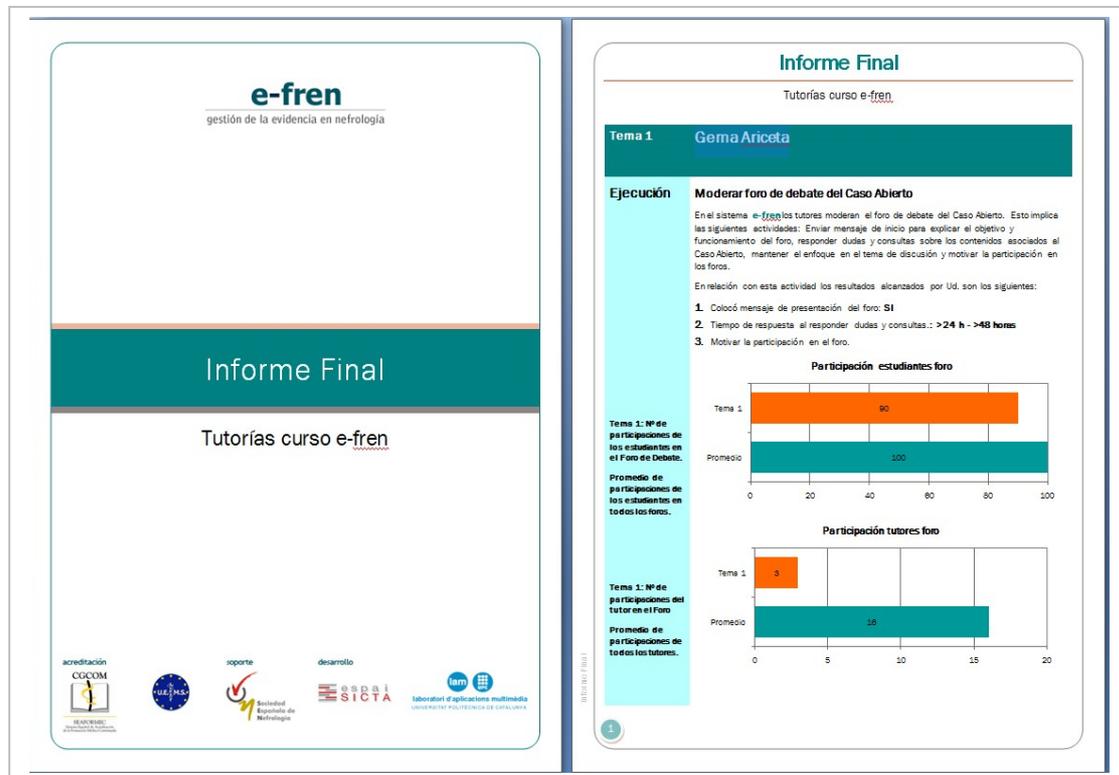


Figure 7. Tutoring performance report in the e-fren environment

## 5. Results

In the partial implementation of the model, only indicators associated with the Performance and Results stages were computed, because data collection tools to estimate the indicator for the tutoring Preparation stage has not been completed. The quality range for all tasks in the Performance and Results stage is (minimum) 7 points and (maximum) 10 points. Each one of the variables used to calculate indicators has its own quality range between 7 and 10 as minimum and maximum value, respectively.

Table 1 shows the values of management indicators for tutors in module 1 of the e-fren environment. According to this table, the average for all indicators is higher than the minimum, just like the global indicator for all tutors. Tasks with the best average in terms of indicators are progress monitoring, with 9.9 points, and result evaluation, with 8.9 points. Consultation management was the worst in terms of evaluation, reaching less than the quality minimum value in three different opportunities.

Table 1 Tutoring management indicators

	Performance				Results	I <sub>1</sub>	I <sub>2</sub>	GIT (*)
	Moderate forums	Answer questions	Monitor progress	Evaluate activities				
Tutor 1	8.7	9.0	10.0	8.5	8.0	9.1	8.0	8.8
Tutor 2	9.6	9.4	10.0	8.8	8.2	9.6	8.2	9.2
Tutor 3	9.8	8.3	9.3	8.8	7.6	9.4	7.6	8.9
Tutor 4	9.7	6.0	10.0	8.9	7.8	9.3	7.8	8.9
Tutor 5	9.4	9.4	10.0	8.6	5.7	9.5	5.7	8.4
Tutor 6	9.3	9.6	9.8	9.6	7.0	9.5	7.0	8.8
Tutor 7	6.8	6.3	10.0	8.9	6.5	7.9	6.5	7.5
Tutor 8	6.4	5.2	10.0	9.1	7.4	7.6	7.4	7.6
Tutor 9	6.0	3.2	10.0	8.7	8.8	7.2	8.8	7.7
Tutor 10	9.3	9.1	10.0	8.5	7.5	9.4	7.5	8.8
Tutor 11	9.3	9.1	10.0	9.3	8.2	9.5	8.2	9.1
<b>Average</b>	<b>8.6</b>	<b>7.7</b>	<b>9.9</b>	<b>8.9</b>	<b>7.5</b>	<b>8.9</b>	<b>7.5</b>	<b>8.5</b>
<b>Std. Dev.</b>	<b>1.4</b>	<b>2.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.6</b>

(\*)GIT: Global Indicator of Tutoring

## 6. Conclusions

The model proposed has a positive impact on tutoring management and can be improved with the incorporation of additional support tools.

PLE key elements to support tutoring include personalized tools and activities that are adapted to each tutor's needs. The need to strengthen support in consultation management in order to improve this indicator in future editions has been observed.

Even though the model has been implemented only partially, the results obtained encourage us to complete the implementation of tools for planning, description of activities, operation of tools and tutoring progress. In fact, in the action-research context, the idea is to improve the process through continuous and systematic research. In this case, we have made a number of questions related to tutoring from the perspective of quality management. We are interested in knowing the relation between management efficiency and students' results, terminal efficiency, tutoring quality perception and support tools.

Communication tools between tutors are planned to be included to supplement the model, since this would create a space where tutors can share their tutoring experience, as well as contents, clinical experiences and contacts for future works. The aim is to promote a community of nephrologists that find in the e-fren environment an opportunity to learn, research and work collaboratively.

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