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Author(s):	Dieter Jungmann, Rico Böhme
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PROJECT OFFICER:

Inga Bakane

Project Co-ordinator

<i>Company name</i>	<i>:Robotron Datenbank-Software GmbH</i>
<i>Name of representative</i>	<i>:Prof. Dr. Dieter Jungmann</i>
<i>Address</i>	<i>:Stuttgarter Str. 29</i>
<i>Phone number</i>	<i>:+49-351-4021-650</i>
<i>Fax number</i>	<i>:+49-351-4021-696</i>
<i>E-mail</i>	<i>:dieter.jungmann@robotron.de</i>
<i>Project WEB site address</i>	<i>:www.ennics.org</i>

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1 Executive Summary

Sleep complaints are a major burden for aged, disabled, children and working adults. Their negative impact upon mental, psychological and body functions and their repercussions upon the quality of individual daily life justify the efforts in sleep medicine, education and training.

ENN-ICS – European Neurologic Network - Interactive Communication System is an e-health project integrating advanced e-learning and e-publishing technologies with the goal to offer a new multilingual, regional and multinational service in the field of Sleep disorders.

ENN-ICS offers different services in an integrated platform adapted to the needs of health care professional in the medical field sleep disorder. The platform enables the access to tools and a portal for developing and using learning content anywhere and anytime.

The ENN-ICS platform is based on ICT services and software tools developed some years before. Therefore they have been upgraded and adapted to the newest standards, classifications and knowledge in the healthcare environment.

The validation project started with a market investigation and the production of a draft business model and – after one year – of a draft business plan. At the same time a market and competitive analysis was performed leading to the identification of market segments potentially interested in ENN-ICS and in the assessment of a pricing policy for ENN-ICS tools and services. The results of this investigation indicated that a market for ENN-ICS exists and that the provided tools and services address a real need of the targeted users and customers.

The market response was assessed by different validation users in the ENN-ICS partner countries. About 50 professionals and students were involved in testing the services and answering the market validation questionnaire.

The project was finished with a joint event: ENN-ICS workshop and the opening of the 3rd Master Degree Course at FML in Lisbon which at the same time was the kick-off for the first deployment. All the developed services will be used for the Master Degree Course.

2 ENN-ICS – Introduction

The ENN-ICS project, addressing e-health and e-learning, aims at launching an innovative online learning service supporting medical professionals in a lifelong learning process. The ENN-ICS service is a viable internet based health care service permitting healthcare professionals to remotely assess.

ENN-ICS project overview:

ENN-ICS project duration: March 2005 – March 2007

Project type: Market validation, eTEN

Project objectives:

- Validation of existing, adapted and localized prototypes
- offering e-learning dedicated services
- Market Potential evaluation

Focus of the pilots:

- General Practitioners
- Health Professionals
- Students

Project costs: 2,018,211 mil € (EC contribution: 0.999 mil €)

More info: www.ennics.org

3 The ENN-ICS Consortium

The following partners are within the ENN-ICS consortium:

1. Coordinator: Robotron Datenbank-Software GmbH
2. Centro de Electroencefalografia e Neurofisiologia Clinica, LDA
3. Philipps-University Marburg
4. Dresden University of Technology
5. Atos– Atos Origin Sociedad Anonima Española
6. Karolinska University Hospital
7. Faculdade de Medicina de Lisboa
8. FUTUREtec-Gesellschaft für angewandte Informatik mbH

The consortium has a long-standing cooperation for the last decade. ENN-ICS consortium has his roots in the successful collaboration between 1996-2000 (ENN- HC 1014), from which the ENN Society emerged. It represents the European consensual, updated, scientific knowledge. The partners CENC, Marburg, FML and Ftec stem from the ENN consortium.

ENN-ICS also integrates the results of another European Project: PROMIS (Ten Telecom TT26402) where the partners RDS and Ftec have successfully worked together.

ATOS has managed many successful EU-projects in the last years.

Last but not least, Karolinska University Hospital (KUS) has joined the consortium to strengthen the expertise in treatment of sleep disordered patients and establishing ENN-ICS Centre in the Scandinavian region.

Atos and Ftec are collaborating in the IST RTD project INFRAWEBs partially funded by the EC in development of an Intelligent Framework for Generating Open Development Platforms for Web-Services.

Each partner has strong experience and proven curricula in the corresponding fields. The individual roles are well defined and partner’s know-how is tailored to their role in the project:

Coordinator



Technology Provider



Content Provider



Marketing Specialists



Business Specialist



Consortium and Exploitation Agreements for the common deployment are signed.

Many employees of the project partners were involved and contributed to the final success of the project:

1. Robotron Datenbank-Software GmbH, Dresden, Germany; partner:
Coordinator: Prof. Dr. Dieter Jungmann: dieter.jungmann@robotron.de
Team leader: Lars Geldner
Architect and Java Developer: Lars Geldner
Portal developer: Kathrin Struck
Media Designer: Mandy Splett
Business and Deployment plan: Doreen Paulick
2. Centro de Electroencefalografia e Neurofisiologia Clinica, LDA, partner
Team leader: Prof. Dr. Teresa Paiva: teresapaiva@netcabo.pt
Antonia
3. Philipps-University Marburg; partner
Team leader: Prof. Dr. Thomas Penzel: penzel@mail.uni-marburg.de
eLecture developer: Brigitte Knobel
4. Dresden University of Technology, Germany; partner
Team leader: Prof. Eric Schoop: eric.schoop@tu-dresden.de
e-learning specialist: Rico Böhme
Authoring Tool customization: Christian Kürth
5. Atos– Atos Origin Sociedad Anonima Española; partner
Team leader: Blanca Jordan
LMS specialist: Anchel Saez Lejo
Business specialist: David Salama
6. Karolinska University Hospital; partner
Team leader: Dr. Heikki Teriö: heikki.teri@karolinska.se
Market specialist: Rustam Nabiew
7. Faculdade de Medicina de Lisboa; partner
Team leader: Dr. David Xavier
8. FUTUREtec-Gesellschaft für angewandte Informatik mbH; member
Team leader, marketink specialist: Dr. Caterina Rehm-Berbenni: crehm@futuretec-gmbh.de
Webside design: Andè Druta
9. art & weise GmbH, subcontractor of University Marburg
Matthias Kirchhoff

4 Project objectives

ENN-ICS provides an e-learning service supporting the European wide high level education of students and the continuous medical education (CME) of practitioners in the field of Sleep and Sleep Medicine.

The system providing multilingual services is based on previously developed software and medical content customised to be adapted to the needs of health professionals. Because of the long period between the previous EU and national projects and the start of ENN-ICS much effort was necessary to fulfil the high requirements of the medical standards DISCERN, HON, GMDS and QO18/456.

The main scope of the project was to implement a central system provided in two locations Robotron Dresden and ATOS Madrid to demonstrate and validate the services in Portugal, Germany and Sweden. Based on the English version some validation users came from Spain too.

With the questionnaire integrated into the ENN-ICS portal the users were asked to evaluate the content, the usability and the market potential of ENN-ICS services. The validation questionnaires were filled out by 48 professionals 133 times completely and 14 times partly.

As an important issue the business plan with promising forecasts for the deployment of ENN-ICS in Europe was considered. It was developed in three phases and comprises the final deployment plan with the appendix Exploitation Agreement. The first business case using ENN-ICS products will be the Master Degree Course on Sleep Sciences which is initiated by the partners FML and CENC who will use the products from the beginning of the 3rd Course in March 2007. The other partners will support this pilot business case.

5 Service description and users

5.1 Description of the service

In this section we provide a description of ENN-ICS main products and services to be offered to the two main categories of users.

First group are the end-users, second group are the authors and editors.

5.1.1 Services for End-users

End-users are defined as general practitioners, nurses, medical students and interested patients.

These users have the goal to get new knowledge and/or to get new information. We divide between these two kinds, because there is a difference. To get new knowledge means to learn the e-learning courses embedded into a modern blended learning environment. Mainly medical students or general practitioners will do that. To get new information means to get more quickly the necessary information the user need. This is interesting mainly for interested patients.

For end-user there are several services defined:

Online courses (in two different versions: professional versions, trial versions),

Offline materials (CD-ROM, DVD, Books, Booklets

ENN-ICS portal (general information on sleep and sleep related problems),

E-Validation.

1) Online courses:

ENN-ICS offers on-line courses to professionals willing to keep updated their knowledge about sleep disorders. ENN-ICS courses are created and supervised by experts in the field. Courses are offered in different languages, and they display didactical framework with the following presentation to the users:

- Learning Goals
Explain the goals of each e-lection at the beginning of an e-lection.
- Pre-knowledge
What prior knowledge is necessary to learn and understand the e-lection.
- Problem
A learner gets a problem at the beginning. It's mostly presented with a video. A physician speaks to the learners and explains the tasks. At this moment the learner can't solve the problem. At the end of the e-lection he should be able to solve the problem). This is presented whenever needed. Alternatively to the problem an objective approach with clear targets will be presented with practical applications to be solved in the end (objective oriented learning.
- Summary
It's a summary of the e-lection.

- Literature
Overview about all used literature references.
- Self tests
Test for learners about the learned topics within the e-lections.

The current offer of courses includes the following titles:

1. Basics of chronobiology
2. Sleep physiology
3. Hypersomnia and daytime sleepiness
4. The international classification of sleep disorders
5. Insomnia
6. Sleep related breathing disorders
7. Hypersomnias of Central Origin
8. Parasomnias
9. Sleep laboratory
10. Sleep hygiene
11. Sleep in children

The following titles are currently under construction:

- Sleep in the Elderly,
- Sleep related movement disorders
- Circadian disorders
- Isolated Symptoms

At the moment, ENN-ICS consortium is offering the “Insomnia” course and the “Sleep in children” course as a free trial for their users, in order to allow them to try the system, and for validation purposes. The current offer will be increased with new titles in the future. For further details about the courses and testing please refer to ENN-ICS e-lections overview section in the ENN-ICS web site.

(<http://www.ennics.org/webcms/ennics/live/lections.html>).

2) *Online materials*

The products that will come out from ENN-ICS project are aimed to complete the offer to professionals and students, willing to improve their knowledge about sleep disorders.

- ***Specialised Books***. Specialised books designed with professionals and students in mind will be published. An example for this kind of products is the *Sleep Portfolio* title that will be published by the ENN-ICS consortium, by the end of the project (update of the

existing volume). A Book on Sleep and Dreaming made in collaboration with CENC, FML and ENNICS will be published in 2007.

- **Booklets.** There will be published Booklets (small books dealing with very concrete topics) for professionals willing to go deeper in the different areas of the sleep disorders field. These booklets will be published in different languages depending on the tackled issue. The creation of these materials will be supported by the ENN-ICS experts’ panel.
- **CDs/DVDs.** ENN-ICS consortium will offer CDs and DVDs containing, among other materials, the Sleep Atlas and the Sleep Tutorial (produced during the ENN project with the corresponding updates). These products will be offered via Internet (and also through the publishers associated to ENN-ICS and its members), and will have a catalogue to inform users of the possible options and offerings.

3) ENN-ICS portal

ENN-ICS web site, is offering to professionals and to the general public the following added value services:

- ***Materials:*** ENN-ICS offers special information and materials related to the sleep field for professionals interested in the area. ENN-ICS offers general information about sleep and sleep disorders to the general public willing to know more about this subject.
- ***Consultation:*** ENN-ICS offers in its portal a forum service for professionals. In this forum professionals may post their questions and other professionals or ENN-ICS’ experts panel may answer them. Later this service could be enhanced to a *Community of experts* where professionals may share knowledge and experiences with other professionals around the world. ENN-ICS offers in its portal a forum service for general public. In this forum users post their questions and ENN-ICS’ experts panel may answer them. Later this service could be enhanced to a *Community of patients* where users have the possibility to share their experiences and questions with other patients suffering from sleep disorders.
- ***Specialised literature in the field:*** ENN-ICS portal offers links and references to relevant materials on the subject, events, publications, etc. All these links are supervised by ENN-ICS’ panel of experts
- ***Glossary:*** ENN-ICS web site offers a glossary in four different languages with the most important terms of the sleep disorders field. This service is maintained and enlarged with new terms by ENN-ICS’ experts panel.

4) E-Validation

The goal pursued with the services offered for validation purposes is to enable users of the ENN-ICS project to quickly and comfortably give feedback on the services they have used. This is both useful to raise customer satisfaction in short term and also, in mid term, to adopt the contents and improve it to ensure long term customer satisfaction.

Validation services consist of two parts: Firstly customers can give feedback to the ENN-ICS project. The second one is about to evaluate the validation results.

The goal of the validation questionnaire is to enable the validation of e-learning courses by those users who have registered for courses. The questions the users are asked about the e-learning courses should adhere to the GMDS criteria catalogue which was especially designed for this type of validation.

The objective of the evaluation service is to evaluate the validation results.

5.1.2 Services for Authors and Editors

These services support authors and editors to create, edit, manage and publish the different kind of services for the end-users, mainly the online materials.

To this group of services belong:

Storyboard

Authoring System

Content Management System

Learning Management System

1) Storyboard

Storyboards are designed to pre-edit materials that are the base for the production of the e-learning-units at some later point of time. A storyboard is a pre-step for the production. For development of the storyboards authors have to know only a simplified structure of the *e-learning-units*. For effective information technical transfer of the contents from the storyboards into the authoring system its necessary to associate the structural design of the storyboard with the final e-learning-structure. The goal of the storyboard is to collect and combine all relevant information for the later production with the authoring system. All contents, instructions etc. have to be written down. Textual content on the one side and multimedia-based components on the other side have to be described and added with notes for the production (i.e. descriptions of animations, drafts of figures etc.). With the help of the storyboard a Non-expert should be able to transfer the contents into the authoring-system. Furthermore for the Media-specialists the storyboard is the template for producing the media objects.

2) Authoring System

For the ENN-ICS project we have chosen the XML Editor XML-Mind (XXE). This application is a validating XML editor featuring a word processor-like view. This existing XML-Editor has been adapted to ENN-ICS functionality and needs. The experts' team has developed new XML schemas and XML packaging that encapsulate the contents that will be used by the Content Management System later. The Technical Auditing process for this is based on the capability of the authoring tool to produce the content in a proper format that may be readable and stored by the Content Management System.

With the Authoring System a technical author can write contents, which will finally be presented to the end-users (learners). The Authoring System itself is a network of decentrally installed client software such that every author has the tool installed on his or her computer. This way authors are given the maximum amount of freedom. They can edit contents wherever they are

even not having access to the internet. The technical author uses the storyboards created by the scientific author and transfers all contents from the storyboard into the Authoring System.

3) Content Management System

In the publishing process the management of the content is an important task that lies in between creating and/or modifying contents and making the contents available to the end-users via the learning management system. To thoroughly manage the content (e.g. taking care of language issues of the learning objects, reuse learning contents) a content management system has been customized.

The basis for the content management system (CMS) is an Oracle database 10g and the Oracle XML DB component. These components can be used for setting up a CMS and offer basic functionality for performant native storage, modularization according to XML schema definitions and check-in and check-out of XML-documents. However, the basic functionality provided by Oracle can not cover for special needs so an extensive customization for the special needs for the ENN-ICS project has been done.

Once the authors finish editing they can upload the contents into the CMS using the interface defined. They also have the possibility to send the contents to an editor first, have the editor make a first quality check and the editor would then check in the contents. When content is being imported into the CMS it is checked for compliance with the XML schema defined. In other words it is checked whether the standard for interoperability is met. If not, the user receives detailed error messages. Otherwise the contents will be stored within the CMS.

To publish the final e-learning-units the editor can initialize the publishing (release) process of the final e-learning-units. He has to decide into which output-format the contents shall be transformed. The publishing process itself is an automatically process, which is integrated in the Content Management System. The Content Management System provides the LMS with a zip file (with the published learning units inside) that is a correctly formatted SCORM package.

4) Learning Management System

After the SCORM archive has been imported into the LMS that SCORM package will be unpacked and translated into a course that can be browsed and executed by a Learning Management System user. That means the online e-learning materials as result of the online service will be presented into the LMS to the end-users.

For the ENN-ICS project was chosen ATENEA LMS created by ATOS as the basis of the LMS. ATENEA covers the whole course life cycle, from the moment a course is uploaded to the system, till the moment the course is closed, passing through: launch course, assign tutors, open registration to trainees, accept registrations, monitor trainees, etc. ATENEA supports the work of different roles in training activities: administrator, manager, tutor and trainee. For all of them, ATENEA manages their data, privileges, communications, etc.

However, the basic functionality provided by ATANEA can not cover for special needs so an extensive customization for the special needs for the ENN-ICS project has been done. The main effort has been put in SCORM 2004 compliance, and mainly in the Run-time for the courses. Another major point was the provision of multilingualism. For that, the user interface now has

internationalization (i18n) support, so that its easy to translate it and produce a new version if a new language is required.

5.2 Users and customers

The potential users and customers that were identified by ENN-ICS consortium at an early stage of the project included a wide group of heterogeneous organizations and institutions. Such a big group has been reduced in the subsequent stages according to the outcomes of further market analysis. Potential customers identified:

- Pharma industry: This group may be the main receptor of the ENN-ICS portfolio. Apart from that at this moment, the consortium is evaluating the possibility of including the sponsorship of a pharma industry to reinforce the sales channels. The services that will be offered to this group are the on-line courses and hardware materials (books and CD/DVDs).
- Publishers: This group is traditionally very important for the learning market. ENN-ICS is planning to reinforce the sales of its services by using printed materials such as books or booklets. This group is the actual receptor of the printed materials.
- Insurance companies: The interest of this potential customer will be mainly focused in the online courses, but they may desire a slight change in the contents that are already being offered (even creating content on demand).
- Medical technical providers: Hardware providers may consider the possibility of offering jointly to their equipments, training programmes for their hardware. Apart from that, the identified potential is to consider them as a direct sales channel for medical staff. Both, online courses and printed materials will be offered to this group.
- Universities and Teaching Institutions: They can use e-learning courses in Post graduate formation, namely in Master Degrees and PhD courses conceived according to Bologna recommendations. As an example the Medical Faculty of Lisbon will incorporate the e-learning courses in the 3rd Edition of the Master Degree in Sleep Medicine.
- Accreditation Institutions and Medical Sleep Societies: They are interested in quality assurance and uniformities across EU countries and therefore they can use validated ENNICS tools to assure such criteria. The European Sleep Research Society is currently developing an accreditation process for Sleep laboratories, Sleep Medicine specialists and Somnologists which will be prosecuted by the National societies in all European countries.
- Medical professionals: It is foreseen to have a minor percentage of medical professionals accessing directly to the courses and materials with no kind of institution/company mediating.

5.3 Overall benefits

Overall benefits of ENNICS services can be expressed as follows:

At Health care level:

To create a still non existing service that will benefit up to one third of the European citizens suffering from high impact and chronic disorders, afflicting them through most years of their lives.

To offer multilingual services to a broad part of the Community, within the target fields.

To use Sleep Disorders applications as a model, which can be applied for other diseases as well like stroke, headache, etc.

To gather data in order to obtain essential information at European level (European Chronotypes and European Sleep Habits)

At technological level:

To create a Multi Communication Centre offering knowledge-based multimedia, multilingual, interactive services.

At Information Society level:

To develop sustainable network services of e-health, e-learning and e-commerce.

At social level:

To develop the ENN-ICS Centre to a brand, to market and sell the services with constantly increasing financial incomes and reinvesting the profits in further research to benefit the scientific community and society (Self-sustaining marketing © 1998 FUTUREtec¹).

To create awareness, better understanding and proper treatment of sleep disorders (ENN Network).

To educate through e-learning and e-teaching (nurses, students, GPs, citizens, doctors).

To apply the information society facilities to less privileged citizens

At economic level:

To market the ENN-ICS Centre in the European and international markets.

To provide information to the citizens and sell health care services using innovative information technologies (mobile, fax, Email and the Internet) - (Home Care in the long term).

¹ defined as marketing the results of research with all financial benefits constantly reinvested in further research, to benefit society

6 Market validation: Main results and conclusion

6.1 Methodology

Operational Validation Strategy

The creation of a still non existing service that will benefit up to one third of the European citizens suffering from disturbed sleep and/or chronic sleep disorders as well as the service for teaching and supporting healthcare professionals required the assurance of high quality standards. For this purpose, reliable validation instruments regarded as gold standards (GMDS Criteria Catalogue, DISCERN Questionnaire and HON Principles) have been chosen and have been adapted for the evaluation process.

ENN-ICS tools, products, and services - i.e. authoring tool, technical usability of services, contents, and the web portal in its capacity as a medical e-health web site - were evaluated by different user groups in multiple-stage procedures.

Before starting the public validation, the project partners evaluated the system and its components according to their competence areas in order to screen the fulfillment of quality criteria and technical functionality for subsequent optimization. In addition, UNIMAR and CENC performed internal evaluation runs by test users. The optimization and improvement of tools and contents were realized prior to public presentation.

The ENN-ICS Sleep Tutorial comprising e-lections on sleep disorders listed by the International Classification of Sleep Disorders (ICSD) was evaluated by:

- specialized physicians
- general practitioners
- students
- medical-technical assistants
- nurses

in 3 initial countries:

- Sweden
- Germany
- Portugal.

Additional users had been recruited in Spain.

Based on multiple-stage procedures, the results of the validation of ENN-ICS services allowed to continuously revise contents, editorial and technical aspects, ergonomics, design, and didactics. All ENN-ICS partners contributed to the stepwise refinement of the system development using their specific competence area in accordance with the quality requirements defined by DISCERN, HON, and GMDS.

Automatic Validation System

The validation data was collected in an automatic assessment process. Online questionnaires were implemented and could easily be accessed by registered users at ENN-ICS web portal. Detailed registration information for the subscription to the e-tutorial as well as instructions guiding

evaluators through the use of validation tools were available in the public forum area (see Annex II). Free access to the online questionnaire for the customer survey was provided to obtain feedback and perception on ENN-ICS products and services by interested visitors and potential clients.

The questionnaire conforms to the GMDS-standard. A statistic gave information on how many questionnaires were filled in.

Self-Assessment Process

The self-assessment process covered the internal evaluation of the LMS and Web portal. It was realized in different stages after the implementation of the system components, i.e. contents and tools.

Web Portal

The HON Principles were selected to test the compliance of the web portal with the following requirements:

Principle 1. Information must be authoritative

Principle 2. Purpose of the website

Principle 3. Privacy – Confidentiality

Principle 4. Information must be documented: Referenced and dated

Principle 5. Justification of claims

Principle 6. Website contact details

Principle 7. Disclosure of funding sources

Principle 8. Advertising policy

HON participated in the development of EU Criteria Quality Criteria of Health Related Websites (5) and integrated all 8 Hon Code Principles into its result. In November 2005, the project partner KUS made a site evaluation of the ENN-ICS website based on the HON Principles. A detailed documentation elaborated by KUS presented suggestions on adjusting the current website to EU Quality Criteria for Health Related Websites. The draft was discussed among the partners and the web site was revised according to the results. The upgrade integrated and considered the following topics:

- Purpose of the web site
- Terms of Use
- Funding Policy
- Advertising Policy
- Privacy Statement
- Contact Information

RDS checked the need for optimization at regular intervals and made necessary adjustments following the HON Principles. (For detailed documentation, see Annex III).

LMS

In a first step, in July 2005 the full GMDS Criteria Catalogue was applied during the process of self-assessment for testing the LMS, i.e. tools and contents, by the project partners TUD and UNIMAR. Based on the results distributed among all partners, the adjustment of the technical components and the revision of contents was performed by the corresponding partners according to their competences and responsibilities.

The updated and extended system was assessed in a second step during a workshop in Lisbon, in May 2006, where CENC, TUD and UNIMAR examined the compliance of the LMS with essential quality criteria following an abbreviated version of the GMDS criteria catalogue designed to be used by test and end users. In addition, UNIMAR and CENC performed further evaluation tests with selected test users. The results were presented during the project meeting in Marburg, in July 2006. The need of optimization was discussed by the consortium and necessary improvements were realized before the start of public validation. (For detailed documentation, see Annex IV).

Public Validation of Contents and Tools

The abbreviated version of the GMDS Catalogue focusing on primary criteria was used in the public validation. Test users from Sweden, Germany and Portugal were recruited to assess the compliance with quality requirements related to domain competence, competence in software engineering, media competence, design competence, and didactic competence.

Invitation letters including detailed registration information for evaluating the eSleep Tutorial were distributed to pre-selected test users in Sweden, Germany and Portugal.

The validation period started August 1, 2006 and was planned to be completed September 30, 2006. It was extended until December 31, 2006, to recruit more users. On January 9, 2007, it was completed and all results were compiled.

Validation Procedure in Sweden

In Sweden, validation was divided into two parallel tracks. The first track was to invite potential end-users to validate ENN-ICS services as a whole, and provide feedback regarding commercial opportunities at their organizations. The second track was to validate the content of the courses developed in ENN-ICS portal. Promotions and advertisements in Tromsö Telemedicine Conference, Umeå Telemedicine Conference, and Annual Conference of Swedish Medical Society played an important role in attracting right target group. In addition, sleep laboratories and medical universities were consulted and informed. Validation for all potential users was free of charge and to further stimulate end-users, free movie ticket to the cinema for one filled in questionnaire was offered from Karolinska's internal funding. All different target groups did answer questionnaire (medical doctors, nurses, medical technicians, students), however, mostly students were willing to spend time on answering the questionnaire. Currently, validation is still in progress in Sweden, and is scheduled to be completed by the end of February.

Validation Procedure in Germany

65 sleep experts and members of the task group "Education & Training" of the German Sleep Society (DGSM) were addressed and invited to take part in the evaluation of the eSleep Tutorial and the LMS. Invitation letters including project description and detailed registration information had been distributed to all test users before the start of the validation period, on July 28, 2006. In the preliminary stages of the public validation, potential users had been addressed in several promotion and recruitment activities, as during the WASM and DGSM Congress in Berlin, October 2005, and during the DGSM Congress in Regensburg, October 2006. UNIMAR presented the ENN-ICS project at the annual meetings of the DGSM task group "Education & Training" and offered interested users to test the system free of charge for participating in the validation. The task group members manifested high interest in e-learning services and announced their interest in their participation. The task group leader transferred e-mail lists to UNIMAR naming all members. These persons were contacted by multiple-address messages. In addition, the task group members agreed to act as multiplicators for the promotion of ENN-ICS and announced the possibility of time-limited free use of the system among colleagues and students on the condition of participating in the evaluation.

Furthermore, specialized physicians and students at the university hospital in Marburg were addressed and received invitation letters.

UNIMAR distributed leaflets inclosing project and registration information at national and international congresses inviting sleep experts and representatives of industrial exhibitors to take part in the validation and the customers' survey.

Validation Procedure in Portugal

In the beginning of July 2006 CENC invited by email a group of 50 healthcare professionals to take part in the Sleep e-Lectons and LMS evaluation. 35 persons accepted immediately, showing high interest and praising the initiative of e-learning on Sleep in Portuguese. The group included: 19 Physicians, 3 Psychologists, 2 Nurses, 8 Neurophysiology Technicians, 1 Therapist, 1 Informatics Technician and 1 Research Assistant, from different country regions, including Azoren and Madeira Islands, and students of the Master Degree on Sleep Sciences of the Lisbon Medical Faculty. CENC sent them all information concerning the registration and online validation procedures, and sent the list with names and emails to Robotron authorizing their inscription in the Portuguese courses. They immediately received user names and passwords for the login.

The validation carried out in Portugal occurred from the 1st August till the 30th September 2006. During this time FML controlled the participation of the Portuguese task group through the validation evaluation in the ENN-ICS portal and sent them remembering emails concerning the deadline. 111 courses were validated by 25 professional.

CENC presented two posters in the 4th Congress of the Portuguese Sleep Society in the 27th and 28th October 2006, one describing the “ENN-ICS project” and other “the validation of the eSleep Tutorial in Portugal”.

Market Validation

UNIMAR promoted ENN-ICS at numerous national and international congresses requesting from potential users, i.e. scientists and industrial exhibitors, to fill in the online questionnaire of the

customers' survey at ENN-ICS web portal. Flyers and leaflets including project description were distributed at registration desks and by direct addressing of participants and industrial exhibitors.

ATOS has contributed mainly in two ways to the promotion of ENN-ICS products and services. On one hand, ATOS has distributed leaflets and information in different events around Europe as for instance The World of Health IT (Geneva, October 2006), e-Challenges Event (Barcelona, October 2006) and the IST Event (Helsinki, November 2006). Furthermore, the representatives had carried out face to face presentations to potential business partners and final users (universities, medical doctors, health managers, etc.).

On the other hand, the second way of promotion that ATOS has used is the transmission of information by e-mail. In this sense, ATOS has used its contacts in the fields of: general medicine, universities, hospitals and healthcare in general to distribute information related to ENN-ICS project. During the validation phase, ATOS contacted different institutions with a request to participate in the evaluation of the tools and the services of the project. All users contacted by ATOS were asked to fulfil the evaluation of contents and market validation questionnaires provided.

6.2 Experiences and results

Analysis and Interpretation of Results

The analysis was made up of two components - the assessed values related to the LMS including the presented contents and the results of the customers' survey.

E-Sleep Tutorial and LMS

During the defined validation period, test users in Germany, Portugal, Sweden and Spain evaluated multilingual versions of e-lections in the available languages; English, German and Portuguese. The E-Sleep Tutorial comprises English, German and Portuguese translations. Swedish users evaluated English versions.

User statistics and overall estimation of e-lections in Sweden, Germany, and Portugal

Each lesson in every language was evaluated separately by test users. Some users were asked to fill in multiple questionnaires and evaluate the e-lections that they had registered for. Others evaluated only one or few e-lections. The system allowed filling in questionnaires using several sessions. Entries could be saved and the questionnaire could be left in an open status for further additions and / or changes. Questionnaires could be logged on again and users could complete them according to personal time demands. Completed questionnaires could not be accessed again and the values were definitely stored for statistical evaluation.

The following table shows the final number of test users and the number of questionnaires gathered as per country:

COUNTRY	COUNT QUEST	COUNT USER	NOT FINAL	FINAL
Germany	15	11	3	12
Portugal	117	24	6	111
Spain	4	3	1	3
Sweden	11	10	4	7

Table 1: Total number of questionnaires per country

The table shows the total amount of questionnaires filled in (COUNT_QUEST), the total number of users (COUNT_USER), and the number of uncompleted questionnaires (NOT_FINAL) as well as the number of completed questionnaires (FINAL) by each participating country (COUNTRY).

The analysis considers the average values of the validated main categories, i.e. contents, technical aspects, layout & design & ergonomics, and didactics (representing the 4 competence areas of the project partners and their responsibilities). In addition, the standard deviation was calculated to estimate the relevance of the assessed values. In view of the low number of users, data interpretation took into consideration generally centralized approaches, as a firm statistical basis is not given.

The results related to all evaluated e-lections, regardless of the differences between language versions, countries or even person groups (representing the results of all users) show:

Apart from the e-lesson "Sleep Laboratory", all other e-lections reached good average values ranging between 1,75 and 2,4 (1 = GMDS Criteria fulfilled, 4 = GMDS Criteria partially fulfilled, 7 = GMDS Criteria not at all fulfilled).

The calculated standard deviation derived from the average value of the overall estimation of an e-lesson without differentiating between the 4 categories corresponding to the competence areas:

The e-lections "Sleep Physiology" and "Sleep Laboratory" point out a higher standard deviation compared to other e-lections. All in all, the scores indicated high acceptance and good ratings for most lections regarding all competence areas except the above mentioned versions. Identified needs for optimization are to be considered in subsequent revisions.

The diagrams presenting the average values of all courses independent to countries and person groups, but differentiated between language variations, point out that, altogether, conclusions have to be drawn with caution. The standard deviation shows unequal distribution ranging between 1.5 and 5.5. The broad range in the assessment of technical aspects suggests that users seemed to set very different and individual benchmarks as technical settings did not vary in different e-lections. It indicates different needs and expectations on the users' part. Indeed, statistically valid interpretations are not possible in view of the limited figures and quantifications.

Country-Related Assessment Results

Germany

Regarding the assessment of German versions, statistic inference is not given in view of the low number of users. E-lections assessed by only one user, are not considered in the interpretation for unquestionable lack of significance. "Sleep Physiology" (assessed by 4 users) showed good results, although technical aspects approached a medium rating. "Sleep Laboratory" (assessed by 4 users) fulfilled the GMDS quality criteria only partially. In Germany, evaluators were mainly recruited among members of the DGSM task group "Training and Education", i. e. experts in sleep medicine and education. This might explain that the results show a slightly increased tendency of critical feedback compared to the average values of e-lections assessed by all users (independent from countries and person groups).

Average values of the four areas (content, technique, design and didactics) of all courses assessed by German users

Unfortunately, the number of German users was low. The reason of minor participation might be owing to the workload of addressed professionals as being reported by several users. Some users who had been personally invited by UNIMAR to participate in the evaluation explained on inquiry that they did not find time for the registration and testing the e-lections. Online support was offered in such cases, but, ultimately, was not called on.

The two courses being analyzed showed relatively high scores regarding the standard deviation.

Average value and its standard deviation of all courses assessed by German users:

Valid conclusions can not be drawn due to the marginal quantifications. However, the revisions of these e-lections will be done with selective attention.

Portugal

Pre-selected users in Portugal confirmed the fulfillment of GMDS quality criteria in all areas at high rates. In two cases, English versions have been evaluated by only one single user. They are not considered in the interpretation. Portuguese versions were evaluated by 17 to 20 users. Average values of assessed e-lections are ranging between very good and good, i.e. between 1 and 2.2.

Inspecting the values regarding the standard deviation, the reliability of the results tends to be confirmed. As a maximum, critical results are approximating value 3 which notifies a high compliance rate.

Sweden

In Sweden, 3 e-lections were evaluated by one single user. The e-lection "Sleep Physiology" was evaluated by 4 users with average values between 3.5 and 4.25 which indicate some need for optimization. Indeed, the standard deviation is notably high which disallows reliable data interpretation.

Person Group Related Assessment Results

The structure of the questionnaire allowed to analyze the assessments by different person groups / types. The validation data was screened according to the following groups:

- sleep medicine experts
- specialized physicians
- general practitioners
- students
- medical-technical assistants
- nurses
- others

In the analysis, differentiations between countries were not considered due to the limited number of quantifications. For the same reason, the above mentioned person groups except the group "Others" are not regarded separately in the analysis because the number of completed questionnaires is ranging between 1 and 3 test users per e-lection.

The results derived from questionnaires completed by the person group "Others" confirms the high acceptance and good ratings by Portuguese users related to Portuguese versions.

Customers' Survey

The online questionnaire for the customers' survey could be accessed by potential users at ENN-ICS web portal without registration.

The user statistics is presented in the following table:

COUNTRY	COUNT_FILLED_OUT
Germany	10
Sweden	8
Portugal	6
Spain	1
Europe	0
outside Europe	1
Total	26

PERSON_TYPE	COUNT_FILLED_OUT
individual	26
hospital based medical service	0
medical service outside the hospital	0
company	0
other organization	0
Total	26

Table 2: Users statistics

The total number of questionnaires filled in by potential customers is 26. All persons chose the person type "individual". Some users did not answer all questions which are considered in the data presentation. The customers estimation on the upraised questions without differentiating between person groups and origin is as follows:

Results of Customers' Survey (all potential clients): Average Values and Standard Deviation

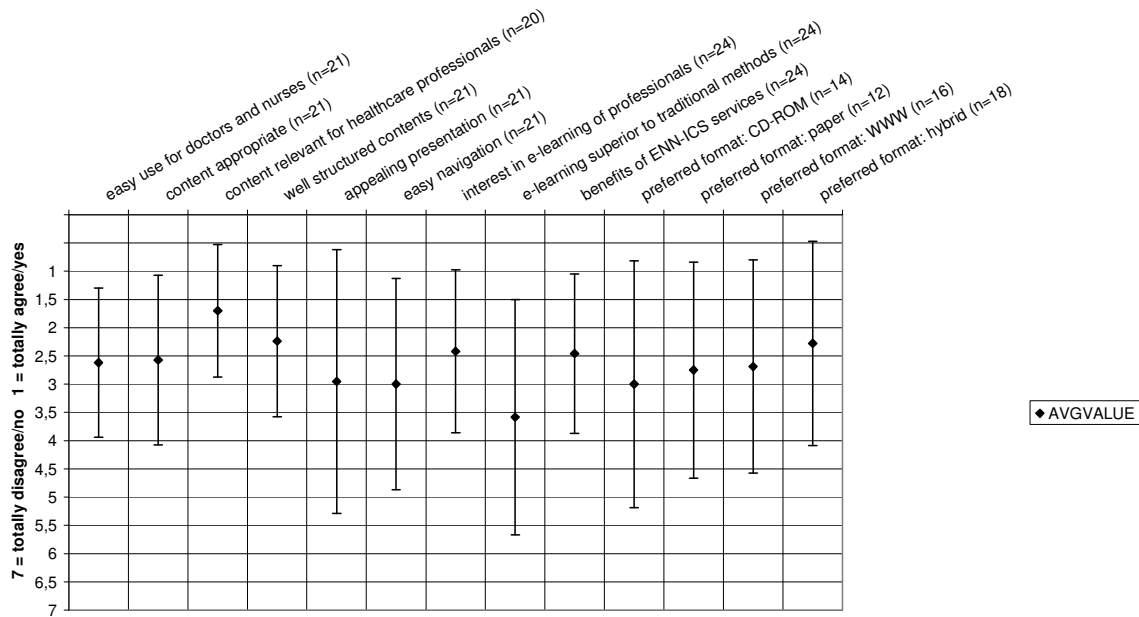


Fig. 1: Costumers' estimation related to Questions 1 to 10d (without differentiating between person groups and origin).

Results of Customers' Survey (all potential clients): Average Values and Standard Deviation

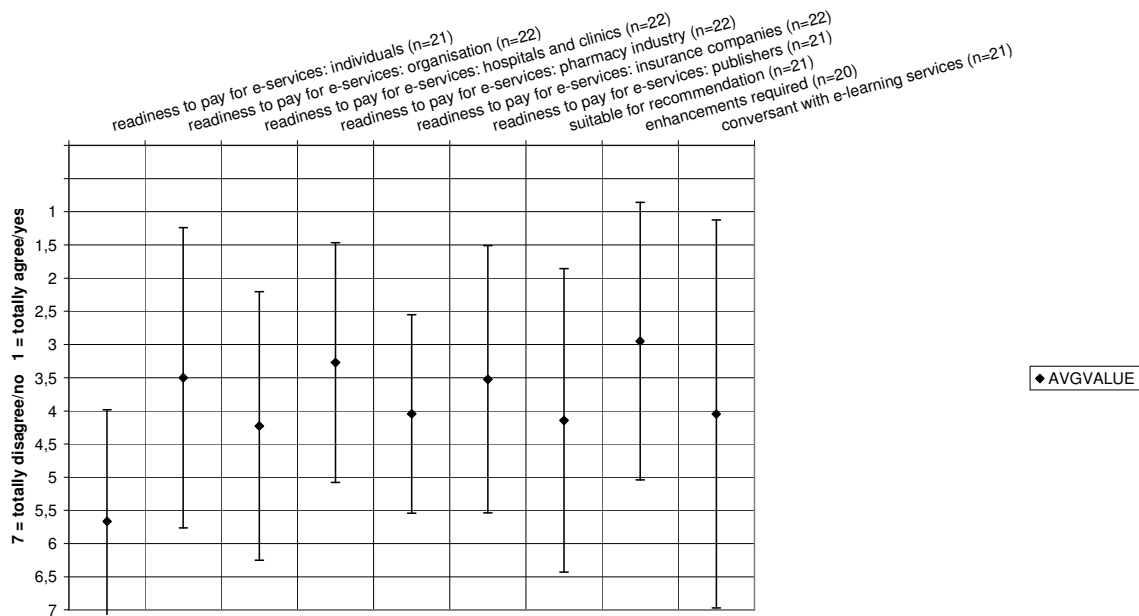


Fig. 2: Customers' estimation related to Questions 11 to 19 (without differentiating between person groups and origin).

The standard deviation of most average values is quite high which does not allow reliable estimations. Nevertheless, general tendencies can be made out. The average values of questions relating to the presentation and use of ENN-ICS services and products certify rates of solid acceptance. The interest of professionals in e-learning and their believe in its benefits are high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference regarding the format of presented contents is quite balanced, but web based presentation and hybrid presentation using all formats (paper, web, CD) are slightly favoured.

Average values of questions related to the readiness for paying e-services show moderate rates. Organizations, pharma industries and publishers are estimated to show middle-rated readiness. Hospitals, clinics and insurance companies are still ranging in the medium scale but their readiness to pay is estimated to be lower than the readiness of the before mentioned groups. Costumers estimate that the willingness to pay of individuals is very low. According to the average values, the suitability for recommendation of ENN-ICS services is moderate and enhancements are required to some extent. These results must be relativized in view of the fact that the familiarity with e-learning is stated being low. In addition, there is a high standard deviation which puts the relevance of the results into question.

The tendencies detected in the above presented analysis are confirmed by the estimation of German users with some downward trend. In view of the high standard deviation detailed analysis is not presented but all charts can be viewed, together will all other diagrams, in Annex VI of “eD4-07 ValidationReport-v2.2”. For the same reason, the interpretation of the results derived form Swedish customers is not presented in detail here, but can be looked up in the annex. Portuguese costumers showed upward trends in their estimations.

Results of Customers' Survey (potential portuguese clients): Average Values and Standard Deviation

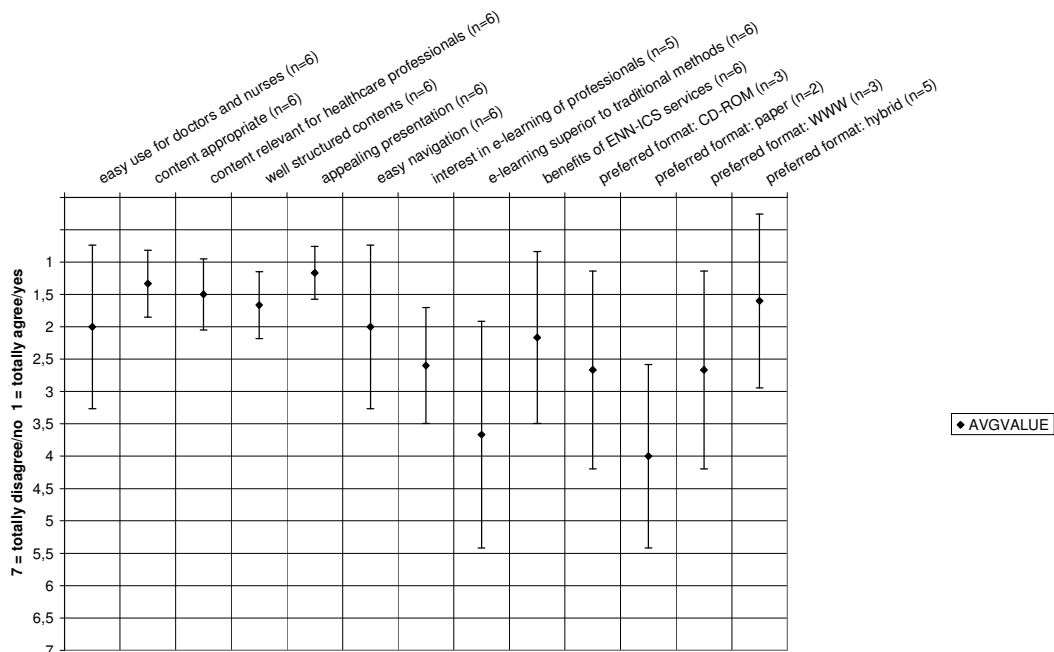


Fig. 3: Customers' estimation related to Question 1 to 10d (Portugal)

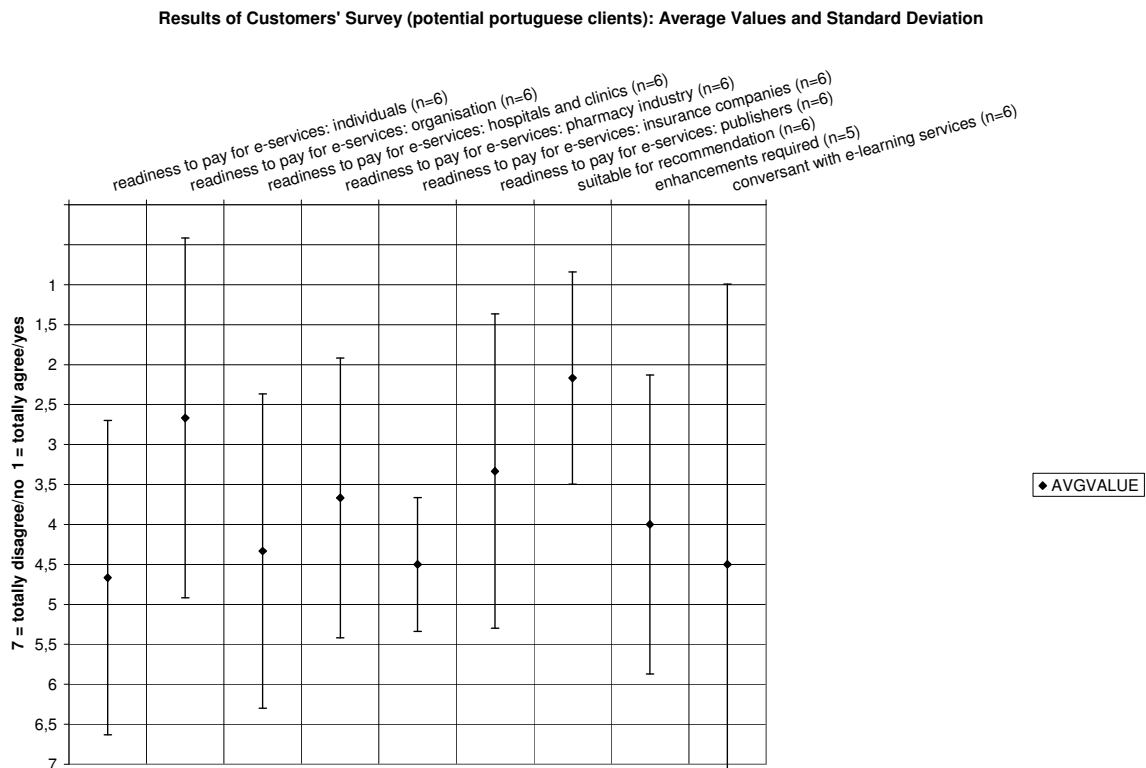


Fig. 4: Customers' estimation related to Question 11 to 19 (Portugal)

The average values of questions relating to the presentation and use of ENN-ICS services and products certify rates of high acceptance. The interest of professionals in e-learning and their believe in its benefits are relatively high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference regarding the format of presented contents is unequally distributed. Clearly preferred is web based and hybrid presentation.

Average values of questions related to the readiness for paying e-services show moderate rates. Organizations, pharma industries and publishers are estimated to show good or middle-rated readiness. The readiness of hospitals, clinics and insurance companies is estimated to be lower. Costumers estimate that the readiness to pay of individuals is rather low. According to the average values, the suitability for recommendation of ENN-ICS services is given, but enhancements are required. These results must also be relativized in view of the fact that the familiarity with e-learning is stated being low. In addition, there is a high standard deviation which puts the relevance of the results into question.

Estimations by the person group "Individuals" independent from origin confirm good use and presentation of ENN-ICS contents. The interest of professionals in e-learning and their believe in its benefits are high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference of the format is balanced, but the hybrid presentation is slightly favoured.

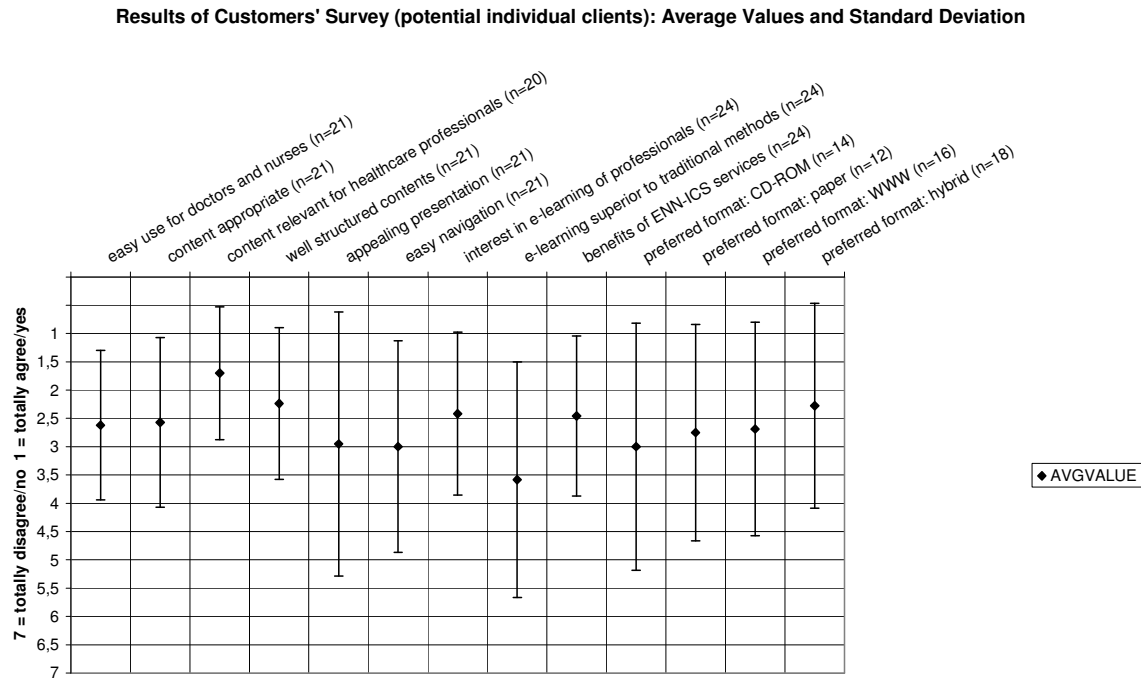


Fig. 5: Customers’ estimation related to Question 1 to 10d considering person groups independent from origin (person group = individual)

Average values of questions related to the readiness for paying e-services show moderate and low rates. Organizations, pharma industries and publishers are estimated to show medium readiness. The readiness of hospitals, clinics and insurance companies is estimated to be lower. Costumers estimate that the readiness to pay of individuals is very low. According to the average values, the suitability for recommendation of ENN-ICS services is moderate and some enhancements are required. Due to the low familiarity with e-learning as being stated by the customers, the estimation can not be regarded as reliable judgement. In addition, there is a high standard deviation which puts the relevance of the results into question.

6.3 Conclusions

ENN-ICS Centre was validated by user groups in Germany, Portugal, Sweden and Spain. The scope of the validation as carried out in ENN-ICS was on the medical contents and on the tools. The results of the self-assessment of ENN-ICS services allowed to continuously revise contents, editorial and technical aspects, ergonomics, design, and didactics during the phases of development and implementation. All ENN-ICS partners contributed to the stepwise refinement of the system development using their specific competence area in accordance with the quality requirements defined by DISCERN, HON, and GMDS.

The public validation showed good ratings, in particular related to Portuguese versions of e-lections. Nevertheless, only general tendencies could be concluded in view of the limited number of users.

Following high quality standards according to HON principles and GMDS criteria, the system architecture and its applications can be used as a model for future e-health related websites dealing with neurological and other medical topics.

7 Business development aspects

7.1 Player’s business perspectives

All project’s participant are interested in exploiting ENN-ICS products and services that have been evaluated during the project. In order to maintain an open collaboration, which should not be restricted to the main business plan elaborated during the execution of the project, the consortium has developed an Exploitation Agreement. This Exploitation Agreement which provides the necessary legal infrastructure to pursue any collateral business.

However it is foreseen that in general terms the partners adopt the following roles:

Parties	Roles
RDS	IT Partner
CENC	Content Provider
UNIMAR	Content Provider
TUD	IT Partner
ATOS	IT Partner Operations Management Financial Management
KUS	Content Provider
FML	Content Provider
FTEC	Commercial support

Table 3: Role of the partners

IT Partner	<p>Perform the technological upgrade and carry out the maintenance of the ENNICS service components. The efforts needed to be spent to upgrade the system by the IT partners will be determined in an ad-hoc basis, and a system to compensate their effort will be agreed with them.</p> <p>The above mentioned Responsibilities shall be always performed jointly by the IT Partners. They shall agree all the actions and decisions to be taken regarding their responsibilities. Every IT Partner will assume its own costs regarding the exploitation.</p>
Content Provider	<p>CP partners should make all ENNICS related content available to the BPCP whilst keeping their Intellectual Property Rights.</p> <p>Along with their commercial activities they should:</p> <ul style="list-style-type: none"> – Demonstrate the ENNICS services as scheduled by the IT Partners. – Organise ENNICS information days (one “Information Day” at least every six months organised at the premises of the Content Providers, as well as additional demonstrations if requested by any of the IT Partners). – Participate in negotiations explaining advantages of ENNICS services, if requested by any of the IT Partners.
Operations Management	<p>Coordination of the day to day operations among partners to support the delivery of ENNICS service and commercial activities. This includes:</p> <ul style="list-style-type: none"> – Coordinate information flow among partners – Centralised communication with suppliers – Quality assurance management – Purchasing and supplying management for ENNICS products and services – Technical leadership
Financial Management	<p>Management of the income taken from the different commercial activities and distributing of the resulting monies among the partners accordingly to the previously agreed income sharing scheme.</p>

Table 4: Tasks of the roles

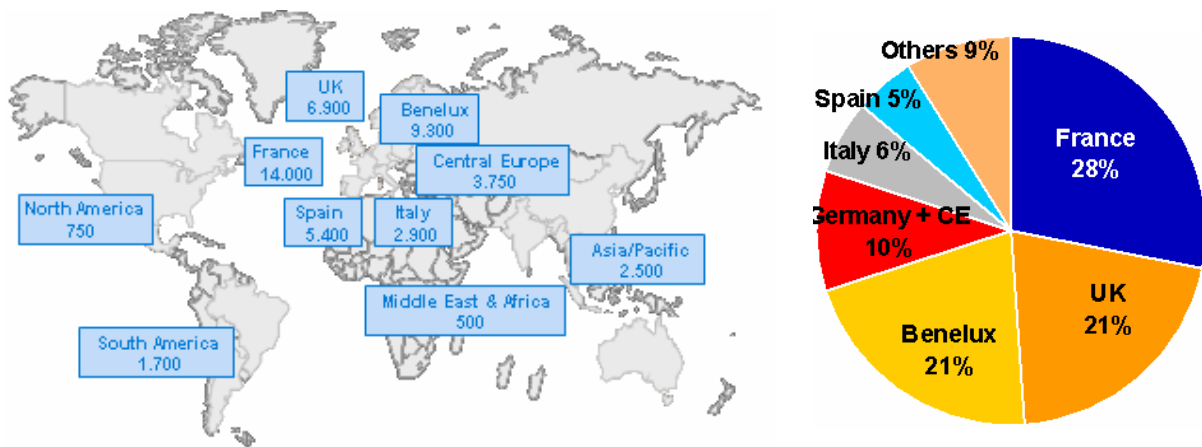
However, the actual roles will be agreed for each business. The current activities follow the Business Plan and Deployment Plan defined during the project. During this first year of operation, the consortium has decided to enter into five countries; Austria, Germany, Portugal, United Kingdom and Sweden. There are two main reasons for choosing these five countries:

- Germany, Portugal and Sweden are countries where pilots have been implemented therefore the services are thought to be deployable without big customisation efforts
- Due to linguistic and cultural proximity Austria is also considered to be deployable without big customisation efforts
- Since one of the interface and content is available in proper UK English, and AtosOrigin has a great presence in the UK market, the consortium has also decided to enter in UK market.
- Taking into account that the first sales effort will be carried out by the partners, it is more feasible that each partner target domestic’s clients.

The specific strategy to for each one country is described in the following sections, where specific market characteristics and consortium capabilities are been taken into account.

As it has already been explained all partners participate in the commercial activity, which is compensated with a 6% of the incomes generated by the sale. Since, there are partners who are not capable of closing negotiation and contracts with the clients, another industrial partner will provide the main legal and administrative infrastructure in order to negotiate the economic and legal details. For these cases, there is already a policy for the economic compensation of the effort.

Moreover, Atos Origin, which is the main industrial partner of the consortium, has relevant presence in most of European markets and overseas, as it is showed map.



AtosOrigin number of employees

Revenues sources of AtosOrigin

Fig. 6: Number of Employees and Revenues of Atos Origin World wide

We can also appreciate, the great presence in economic terms that Atos Origin sae has on the different European markets.

The pre-commercial activity has already started by different members of the consortium. In fact, as a result of these initiatives, the consortium is currently at the time of the elaboration of this report, the possibility of entering into anther totally different market, which is **China**. This business opportunity will require to go much further that what has been analyse in the Business Plan and on this report, but at the same time it is a great opportunity that could boost sales in to a

different level allowing the consortium to establish a position in one of the most attractive markets in the world and benefit of the economy of scale.

7.2 Revenues flows

The following graphs shows the relation between each player of the Business Model defined in the exploitation of ENN-ICS’ product and services. In the graph we can appreciate how services are exchange (slashed lines) for fees (full lines).

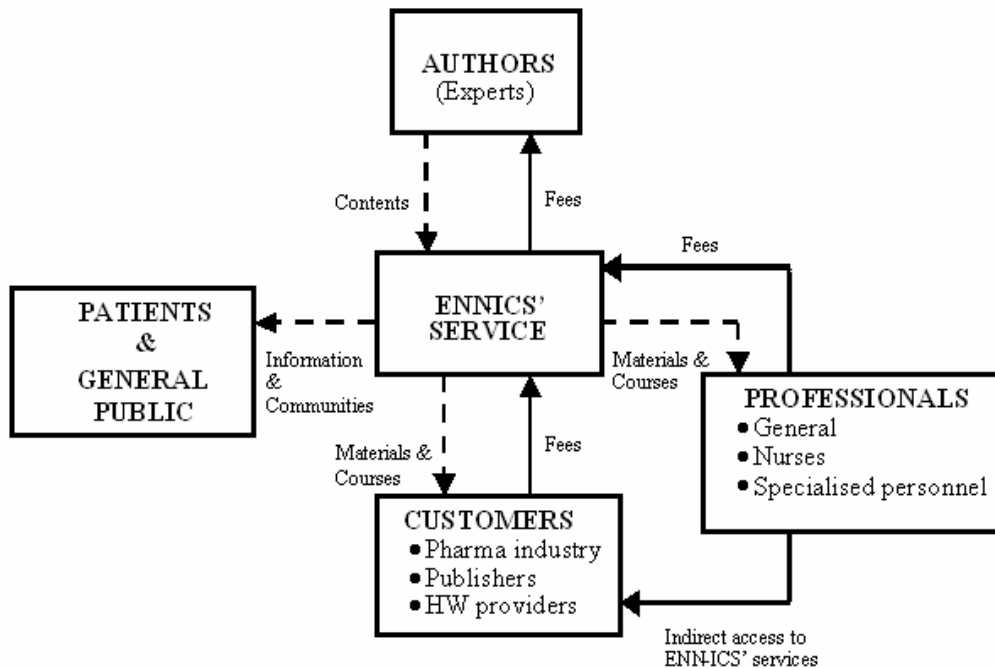


Fig. 7: Relation between each player of the Business Model

This general overview shows that the basic work flow is the following: ENN-ICS materials and courses are provided by authors (experts in the specific field). The materials and courses are purchased by customers that will finally provide them to doctors, nurses and students (it is also possible as explained above that some professionals have direct access to the courses and materials). General public and patients will obtain free information from ENN-ICS. Communities for patients will be created, which will count with the participation of professionals through the web service.

7.3 Market size and trends

The services offered by ENN-ICS target a specific audience to which the platform will be more beneficial such as general practitioners, nurses, specialised personnel and students. The main counter parts of our target market are professionals and researchers working in the Sleep Disorders field. From this sub-set it will be necessary to consider a reduction in the number of those ready to use new technologies and the Internet, to improve their knowledge and share their experiences.

It is necessary to have a clear idea about the number of final users (that at the end may mean, at least, the sale of one course or one book) that ENN-ICS may have, but it is also needed to see the progression in the next 5 years. In order to do these projections the following data have been considered: the total number of practitioners and nurses, the population and the increasing rate per habitant that are contained in the WHO and EUROSTAT sites. With this information it is possible to present the following tables:

	2007	2008	2009	2010	2011
Albania					
Austria	1.722	1.732	1.742	1.752	1.762
Belgium	2.820	2.827	2.834	2.842	2.849
Bosnia and Herzegovina					
Bulgaria	1.593	1.584	1.575	1.567	1.558
Croatia	664	664	664	665	665
Cyprus	109	112	114	117	119
Czech Republic	2.259	2.262	2.264	2.266	2.269
Denmark	935	937	939	941	943
Estonia	378	378	378	378	378
Finland	1.014	1.017	1.019	1.021	1.024
France	12.251	12.309	12.367	12.425	12.483
Germany	17.521	17.555	17.590	17.624	17.658
Greece	3.076	3.084	3.092	3.100	3.108
Hungary	1.901	1.900	1.900	1.899	1.898
Iceland	62	63	64	64	65
Ireland	716	729	742	755	768
Italy	14.924	14.935	14.946	14.958	14.969
Latvia	434	433	432	432	431
Lithuania	844	845	846	847	848
Luxembourg	75	76	77	77	78
Malta	82	83	85	86	87
Netherlands	3.087	3.102	3.118	3.133	3.148
Norway	841	846	851	857	862
Poland	6.000	6.021	6.041	6.062	6.083
Portugal	2.243	2.256	2.270	2.283	2.297
Romania	2.539	2.527	2.515	2.504	2.492
Serbia and Montenegro	779	709	638	568	498
Slovakia	1.091	1.097	1.103	1.109	1.115
Slovenia	294	295	295	296	297
Spain	9.097	9.214	9.331	9.448	9.564
Sweden	1.774	1.784	1.795	1.805	1.816
Switzerland	1.663	1.677	1.692	1.707	1.721
Macedonia, the former Yugoslav Republic of	277	279	281	282	284
United Kingdom	8.252	8.294	8.335	8.377	8.419
Turkey	10.671	10.688	10.704	10.720	10.737
TOTAL	111.989	112.315	112.640	112.966	113.291

Table 5: Total potential users in the coming 5 years (Practitioners plus Nurses)

The above table presents the total number of practitioners and nurses in the coming 5 years that will be involved in Sleep Disorder activities. These projections have been made with the assumptions that 3% of the total number of practitioners and 1% of the total number of nurses are dedicated directly to the Sleep Disorders field. These assumptions are considered to be rather conservative.

The schema below, presents the calculation process followed to reach the numbers presented in table 3.

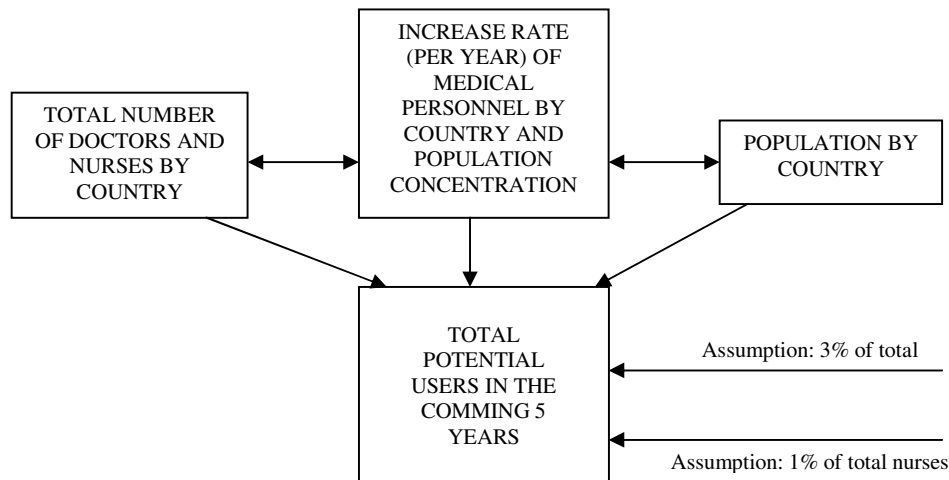


Fig. 8: Calculation process

Entry Year	2008	2009	2010	2011	2012
Albania					
Austria	1,722	1,732	1,742	1,752	1,762
Belgium		2,827	2,834	2,842	2,849
Bosnia and Herzegovina					
Bulgaria					1,558
Croatia				665	665
Cyprus				117	119
Czech Republic		2,262	2,264	2,266	2,269
Denmark		937	939	941	943
Estonia				378	378
Finland		1,017	1,019	1,021	1,024
France		12,309	12,367	12,425	12,483
Germany	17,521	17,555	17,590	17,624	17,658
Greece			3,092	3,100	3,108
Hungary			1,900	1,899	1,898
Iceland			64	64	65
Ireland	716	729	742	755	768
Italy		14,935	14,946	14,958	14,969
Latvia				432	431
Lithuania				847	848
Luxembourg			77	77	78
Malta					87
Netherlands		3,102	3,118	3,133	3,148
Norway		846	851	857	862
Poland			6,041	6,062	6,083
Portugal	2,243	2,256	2,270	2,283	2,297
Romania			2,515	2,504	2,492
Serbia and Montenegro					498
Slovakia					1,115
Slovenia					297
Spain		9,214	9,331	9,448	9,564
Sweden	1,774	1,784	1,795	1,805	1,816
Switzerland		1,677	1,692	1,707	1,721
Macedonia, the former Yugoslav Republ				282	284
United Kingdom	8,252	8,294	8,335	8,377	8,419
Turkey					10,737

Table 6: Total potential users following the market entry cadence

However, the data that are interesting for our analysis are not those containing the total number of potential users, but the total number of nurses and practitioners for each of the years, and for each of the countries where the entry strategy is planned. Table 4 shows these figures using the obtained values and the entrance cadence proposed.

These numbers are indeed the main part of the total potential users that ENN-ICS portfolio may have in the coming years. Other potential users (and therefore, other potential sales currently not considered) are students and technicians. Due to the lack of numbers for all the countries, we have carried out preliminary calculations without these users.

7.4 Potential Customers

The potential customers that were identified by ENN-ICS consortium at an early stage of the project included a wide group of heterogeneous organisations and institutions. Such a big group has been reduced in the subsequent stages according to the outcomes of further market analysis.

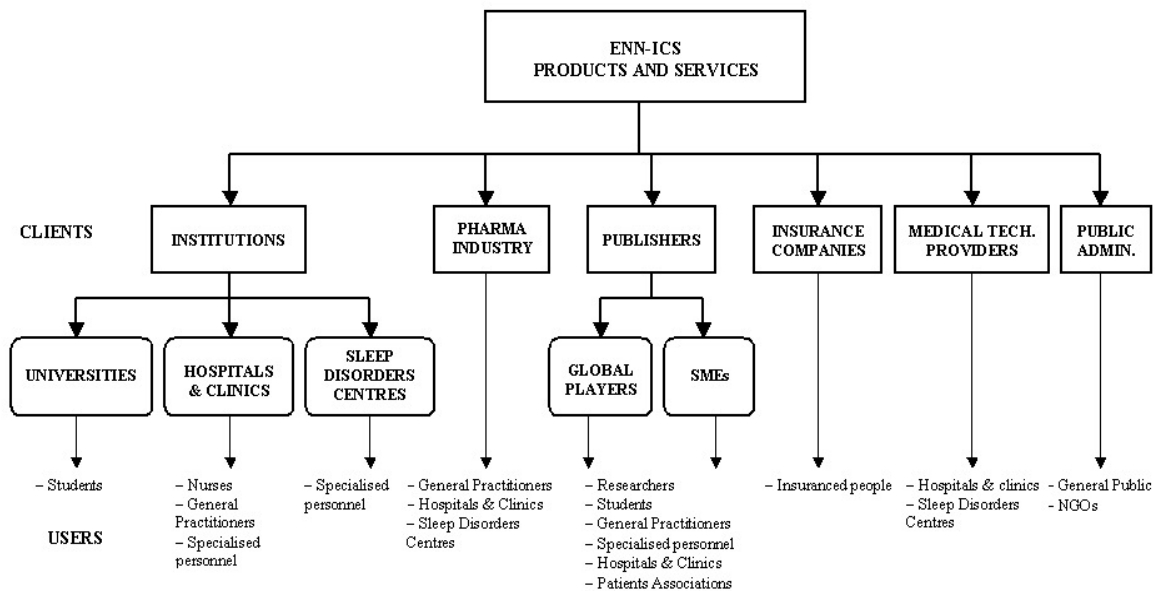


Fig. 9: Potential Customers to ENN/ICS Products and Services

Potential customers identified:

Pharmaceutical industry: This group may be the main receptor of the ENN-ICS portfolio. Apart from that at this moment, the consortium is evaluating the possibility of including the sponsorship of a pharmaceutical industry to reinforce the sales channels. The services that will be offered to this group are the on-line courses and hardware materials (books and CD/DVDs).

Publishers: This group is traditionally very important for the learning market. ENN-ICS is planning to reinforce the sales of its services by using printed materials such as books or booklets. This group is the actual receptor of the printed materials.

Health Insurance companies: The interest of this potential customer will be mainly focused in the on line courses, but they may desire a slight change in the contents that are already being offered (even creating content on demand).

Medical technical providers: Hardware providers may consider the possibility of offering jointly to their equipments, training programmes for their hardware. Apart from that, the identified potential is to consider them as a direct sales channel for medical staff. Both, on-line courses and printed materials will be offered to this group.

Some of these providers are;

3B

ABAXIS

AHLSTROM

AGFA

ALMANA

ALOKA

ANDA

CT Scans

EKG

ASCLEPION

AMED TECH

TENS Equipment

APC Cardiac Equipment

APPLIED QUALITY SERVICES

A.R.C. LASER

ARAB HEALTH

ARCOMED

ATS Hospital Management

BECKMAN COULTER

BIOMEDICAL SYSTEMS

Blood Pressure Monitoring

BIOSCIENTIA

B-K MEDICAL

BLOOD ANALYSIS

BOWA Electrosurgery

CAMPRO SCIENTIFIC

CARDIAC SCIENCE

CHART TECHNOLOGY

CSI

COMPUMEDICS

DATASCOPE

DERUNGS

DEXTER

DIOMED

DORNIER MEDTECH

DOWNS

ENT

DRAEGER

DBJC

EMS ESWL

...

Universities and Teaching Institutions: They can use e-learning courses in Post graduate education, namely in Master Degrees and PhD courses conceived according to Bologna recommendations. As an example the Medical Faculty of Lisbon will incorporate the e-learning courses in the 3rd Edition of the Master Degree in Sleep Medicine.

Accreditation Institutions and Medical Sleep Societies: They are interested in quality assurance and uniformities across EU countries and therefore they can use validated ENN-ICs tools to assure such criteria. The European Sleep Research Society is currently developing an accreditation process for Sleep laboratories, Sleep Medicine specialists and Somnologists which will be prosecuted by the National societies in all European countries.

Medical professionals: It is foreseen to have a minor percentage of medical professionals accessing directly to the courses and materials with no kind of institution/company mediating.

7.5 Market enablers and barriers

The healthcare-IT industry and the R&D outcomes are bringing to the market electronic procedures to support healthcare professionals, individuals, and organizations, introducing every single day technologies in a wider set of applications.

Healthcare delivery and e-learning systems, are confronting important challenges posed by the rapid development of ICT technologies, the need for cost-containment, the focus on effectiveness and efficiency, and the increase of populations’ demands for quality services.

E-Learning market is entering a mature status, which means that, its introduction in all training fields, is leading to an improvement of the learning-teaching process. Moreover, the combination of this e-learning techniques offer to professionals new ways to support their life-long learning processes.

In the sleep disorders field, as for many other medical fields, the possibility of accessing learning and research materials in an easy way, via a web site, facilitates the professionals’ training.

It is also necessary to bear in mind the economical factors operating on the described environment. The improvement in the knowledge of the sleep disorders medical professionals means a reduction in costs associated to the sleep disorders field. This improvement can be seen in a double way:

- Professionals enrich their knowledge because they may access the materials and courses in an easier and more convenient way for them (for instance, the sleep sessions recorded at laboratories may be accessed by several professionals).
- Institutions have other options to the typical training session. These new possibilities offer cheaper training (reducing the costs for conference assistance: human and financial resources).

Based on these facts ENN-ICS offers its services to professionals (doctors, nurses, technicians) and students. It is within ENN-ICS scope also, to spread knowledge among patients and general public, but these groups are not the business objective.

The strong points identified at the very beginning of the project, have been reinforced during the project lifetime. Moreover, and in order to differentiate our products and services from the rest available in the market, we have made serious efforts to ensure the quality of the services and products offered. We still consider that the quality of our materials (not only in the presentation

but more important: the contents and the didactical framework itself) is the most important competitive advantage that we are currently offering.

Other competitive advantages that have been fostered are based on the software used to offer the services. The consortium has invested efforts and money to significantly improve the software that enables the creation, management and presentation of contents. The consortium has followed different usability recommendations from a technical point of view (TENUTA Project) and also from a content point of view (HON Principles).

The consortium has also identified as competitive advantage, the focus of the final services: within Europe there is no similar initiative like ENN-ICS that offers materials, courses, etc. exclusively dealing with sleep disorders based on the knowledge and experience of key professionals: Prof. Teresa Paiva and Prof. Thomas Penzel. Our specialization is a key added value that is being fostered in this second half of the project.

The business opportunity for ENN-ICS portfolio is based in the possibility of *taking advantage of e-learning maturity, entering in the field of sleep disorders, where a lack of specialised training using new technologies has been detected*, and it is perceived as a potential improvement for professionals.

However, the consortium has to overcome important barriers in order to succeed in reaching an important market penetration, the consortium will have to face the following barriers:

Technology barriers: maturity of technology, internet security, user friendly GUI tailored to the different needs and requirements

Legal barriers: data protection, lack of legal rules in the internet, ethical issues, copyright issues, differences between laws of the involved countries

Marketing barriers: need for innovative tools for Internet marketing e.g. cost-benefit analysis tools, regular actualisation of course materials and contents.

Beside these marketing barriers, the consortium has to face competitors and potential competitor, which is an evaluated risk for the success of the main foreseen business activities. The competitors are organised in two different groups; those more related to e-health field and the second group focus more on the e-learning area. At the end of this section, we have included the conclusion that we have arrive after analysing the competition.

Identified Competitors within the e-Health Field.

Competitor	Country	Description
<i>Sömnhjälpen</i>	Sweden	<p>The sleep disorder web-portal, Sömnhjälpen, is owned and managed by Sanofi-Aventis</p> <p>The objective and focus of the web-portal is to provide and propagate knowledge about sleep, sleep disorder and the company’s medicinal preparations</p>
<i>Careit</i>	Sweden	<p>Careit develop, sell and promote psychological, interactive self-care applications for companies, organizations, employees and single private end-users. The focus is mainly in the fields of stress, headache, sleep disorder and panic-anxiety.</p> <p>The treatment is based on both psychological and social procedures, which also include workshop, seminars, resource support, and organizational and leadership development.</p>
<i>Merk’s Family Health Manual</i>	Internat.	<p>This is a book sold on-line and produced by the pharmaceutical company Merk. Chapter 6 Brain and Nervous System Diseases, is about Sleep Disorders (Insomnia, Hypersomnia, Narcolepsy, Sleep Apnea and Parsomnias).</p>
<i>MedicinaInformacion.com</i>	Spain	<p>This web site is oriented to give general information and materials for different medical issues. Apart from that it contains a section called “The expert section” that allows to give more information about a particular disease.</p> <p>It offers to its users a set of manuals, books and guidelines totally free that covers different areas from a professional point of view. This site is aimed to doctors and other specialized personnel but not for the general public itself although some references may be easy readable.</p> <p>It does not offer e-learning facilities.</p>
<i>El Médico Interactivo</i>	Spain	<p>It is self defined as the electronic newspaper of the healthcare sector in Spain and apart from the newsletter itself it contains information and links to resources that deal with all possible issues within the medical field. It is an enormous source of information for professionals and it gives free access to the information contained.</p> <p>It has an on-line training program aimed to general practitioners that opens once a year and has an official certification. The on-line training does not cover any aspect related to the sleep disorders field.</p>

<i>Competitor</i>	<i>Country</i>	<i>Description</i>
<i>E-Magister</i>	Spain	<p>The possibilities to follow the course are online or distance learning. The prices and discounts vary from one course to the other. Users can express their satisfaction with the contents within the web site; these comments are linked to the courses to serve future users as a guide to take or not the course. There are courses in different languages.</p> <p>The specific field is not tackle in any course but they are open to any kind of offer. They may be seen as a possible way of advertisement.</p>
<i>Deutsche Gesellschaft für Schlafforschung und Schlafmedizin</i>	Germany	<p>As the German national accrediting body for sleep disorders centers and laboratories, the DGSM is the leading voice promoting the highest quality of care for patients with sleep problems. At present, there are more than 300 centers and labs accredited by the DGSM that are providing trusted medical assistance in communities all over the country.</p>
<i>Apothekerkammer Nordrhein</i>	Germany	<p>This portal offers e-learning services to pharmacists in many medical fields including sleep disorder problems. Three sleep disorder related courses are offered:</p> <p>Basics in sleep disorder treatments</p> <p>Sleep disorder case studies with 12 different examples</p> <p>Sleep disorder causes and treatments</p>
<i>Global People</i>	Internat.	<p>Global People delivers high quality health and safety training through easy to use classes and modules over the Internet. The training benefits both individuals and organizations by ensuring compliance with the latest health and safety standards in the workplace.</p>
<i>Springer Medical</i>	Germany	<p>Under the name eCME (electronic Continuing Medical Education) Springer offers for GPs 26 for CME certified courses. The e-learning technology is quite simple: Downloading of PDF courseware and checking the knowledge by a multiple choice questionnaire.</p> <p>By e-mail communication we knew that Springer is preparing 2 pilots with SCORM based e-learning.</p> <p>Spring offers no sleep disorder courses.</p>
<i>Phoenix Safety</i>	Ireland	<p>It has a complete offer of courses and materials dealing with Healthcare and Safety issues. The offered services are: consultancy, training and e-learning. They also offer some materials for free. The contents are aimed mainly to</p>

<i>Competitor</i>	<i>Country</i>	<i>Description</i>
		companies willing to implement good welfare and safety programs within their companies.
<i>Sleep Channel</i>	U.S.A.	Healthcommunities.com currently has a community of 19 medical specialty channels (among these <i>sleep disorder channel</i>) and has developed an extensive network of physician members through its Physician Website Management System, in which customised physician practice websites are created and maintained through the sponsorship of medical product underwriters. They are HON compliant but they do not offer courses, just general information for the public.
<i>Sleep Education</i>	U.S.A	The AASM (American Academy of Sleep Medicine) launched Sleepeducation.com in March of 2005 to address the rapidly growing demand for information about sleep. This website is designed to be a valuable tool for patients and members of the public who are seeking dependable information related to sleep, sleep disorders, treatments and services. They do not offer e-learning courses and/or specialised printed materials.
<i>Sleep Laboratory Stanford University</i>		They offer CME certified SCORM based e-learning courses.

Table 8: Identified Competitors within the e-Health Field

We would like to make special reference to the last mentioned initiative, and also to an American initiative that seems of high quality and a very similar concept to ENN-ICS. In the coming paragraphs we explain them in more detail.

American Academy of Sleep Medicine

Country: United States of America

http://www.aasmnet.org/ASMF_Home.aspx

Regarding the American Academy of Sleep Medicine, the offer presented is related to professionals and also to patients.

This institution offers in-person and on-line courses. It also offers books, CDs, DVDs, posters, brochures and other materials sold on-line through their web-site. There are different prices for members and non members.

Their objective is to set and promote excellence in sleep medicine healthcare, education and research. The goal pursued is to ensure the quality of the assistance received by the patient by offering to professionals better educational resources that allow them to enlarge their knowledge in the field.

The web site presents a section named the “AASM Online Learning Center” which is described as “...a venue where medical professionals of various backgrounds and different levels of experience can enhance their understanding of sleep and sleep disorders. The resources in the AASM Online Learning Center provides with information and tools to help you make informed decisions and select the most appropriate referral and treatment options for your patients.”

Entering in this section we can find out that at this moment there is only one on-line course available entitled “Recognizing Sleep Disorders: Sleep Related Breathing Disorders” that is integrated by a slide show with three medical cases but with no theory. They do not offer any kind of multimedia materials.

This site is updated permanently thus, the number of courses offered, and the materials available, are likely to increase in the coming months. It may be possible that the number of courses offered and the materials available increase in the coming months.

Prices

The AASM pricing is the following (data obtained from their products’ catalogue):

Illustrated Guide to Polysomnography: Normal Sleep, CD-ROM: 99\$ (members), 200\$ (non-members)

Evaluation, treatment, diagnosis (different disorders) CD-ROM: from 175\$ to 195\$ (for members) to 350\$ to 390\$ (for non-members)

The offered course is free upon registration.

National Sleep Foundation

Country: United States of America

www.sleepfoundation.org

They provide a lot of information about sleep and sleep disorders. The information is quite general and oriented to patients and professionals. They offer information in English and also some of the sections are translated to Spanish.

They have a very good animation representing a family with four members, where all the critical issues related to sleep disorders are tackled: sleep and women, sleep and children, sleep and elderly people, etc. It is quite informative and very well elaborated.

A special kit “Community Sleep Awareness Toolkit” is sold through the web site. The toolkit includes a CD-ROM and printed materials, and it is aimed to promote public awareness of sleep and its disorders.

They also sell brochures and posters for general public and other educational materials and tools.

Prices

The pricing policy of National Sleep Foundation (data obtained from their products’ catalogue) is:

Public Education Poster: 5\$

Sleep Sheet: 14\$

Sleep diaries: 20\$

Presentations on CD-ROM: 39\$

Community Sleep Awareness Toolkit: 225\$

E-Learning Initiatives Directly Related to e-Health.

There are potential competitors that offer learning and training opportunities, most of them sponsored by pharmaceutical companies. Many of these initiatives are more focused on in-person training, than in on-line training (and none of them present the possibility of purchasing other products such as books, CDs or DVDs.). We present here below a list with the 6 main potential direct competitors:

1.- ECME Consulting Medical Education

Country: International

<http://www.ecme.com/node/home.aspx>

The website is defined itself for international audience composed by healthcare professionals. They offer different sites for different countries. They provide a library of interactive continuing medical education (CME) courses. The courses are subject to registration but they are free of charge for medical professionals.

They are sponsored by the pharmaceutical company Astra Zeneca.

Their current offer is composed by eighteen courses of very different areas. Each course is of three hours duration (on average). Courses are composed by very different screens that contain multimedia objects (including images, animations and videos) and also, in some of the cases, audio files. Most courses are available only in English, but some of them are available in other languages. Their current offer does not include areas related to sleep disorders.

There is no LMS available and therefore, none of the services related to it (such as tutor feedback, possibilities of taking notes, etc.). They do not offer the possibility of generating content on demand and, at this moment, they do not offer courses related to the sleep disorders field.

Prices: Some of the courses have a demo version and a full version. Both of them are free upon registration.

2.- New Media Medicine

Country: England

www.newmediamedicine.com

New Media Medicine develops e-learning courses and animations for use in online medical education.

They define their goal as follows:

“Our aim is to produce a professional, entertaining and highly education experience for medical professionals who want the flexibility and cost savings e-learning provides”

This company creates contents on demand for doctors, students and other healthcare professionals. They work together with the medical team in order to produce appropriate courses for the different needs. Their team of experts is reduced to two medical doctors from the UK, with experience in the creation of e-learning courses although not with all the required medical knowledge for all the fields.

The created courses may contain different multimedia elements including animations, video recordings, audio files, etc. They also include evaluation tests for the students. All the contents included are on demand by the creators depending on their particular needs. They do not have a current offer of courses because they create them for the final customer.

They are aware about the importance of having portable and interoperable contents and therefore, their courses follow the SCORM and AICC standards for content creation. This allows the final users to use any kind of LMS that is compatible with this format. They are HON compliant.

Prices: Prices vary depending on the created course. As far as they directly do not offer the courses by themselves they do not offer a catalogue where the prices may be consulted. It is necessary to contact them to have these data and a budget for the creation of them.

3.- National Programme for IT in the NHS

<http://www.connectingforhealth.nhs.uk/clinicalcoding/trainingaccred/e-learning/>

Country: England

This is an English initiative coming from the central health care system, which intends to offer training and accreditation to its users. Having a centralised model there is a set of benefits that are achieved; the most important are:

Close alliance with development of national clinical coding standards

Development and production of national standard products / training materials compliant with current national coding standards and guidelines

Provision of central training, audit courses and support service for all clinical coding staff

Standardisation of training delivery and outcome

Increased volume of high quality trained-trainers available to the NHS, enabling flexibility for NHS organisations in the provision of local training delivery

Setting and promoting standards for trainers and auditors to ensure quality delivery and integrity.

Most of the courses are face to face, with different duration and locations. The e-learning offer is quite reduced and it is conceived to support the general offer of the Programme.

The access to the course is subject to registration and/or belonging to the NHS Network. It does not offer courses in different languages (because it is a national initiative).

Although this initiative may not be a real competitor (because they already do not have the proper courses and general aim) at this stage, it can be in the mid term.

Prices: All the offered materials are free (they are offered by a governmental institution)

4.- Universidad de Barcelona Virtual

<http://www.ubvirtual.com/es/index.html>

Country: Spain

The formative offer of the UB Virtual is organised in different virtual schools/campus that group courses under the same thematic area pretending to respond to professionals, under graduates and graduates life long learning needs. The offer also foresees training for enterprises and other related institutions. This formative offer complements the traditional life long learning processes

that the Universitat de Barleona develops through Les Heures – UB of Fundació Bosch I Gimpera and its divisions.

They are one of the oldest learning institutions in Europe and they are totally open to the introduction of new technologies in their teaching methods. They consider that their cultural background is not a barrier to enter the future and advance among the current changes.

Their offer is integrated by several different courses that can be followed on line. The courses are offered using multimedia or paper format depending on the pedagogical needs of each of them. Depending on the nature of the course (under graduate, master, etc) the average duration goes from 250 hours to 450 hours. There is a pedagogical team that evaluates the requests of the students to join the course and if the student can follow it or not. All their courses are certified by Universidad de Barcelona.

Prices: Depending again on the kind of course that the student want to follow the prices vary from 1.300€ to 2.400€.

Apart from these initiatives, we would like to highlight that recently have appear the following Master Degrees in Sleep:

5.- Master on line en Sueño: Fisiología y Medicina

Country: Spain and South America

<http://www.revneurol.com/mastersueno/Master.aspx?PAGINA=ESPECIFICACIONES>

This master offers to different professionals and students in the area the possibility of following and on-line master on sleep, sleep disorders and related techniques that give them, knowledge and practice in the field. The master is conceived to last 25 weeks (approximately 6 months), and gives 50 credits. It is composed by different modules offering theory related to physiology, anatomy and other relevant aspects, clinical aspects related to sleep and its disorders and also practical sessions of all the taught materials.

The price of this master is of 1.065 euros and it is certified by Universidad Pablo de Olavide (Sevilla, Spain).

6.- Masters Degree in Sleep Medicine

Country: Australia

<http://www.sleep.med.usyd.edu.au/masters.htm>

They offer two types of Master Degree: Master of Medicine (Sleep Medicine) and Master of Science in Medicine (Sleep Medicine).

The Masters degree is a [coursework](#) degree with an element of self-directed learning in addition to a research project which is written up as a [treatise](#). In the first three semesters content is entirely virtual lectures and text references with the fourth semester having, in addition to lectures and reading material, one unit of study that is investigated by the student and presented for assessment as a literature review.

The research project is to be written up and submitted after the coursework component has been completed although it is strongly recommended that collection of data begin during the coursework phase of the degree. The total duration of the masters is two years equivalent to 48 credits.

The price depends on which of the masters is followed and goes from 17.280\$ to 21.600\$ for local students to 28.560\$ to 35.700\$ for foreign students.

General e-Learning Initiatives.

There are several e-learning initiatives that offer courses and the possibility of creating materials and complete courses in very different fields. However, most of them do not offer any contents related to the medical field for the moment. Nevertheless, we consider them potential competitors for ENN-ICS.

1.- HISPEC CONSULTING

Country: England

www.hispec-c.com

They run a consultancy in technical businesses in the United Kingdom and Europe for companies in the commercial sector and organisations within the public sector on strategy, Process, Technology and People.

Offer description

Product: They focus their assessment strategies on e-business solutions, e-learning, e-government solutions, e-marketing and environment for learning and technology products:

- LMS
- LCMS
- Web Collaboration Virtual Classes Exhibition per type of tools
- Writing contents and publication of web tools
- Competences and valuation of tools' knowledge
- Visual tools and mind maps
- Models for business processes
- Technological tools to handle business productivity

Other remarks: They are not present in the Health care domain and they do not offer the possibility of creating contents on demand.

2.- UNIVERSIDAD VIRTUAL DE BARCELONA

Country: Spain

The Barcelona virtual university is a Spanish university which supplies e-learning contents, which mainly operates in the sectors involving complementary or continuous training, postgraduate distance learning and business training consultancies. This supplier's experience in e-learning or in developing software dates back 4 years. It collaborates with other associations such as Caixa Catalunya, Fundación Bosch, I Gimbera “Les Heures”, Grupo Universidad de Barcelona and Santander Central Hispano. It is a member of an e-learning association and it also belongs to the professional associations AEFOL and AECE. It is endorsed by the guarantee certificates: Internet Quality Stamp and IQ 2003.

Offer description

When analysing this company's offer, it stands out that their solutions are compatible with standard AICC, IMS, SCORM solutions. This company offers its services via housing and they do not need ADSL broadband to operate. These products or services can be implanted in any type of organisation although a specific technical infrastructure is needed. Software must be installed

in the user’s PC but it does not require the use of CDs or DVDs. The products use videos, audio clips and multimedia resources and can be integrated into other software such as Catia, Microsoft, AutoCad but they cannot operate with open software such as Linux and Moodle and so require software ownership.

This supplier’s target public is mainly composed by private entities and end users and they make it possible to incorporate their solutions in the corporative web and in the customer’s image. Furthermore they can create their own contents using this supplier’s product and on the other hand the company creates and personalises contents apart from those already offered in the catalogue. They also have services or products specifically for SMEs.

Prices: the price depends on the generated course. As far as they do not offer the courses directly it is not possible to access a catalogue with prices and products. It is necessary to contact them for a special budget.

3.- GARBEN

Country: Spain

Garben is a Spanish company, with several offices throughout the world. It mainly operates in IT consultancy, IT projects, multimedia, Internet, and training sectors, as a content provider and developing software and platforms.

This supplier’s experience in e-learning or in software development dates back nine years. It collaborates with the Madrid Development Institute (Instituto Madrileño de Desarrollo), it is a member of an e-learning association and it also belongs to professional associations. It is endorsed by the ISO 9001 quality certificate.

Offer description

When analysing this company’s offer, it stands out that its solutions are compatible with standard AICC IMS and SCORM solutions. This company offers its services via hosting and housing and its services require ADSL broadband to operate. These products or services can be implanted in any type of organisation and require licences to be acquired to be able to access its products. Software or plug ins must be installed in the user’s PC and CDs or DVDs must be used. The products include videos, audio clips and multimedia resources and their products can incorporate other software such as Oracle, Microsoft, as it can also operate with open software such as Linux and Moodle, they require software ownership.

This supplier’s target public is mainly private and public entities and end users and it is possible to incorporate their solutions in the corporate web and in the customer image. They can also create their own contents using this supplier’s product and on the other hand they create and personalise contents apart from those already offered in the catalogue. They also have services or products for SMEs and all their solutions are offered with multilingual interface options. Some of their web services are free but the price of the other services and products vary depending on the product structure, content and graphic design.

Prices: the price depends on the generated course. As far as they do not offer the courses directly it is not possible to access a catalogue with prices and products. It is necessary to contact them for a special budget.

4.- SYSTEM POLSKA SP.z.o.o.

Country: Poland

4system Polska S.P. z.o.o. is a Polish company which has sales offices throughout Germany and the Czech Republic. It mainly operates in education and banking sectors as a content supplier and software and platform provider.

This supplier’s experience in e-learning or in software development dates back nine years. It collaborates with other organisations but it is not a member of any business groups and it does not belong to any professional associations.

Offer description

When analysing this company’s offer, it stands out that its solutions are compatible with standard AICC, INS and SCORM solutions and it offers its services both via hosting and housing; they do not require ADSL broadband to operate. These products or services can be implanted in any organisation and no specific technical infrastructure is required. It does not have to be installed in the user’s PC and it does not require CDs or DVDs. The products include videos, audio clips and multimedia resources and their products can incorporate other software such as Oracle, Microsoft, and they can operate with open software such as Linux and Moodle. They do not require software ownership.

This supplier’s target public is mainly public and private companies and it is possible to incorporate their solutions in the corporate web and in the customer image. Customers can also create their own contents using this supplier’s product and on the other hand the company can create and personalise contents apart from those already offered in the catalogue.

5.- ELIOSYS

Country: France

Eliosys is a French company which operates as a software and platform provider and content supplier in the education sector.

This supplier’s experience in e-learning or in software development dates back six years. It collaborates with ALTICS organisations and it does not belong to and business groups or professional associations.

Offer description

When analysing this company’s offer, it stands out that its solutions are compatible with Standard AICC and SCORM solutions, and it offers it services via hosting and housing. They do not require ADSL broadband to operate. These products or services can be implanted in any organisation and specific technical infrastructure is not required. Software does not have to be installed on the user’s PC and CDs or DVDs are not required. Their products can incorporate other software such as Oracle, Microsoft and it is also possible to operate it with open software.

This supplier’s target is mainly private companies and it is possible to incorporate their solutions into the corporate web and the customer’s image. Customers cannot create their own contents using this supplier’s product but on the other hand the company can create and personalise contents apart from those already offered in the catalogue with a multilingual interface. They do not have services or products for SMEs and none of the services offered on the web are free.

ENN-ICSS Competitor Analysis Conclusions

From the previous analysis, we can draw 5 major conclusions:

The most direct competitors are based in the USA.

Most competitors do not offer courses in different languages

Most competitors do not have a so focused offer as ENN-ICS.

There is an effort from the pharmaceutical companies to enter this sector (we can see examples such as Sanofi-Aventis, Astra Zeneca or Almirall). Most critical is that the offered services are free of charge.

Typical educational publisher like Springer and Elsevier are offering already certified eCME services, but not SCORM based.

8 Next steps

The ENN-ICS consortium planned to invest a total amount of 3.248.160 euros for the deployment phase of five years. For that case the business plan is outlined. The value of Continuously Medical Education (CME) is widely recognized in both the US and Europe. Even though the approaches these two regions have taken with regard to the regulation, provision and funding of CME activities vary considerably. Therefore, CME companies must take into consideration regional differences that affect their role in the development and provision of both traditional and online CME activities (eCME).

In Europe the EUROPEAN UNION OF MEDICAL SPECIALISTS (UEMS) and the European Accreditation Council for Continuing Medical Education (EACCME) are responsible for the CME processes. At present there is no unique EU regulation for the accreditation of CME courses. A very special case is e.g. Germany where the “Bundesärztekammer” is member of the EACCME but the accreditation is done by the “Landesärztekammern”. After the completion of European wide unique regulations a sound basis for an European eCME-Center with many medical disciplines can be established.

The near consequence for Germany: The eCME business is already established and they have no Sleep Disorder courses. The ENN-ICS courses are SCORM standard based and can easily be migrated to the CME-Center CME.Springer.de: They require learning scripts as PDF documents, which can be generated from ENN-ICS learning contents in XML format based on the Single Source Multiple Media and Usage concept. The consortium prefers the eCME-Center, because it already offers additional courses in English and Russian and has an established customer base. The management will also expand the European activities.

RDS is committed to support the deployment activities by the partners, especially the actual business case of FML. Furthermore the internet portal technology including the CMS and the questionnaires will be used in the EU project “European ALARA Network for Naturally Occurring Radioactive Material-NORM” an assignment of DIRECTORATE-GENERAL ENERGY AND TRANSPORT. In addition, the e-learning technology and methodology will be used for an e-lection of the own software product, the Energy Data Management System “robotron*ecount”.

CENC is strongly committed to the dissemination of Sleep Medicine and Sleep Sciences in Portugal and worldwide. The conventional (books and booklets) and non conventional publications (internet) are among CENC’s activities and commitments. A new outcome is the book on Sleep and Dreaming that will be published during 2007. Furthermore CENC is interested in reaching other professionals with their training, to help them treating sleep disorders which have high negative influence such as traffic accidents and excessive sleep medication consumption .

FML is committed to the deployment and commercial offer of the service. The university is interested in high level education , using e-learning services for the Master Degree in Sleep Sciences represents an important perspective in the post Bologna era.

As mentioned before, all the partners have managed to reach good solutions, to correct errors and mistakes and to overcome difficulties, so the consortium thinks validation has brought the partners closer to each other and strengthened the commitment to go further. As a Medical Teaching Institution, ENN-ICS provides tools for teaching and training pre and post graduate

students, nurses, technicians and doctors. The commercial offer of the services will allow ENN-ICS to reinvest the profit in research and teaching facilities. As a scientific institution, FML will be associated with a broadband high-quality teaching tool and also with scientific publications.

UNIMAR is very interested in the development of courses for physicians and technicians who want to achieve a degree "sleep specialist" in Germany and are interested to attend courses at the moment. In Germany “sleep specialist” is an official medical degree “Zusatzweiterbildung” given by the chamber of physicians after completing an exam. This degree is similar to “child cardiology” or “allergology” which also requires 18 month training at certified sites.

TUD is committed to support training activities for potential authors. Furthermore the authoring system will be used in the EU Tempus project “QaelearnIT (SM_SCM-T007A06-2006) as well as in other future projects. In addition, TUD will use the authoring system to produce own e-learning materials for the own courses of study.

ATOS: As it is presented in the different final documents of the project devoted to business and initial deployment plan (D9c and D10), ATOS will lead the defined structure for the deployment of the services. ATOS will perform two crucial roles within the deployment phase that are the operations’ management and the financial management.

Apart from these two important roles, ATOS will facilitate the entrance of ENN-ICS services in those countries where the company is present by using its commercial contacts. However, these contacts will take into account the current business that the company has in different countries that, in some cases, may mean the impossibility of entering some of the market segments defined.

Regarding the technical aspects of the project, ATOS platform will not be used in the deployment because currently the volume of business is small and the costs associated with the platform are very high for the initial deployment phase. This does not mean that in the coming future ATOS’ platform will not be used but at this moment it is necessary to highlight that ATOS prefers to foster the deployment of the business better than try to make profit from it through direct sell of its products.

Karolinska desires to pursue further deployment of the project in regards to e-learning courses offered by ENN-ICS services.

9 Appendices

9.1 ENN-ICS management

Project Coordinator (PC)

The Project Coordinator is responsible for the overall co-ordination of the project and is the contact person for the European Commission, represented by the Project Officer (PO). He takes care of the project planning and monitoring, progress reports, cost statements, budgetary overview and review organization. The PC handles all day-to-day administrative and management functions with the help of the other management bodies.

WP-Management

The WP-Management is composed of Work Package Leaders. One of the main objectives of this body is to increase the communication, coordination and cooperation between the Work Package Leaders and the work packages itself.

The WP-Management reports, discusses and consults the technical issues and decisions taken during the project with the PC. The organisational issues as well as the control over the decisions concerning the exploitation and deployment were reported and consulted with the PM.

Work Package Leaders (WPL)

Each WP is lead by a Work Package Leader (WPL), responsible for the work carried out within the WP. He has to provide periodic reports to the WP-Management detailing manpower allocations and other costs. Details of technical progress within the work package will be passed to the Technical Officer for evaluation. Each WPL shall be responsible for the timely completion of deliverables due from the work package and their submission to the Technical Officer, Scientific Officer and Project Manager for validation. Each WPL is also responsible for identification of risks and for proposing solutions in respect of his work package.

Assignment of persons to positions

Project Officer:	Dr. Pascal Collotte, Inga Bakane/eTEN
Project Coordinator:	Prof. Dr. Dieter Jungmann/Robotron
WPL1:	Prof. Dr. Dieter Jungmann/Robotron
WPL2:	Dr. Heikki Teriö/Rustam Nabiew/Karolinska
WPL3:	Prof. Dr. Eric Schoop
WPL4:	Prof. Dr. Thomas Penzel
WPL5:	Blanca Jordan, David Salama/Atos Origin
WPL6:	Prof. Teresa Paiva/CENC

9.2 Work package overview

WORK PACKAGE No. 1: Project Management

The project management consists of the following tasks:

- Project Planning
- Project Monitoring
- Project Organisation
- Administrative co-ordination
- Horizontal consortium activities

The work in the WP is supported by a project management tool. All planned events were done in time. All deliverables and reports are created and delivered to eTEN.

Two amendments were done :

- Extension of the project duration from 24 to 25 month
- Budget shift from partner FML to CENC.

WORK PACKAGE No. 2: User requirements

All partners actively contributed with their experience, knowledge and understanding of how the market and user requirements are to be performed, which were clarified in a start-up workshop. KUS and Ftec provided the necessary guidelines for the work to be performed. There was a similar effort by each partner.

This WP supported the validation (WP4), the business plan (WP 5) and gave feed-back on user needs and key requirements to the ENN-ICS Health Centre (WP 2, 3)

WORK PACKAGE No. 3: Adaptation and Localisation for Prototype

In order to introduce e-learning successfully, didactical and IT aspects were introduced into authoring, editing, publishing and learning processes. An appropriate concept was developed and prototypes were customised for an adequate editorial & publishing system. This WP focuses on providing these elements in order to efficiently support the complete life cycle of publishing and e-learning processes.

The work developed assured the broadest marketing and dissemination possibility with an internet knowledge base service. This WP was focused on internet pilot validation; it sat a pilot for market validation and users needs and requirements, taking the market environment into account.

WORK PACKAGE No. 4: Validation

The validation work package created a structure for the initial and continuous quality control of the new business. In the beginning mechanisms for validation were created and adopted from other successful models. A mechanism was installed to test and validate the new products. Separate tasks were dedicated to the validation of products, such as courses, the CD/DVDs and the educational books. The validation carefully checked the accurate translation of all material.

The most important task of the work package was the validation of new services. For this purpose validation per questionnaire and per statistical test was performed. A workshop in Marburg and a seminar in Lisbon were organized to gather quality assurance and peer review.

The validation of all products and procedures is an integral part of the initiation of the new business dedicated to sleep disorders. The process and product validation was done in separate tasks in order to structure the process and overall structure validation. The gathering of data essential for the business and deployment plan was done.

WORK PACKAGE No. 5: Business Plan and Final Deployment Plan

ENN-ICS business plan is the most strategic project result. The services and tools showed the acceptance of the pilot users and the right cost/benefit relations combined with all the new information and experience gained during the project. A sound business plan was established to describe the necessary investment and ways of procedures to enter successfully the deployment phase.

Based on this document the aim of the service providers RDS, TUD, Atos and Ftec was to achieve the development of a professional ENN-ICS centre serving the whole European and international market. They were supported by ENN-ICS content providers (CENC, UNIMAR, KUS, FML) and other consultants because they in practice are able to introduce successfully the service to the target groups (Citizens, Professionals and Institutions). The partner roles will be reanalysed. Market validation data obtained in WP5 is an essential feature.

A clear and precise market and product definition, the interest for customers, the marketing strategy with prices, distribution circuits and promotion channels were defined. Manufacturing costs and forecasts of profitability, management and management control systems and financing and operational requirements were specified. Legal European environment and effects on social cohesion were addressed. Technical issues, interoperability, standardisation, security and management of the platform were considered.

The deployment plan provides the roadmap towards the deployment of the services and to run the business. This plan gives the opportunity to the partners to establish a strategy for exploiting the ENN-ICS services at European level.

WORK PACKAGE No. 6: Dissemination & Business Partner Screening

Raising awareness at national and international level, with the support of the ENN community, through:

- Attendance at conferences and deepening already existing contacts within the EU Parliament
- Website and portal with public and private forums, events, scientific chats, etc
- Public relations, press releases, publications
- Dissemination material e.g. brochures and posters
- The dissemination instruments or the Commission e.g. eTEN portal
- Disseminate results products and other outcomes
- Screening and beginning to select business partners and strategic alliances.

9.3 Deliverables produced

Delivery schedule Deliverables and Reports defined in the technical annex			
Deliverables	Originally Planned (according Contract)	Current schedule (to be justified)	Actually Delivered
WP 1 R 1 Quarterly Monitoring Report	01.07.05	30.06.05	30.06.05
WP 1 R 2 Quarterly Monitoring Report	01.10.05	01.11.05	04.11.05
WP 1 del nr 1 Quality control procedure	01.04.05	30.06.05	30.06.05
WP 2 del nr 2 Market and User Requirement Document	01.08.05	01.08.05	01.08.05
WP 2 del nr 3 Trans European Dimension	01.06.05	30.06.05	30.06.05
WP 2 del nr 4 Review of economical, local custom or regulatory differences	01.06.05	01.08.05	01.08.05
WP 3 del nr 5a ENN-ICS Prototype	01.08.05 and 01.03.06	01.08.05 and 01.04.06	01.08.05 21.03.06
WP 3 del nr 5b ENN-ICS Services tutorial	01.08.05 and 01.03.06	31.01.06 and 01.04.06	31.01.06 21.03.06
WP 3 del nr 6 Interoperability of technology	01.12.05 and 01.09.06	01.03.06 and 01.09.06	28.02.06 04.12.06
WP 4 del nr 7 Validation Report of ENN-ICS Centre	01.03.07	01.03.07	21.02.2007
WP 5 del nr 8 ENN-ICS IPRs and Technical audit	01.08.05 and 01.09.06	01.08.05 and 01.09.06	01.08.05 and 21.02.2007
WP 5 del nr 9 Business plan	01.11.05 and 01.07.06 and 01.03.07	01.11.05 and 01.07.06 and 01.03.07	04.11.05 15.12.06 22.02.2007
WP 5 del nr 10 Deployment plan	01.03.07	01.03.07	22.02.2007
WP 6 del nr 11 Dissemination strategy	01.06.05	01.09.05	15.10.05

WP 3 del nr 12 ENN-ICS website	01.06.05 01.09.05	and	10.05.05 01.09.05	and	10.05.05 19.10.2005
WP 6 del nr 13 Book and posters	01.08.05 01.10.05 01.01.07	and and	01.11.05 01.04.06 01.01.07	and and	04.11.05 01.04.06 21.02.07
WP 6 del nr 14 Review analysis of forums, chats	01.12.07		21.02.07		21.02.2007
WP 6 del nr 16 Workshop 1 Report	01.12.05		01.03.06		28.02.06
WP 6 del nr 17 Workshop 2 Report	01.03.07		16.03.07		04.06.2007
WP 6 del nr 18 Review of potential Business Partners	01.02.07		01.02.07		21.02.2007

Table 9: Deliverable scheduling and delivering date

9.4 Time table and schedules

M.	Month/Year	Host	Type of Meeting
1	11.03 - 13.03.2005	RDS	Kick-off Consortium Meeting in Dresden
3	11.05. - 12.05.2005	KUS	Discussion of Interactive Services, Users' Needs and Market Analysis
5	19.07. - 20.07.2005	TUD	Technical and training requirements; Business Plan status and progress; Content Development; Internal validation done
9	30.11. - 01.12.2005	Atos	1. Workshop: alpha-Prototype available; Begin of the validation Phase
16	13.07. - 14.07.2006	UNIMAR	Business Plan; Deployment Strategy; Financial Plan; Validation progress
23	02.03.2007	FML/ CENC	Dissemination and Deployment; Final validation; 2. Workshop; ENN-ICS Services ready

Table 10: Date and Host of project meetings/workshops

Deliverable “Final Report”

Task	Vorgangsname	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
WP1: Project Management		▶																											
1.1	Project Planning		█	█	█																								
1.2	Project Monitoring																											█	█
1.3	Project Organisation		█	█	█																							█	█
1.4	Administrative co-ordination		█	█	█																							█	█
1.5	Horizontal consortium activities		█	█	█																							█	█
WP2: Market Analysis and Study		▶																											
2.1	Overview of EU & International Market		█	█	█	█																						█	█
2.2	Potential of National Markets for the ENNIS products and services		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
2.3	Examination of Guidelines (Legislation and Standards on data security, patient privacy, medical ethics)		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
2.4	User Needs Analysis and Key Requirements		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
2.5	Competitive Analysis: Strengths, weaknesses, barriers, advantages		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
WP3: Adaption and Localisation for Prototype Content		▶																											
Milestones																													
3.1.1	E-learning and e-teaching methodology and contents		█																										
3.1.2	DTD-Engineering			█	█	█																							
3.1.3	Customization of the Content Management System		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.1.4	Definition and Customization of design templates		█	█	█																								
3.1.5	Tutorial-Engineering					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.2.1	Customisation of existing LMS			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.2.2	Localisation of the LMS					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.2.3	Training of tutors and LMS administrators					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.3.1	Design prototyp system architecture		█	█																									
3.3.2	Data + information model, adapting prototypes			█	█																								
3.3.3	Content/Knowledge Database and multilingual repository					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.3.4	Connectivity and interoperability of multimedia components including service network structure							█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.3.5	Test procedure and approval by partners									█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3.3.6	Set up of the ENN-ICS Internet Portal																												

Table 11: Task Schedule: WP1, WP2 and WP3

Task	Vorgangename	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
WP4: Market Testing & Trials		[Timeline bar from 5 to 25]																										
4.1	Validation Plan and co-ordination with competence center																											
4.2	Validation of Courses, Tutorials, Training Guide, Training Sessions																											
4.3	Validation management tools																											
4.4	Process and structure validation																											
4.5	Supervision of validation procedures																											
4.6	Documentation and report of validation																											
WP5: Draft Business Plan and Final Deployment Plan		[Timeline bar from 1 to 25]																										
5.1	ENN contracting and licensing																											
5.2	Licensing and royalty management																											
5.3	ENNICS services and tools and marketing strategy																											
5.4	Customer Needs and Competitor Analysis																											
5.5	Description of Services -Products- USP																											
5.6	Market Potential																											
5.7	Definition of promoters and strategic alliances																											
5.8	"As is state" Business Process Model																											
5.9	Risk and Break Even Analysis																											
5.10	Financial Plan																											
WP6: Dissemination & Business Partner Screening		[Timeline bar from 1 to 25]																										
6.1	Dissemination Plan																											
6.2	ENNIS Website																											
6.3	First Workshop																											
6.4	Secound Workshop																											
6.5	Documentation, contract templates, Information for ENNICs Care Center																											

Table 12: Task Schedule: WP4, WP5 and WP6

9.5 The ENN-ICS trial scenarios

Analysis and Interpretation of Results

The analysis consists of two components - the assessed values related to the LMS including the presented contents and the results of the customers' survey.

9.5.1 E-Sleep Tutorial and LMS

During the defined validation period, test users in Germany, Portugal, Sweden and Spain evaluated multilingual versions of e-lections in the available languages; English, German and Portuguese. The e-Sleep tutorial comprises English, German and Portuguese translations. Swedish users evaluated English versions.

9.5.2 User statistics and overall estimation of e-lections in Sweden, Germany, and Portugal

Each lesson in every language was evaluated separately by test users. Some users were asked to fill in multiple questionnaires and evaluate the e-lections that they had registered for. Others evaluated only one or few e-lections. The system allowed filling in questionnaires using several

sessions. Entries could be saved and the questionnaire could be left in an open status for further additions and / or changes. Questionnaires could be logged on again and users could complete them according to personal time demands. Completed questionnaires could not be accessed again and the values were definitely stored for statistical evaluation.

The following table shows the final number of test users and the number of questionnaires gathered as per country:

COUNTRY	COUNT_QUEST	COUNT_USER	NOT_FINAL	FINAL
Germany	15	11	3	12
Portugal	117	24	6	111
Spain	4	3	1	3
Sweden	11	10	4	7

Table 12: Validation results related to countries

The table shows the total amount of questionnaires filled in (COUNT_QUEST), the total number of users (COUNT_USER), and the number of uncompleted questionnaires (NOT_FINAL) as well as the number of completed questionnaires (FINAL) by each participating country (COUNTRY).

The analysis considers the average values of the validated main categories, i.e. contents, technical aspects, layout & design & ergonomics, and didactics (representing the 4 competence areas of the project partners and their responsibilities). In addition, the standard deviation was calculated to estimate the relevance of the assessed values. In view of the low number of users, data interpretation took into consideration generally centralized approaches, as a firm statistical basis is not given.

The following figure shows the results related to all evaluated e-lections, regardless of the differences between language versions, countries or even person groups (representing the results of all users):

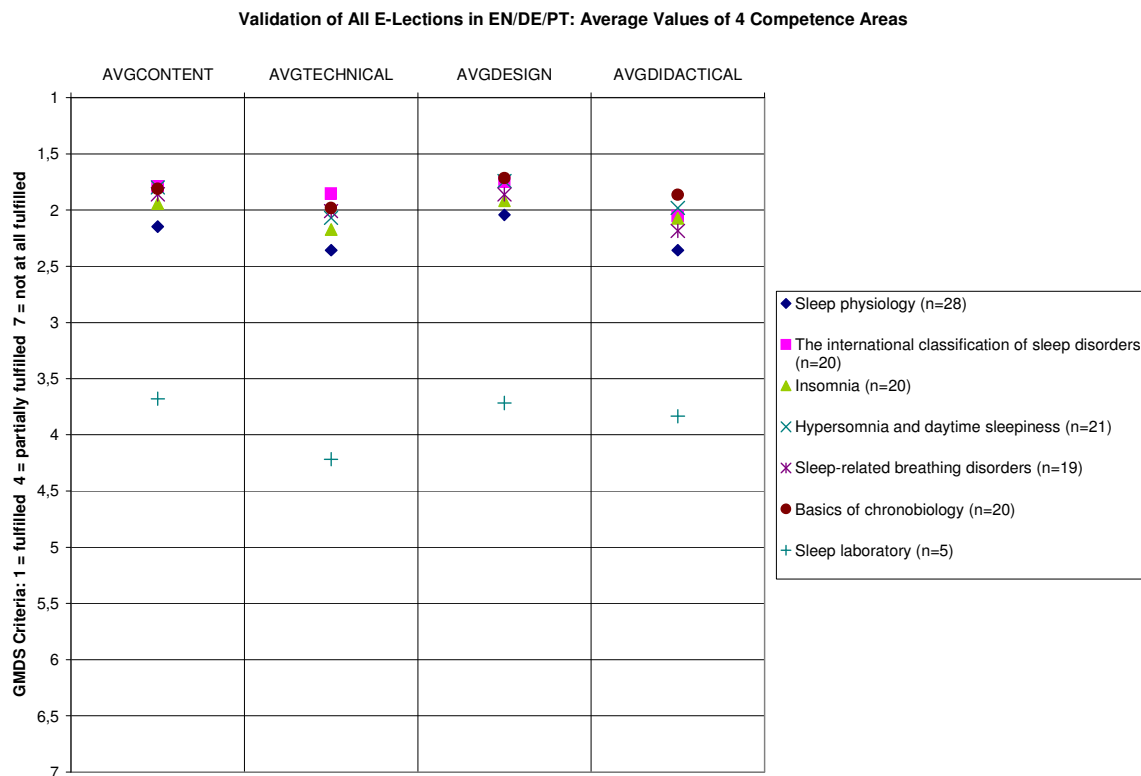


Fig. 10: E-lections were evaluated in every language by all users in Sweden, Germany, Portugal and Spain. Average values are related to the main categories: contents, technical aspects, design, and didactics.

Apart from the e-lesson "Sleep Laboratory", all other e-lections reached good average values ranging between 1,75 and 2,4 (1 = GMDS Criteria fulfilled, 4 = GMDS Criteria partially fulfilled, 7 = GMDS Criteria not at all fulfilled).

The following figure shows the calculated standard deviation derived from the average value of the overall estimation of an e-lesson without differentiating between the 4 categories corresponding to the competence areas:

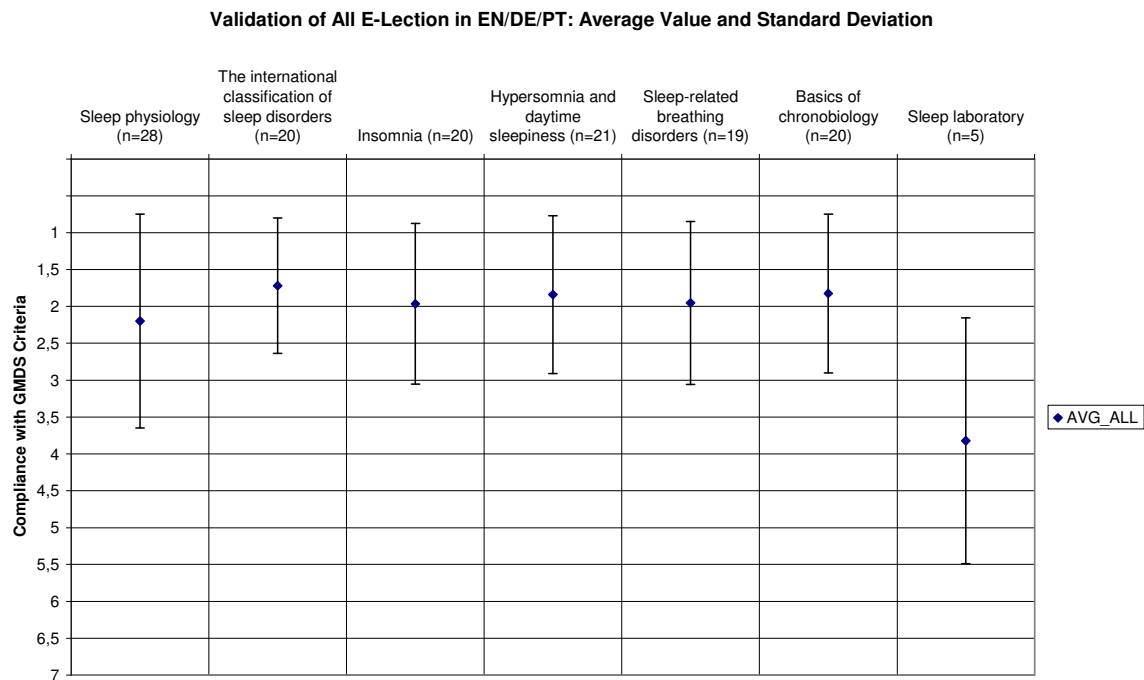


Fig. 11: Standard deviation relating to the e-lections evaluated in all languages by all users in Sweden, Germany, Portugal and Spain.

The e-lections "Sleep Physiology" and "Sleep Laboratory" point out a higher standard deviation compared to other e-lections. All in all, the scores indicated high acceptance and good ratings for most lectures regarding all competence areas except the above mentioned versions. Identified needs for optimization are to be considered in subsequent revisions.

The diagrams presenting the average values of all courses independent to countries and person groups, but differentiated between language variations, point out that, altogether, conclusions have to be drawn with caution (fig 10 and fig. 11). The standard deviation shows unequal distribution ranging between 1.5 and 5.5. The broad range in the assessment of technical aspects suggests that users seemed to set very different and individual benchmarks as technical settings did not vary in different e-lections. It indicates different needs and expectations on the users' part. Indeed, statistically valid interpretations are not possible in view of the limited figures and quantifications.

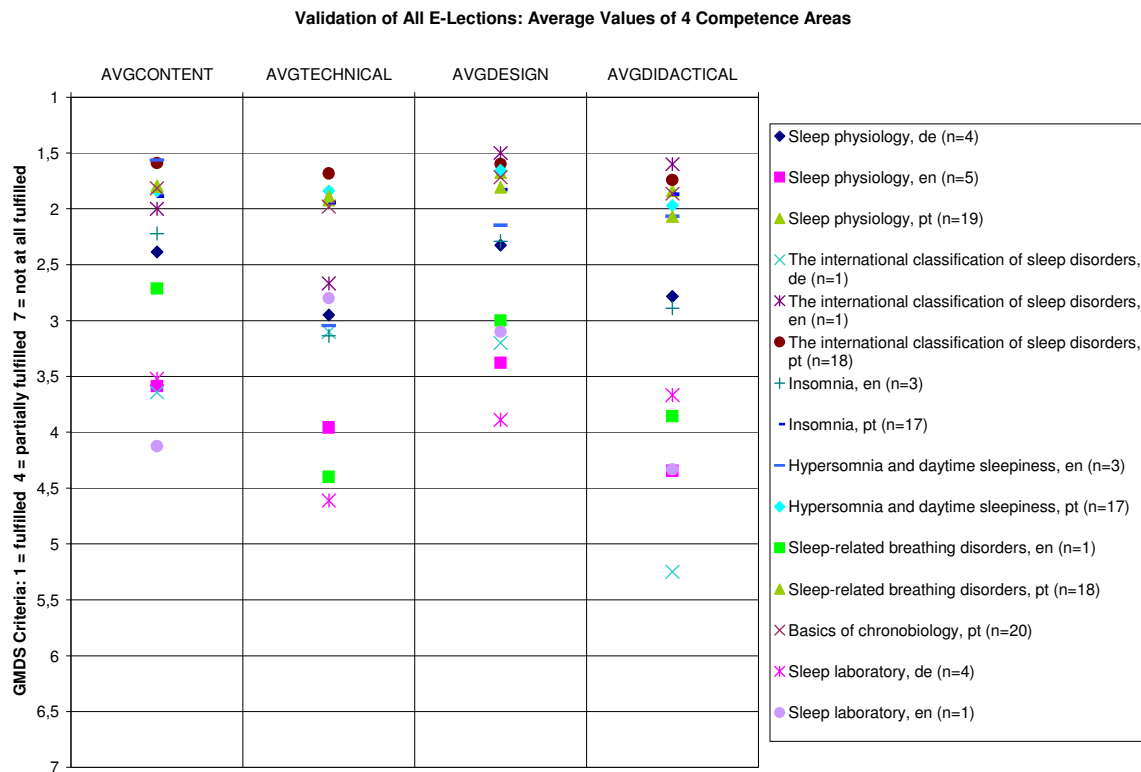


Fig. 12: Average values of the four areas (content, technique, design and didactics) of all evaluated courses differentiating between language versions without limitation to person types or countries.

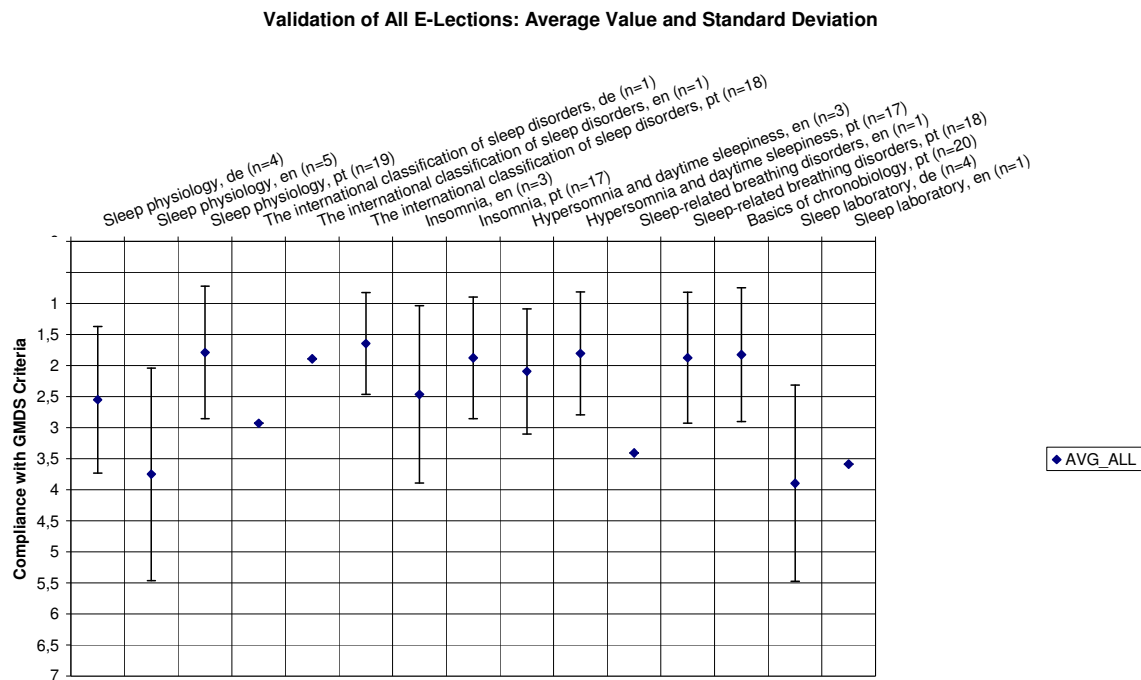


Fig. 13: Average value and its standard deviation of all evaluated courses differentiating between language versions without limitation to person types or countries.

9.5.3 Country-Related Assessment Results

Germany

Regarding the assessment of German versions, statistic inference is not given in view of the low number of users (fig. 11). E-lectons assessed by only one user, are not considered in the interpretation for unquestionable lack of significance. "Sleep Physiology" (assessed by 4 users) showed good results, although technical aspects approached a medium rating. "Sleep Laboratory" (assessed by 4 users) fulfilled the GMDS quality criteria only partially. In Germany, evaluators were mainly recruited among members of the DGSM task group "Training and Education", i. e. experts in sleep medicine and education. This might explain that the results show a slightly increased tendency of critical feedback compared to the average values of e-lectons assessed by all users (independent from countries and person groups).

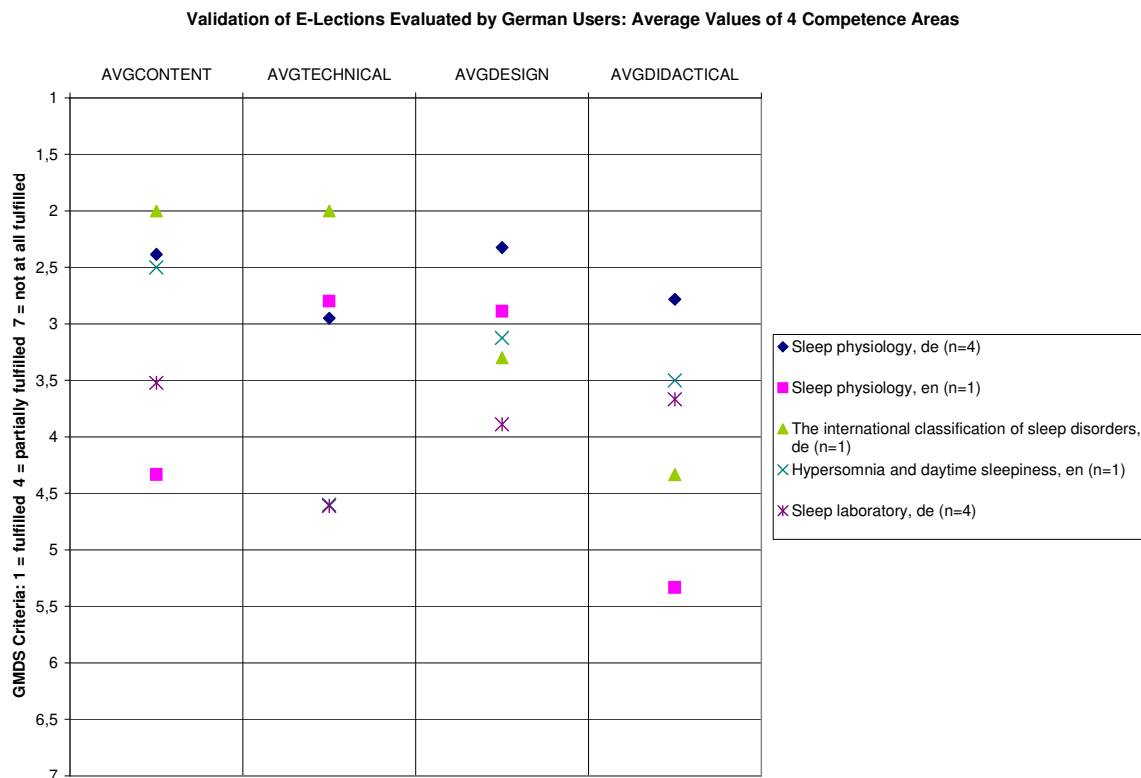


Fig. 14: Average values of the four areas (content, technique, design and didactics) of all courses assessed by German users.

Unfortunately, the number of German users was low. The reason of minor participation might be owing to the workload of addressed professionals as being reported by several users. Some users who had been personally invited by UNIMAR to participate in the evaluation explained on inquiry that they did not find time for the registration and testing the e-lectons. Online support was offered in such cases, but, ultimately, was not called on.

The two courses being analysed showed relatively high scores regarding the standard deviation.

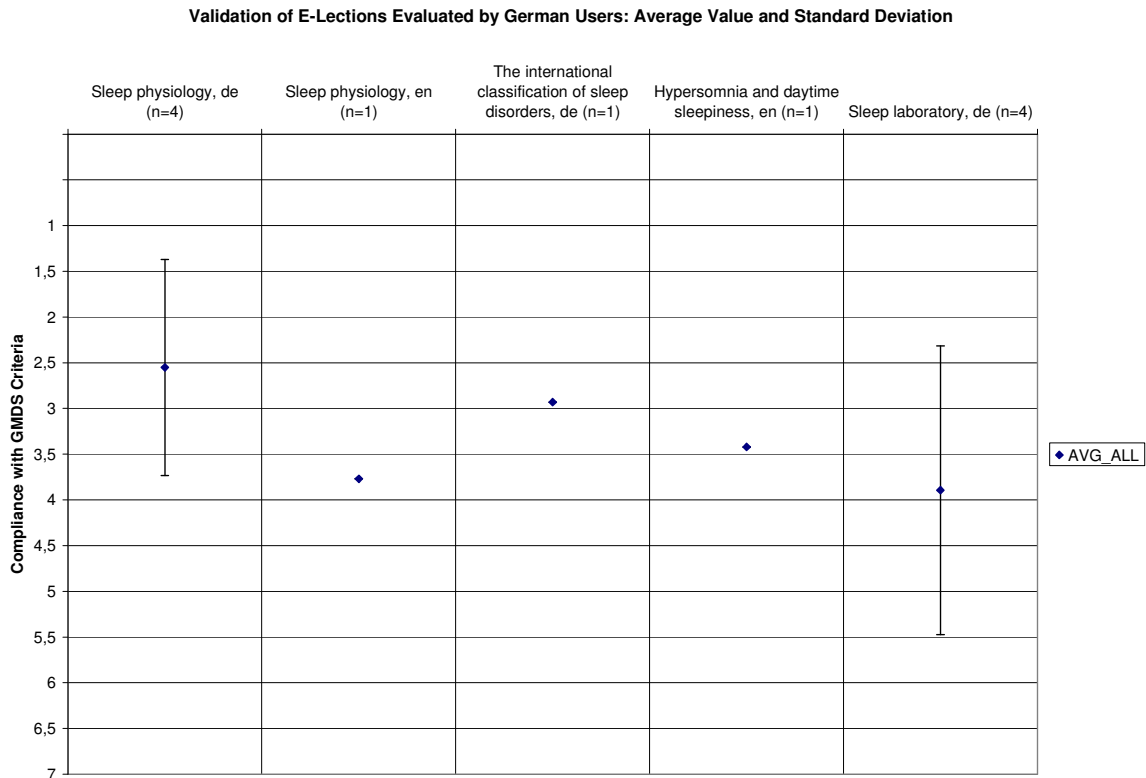


Fig. 15: Average value and its standard deviation of all courses assessed by German users.

Valid conclusions can not be drawn due to the marginal quantifications. However, the revisions of these e-lectons will be done with selective attention.

Portugal

Pre-selected users in Portugal confirmed the fulfillment of GMDS quality criteria in all areas at high rates. In two cases, English versions have been evaluated by only one single user. They are not considered in the interpretation. Portuguese versions were evaluated by 17 to 20 users. Average values of assessed e-lectons are ranging between very good and good, i.e. between 1 and 2.2.

Inspecting the values regarding the standard deviation, the reliability of the results tends to be confirmed. As a maximum, critical results are approximating value 3 which notifies a high compliance rate.

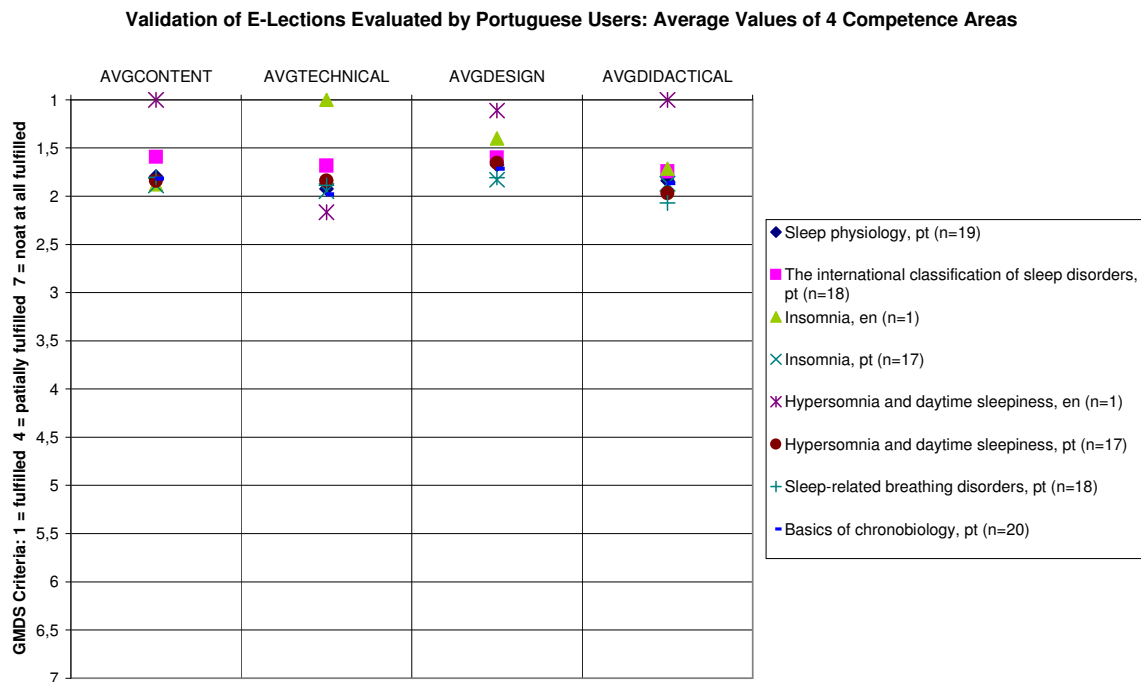


Fig. 16: Average values of the four areas (content, technical aspects, design and didactics) of courses assessed by Portuguese users.

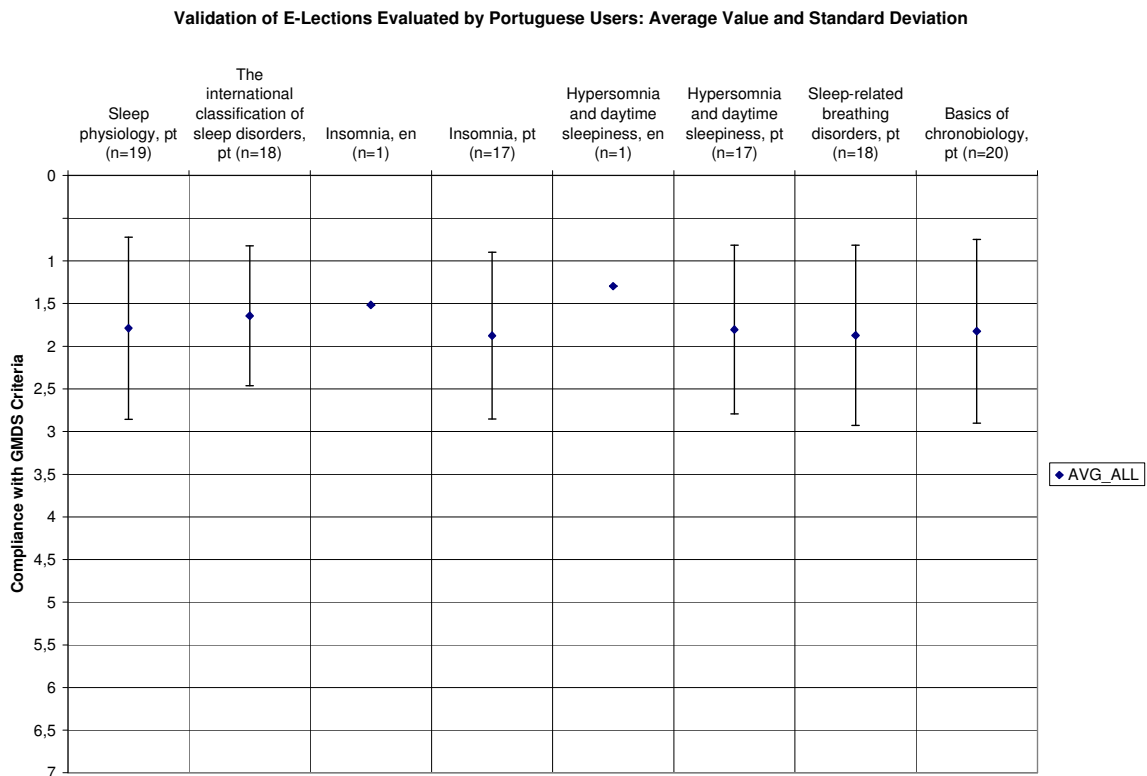


Fig. 17: Average value and its standard deviation of all courses assessed by Portuguese users.

Sweden

In Sweden, 3 e-lectons were evaluated by one single user. The e-lection "Sleep Physiology" was evaluated by 4 users with average values between 3.5 and 4.25 which indicate some need for optimization. Indeed, the standard deviation is notably high which disallows reliable data interpretation.

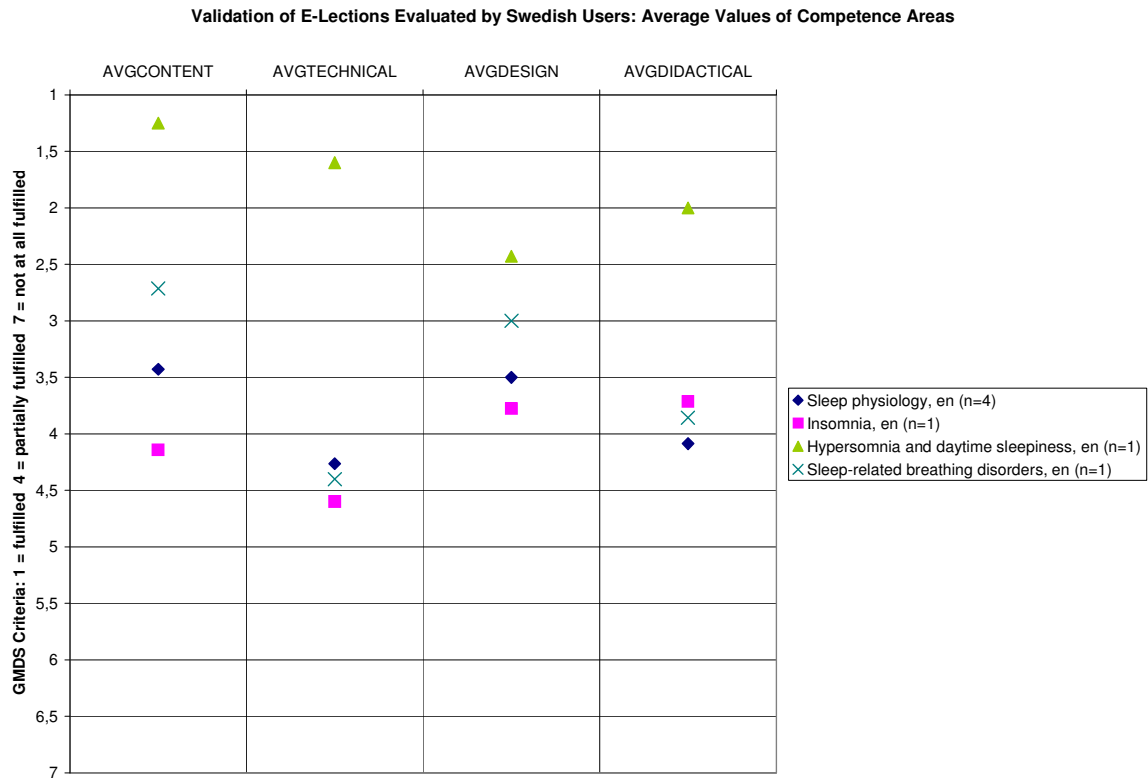


Fig. 18: Average values of the four areas (content, technique, design and didactics) of all courses assessed by Swedish users.

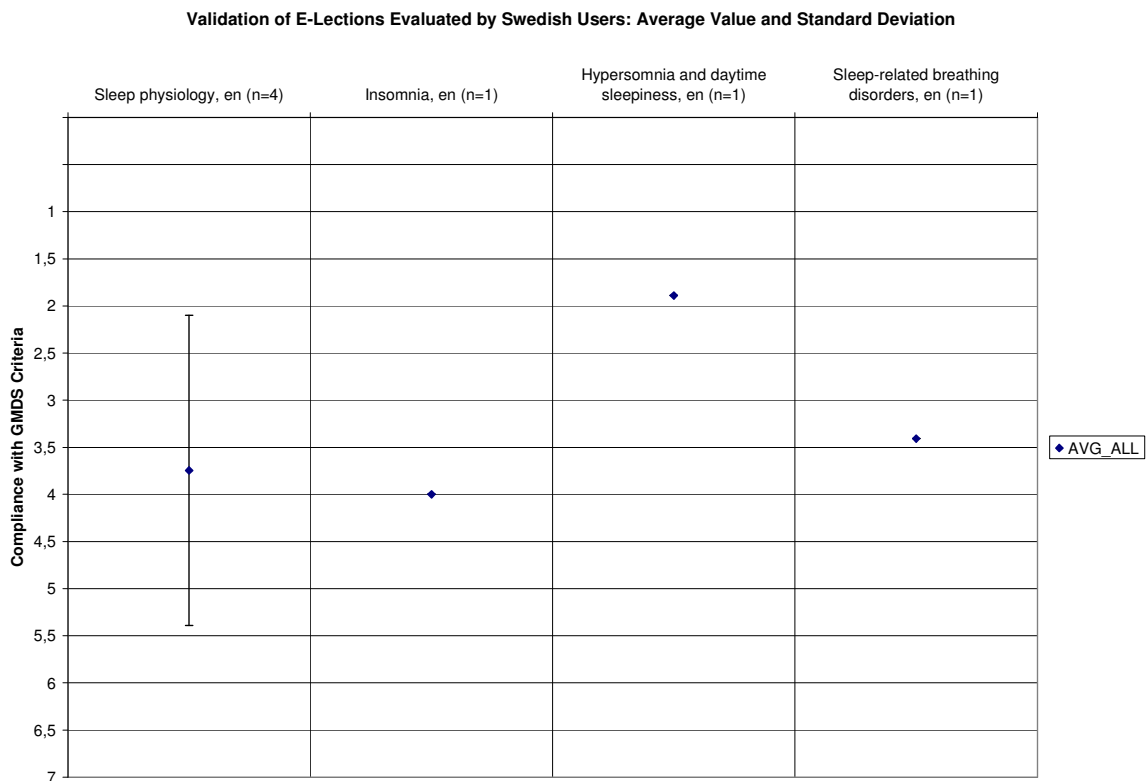


Fig. 19: Average values and its standard deviation of all courses assessed by Swedish users.

9.5.4 Person Group Related Assessment Results

The structure of the questionnaire allowed to analyse the assessments by different person groups / types. The validation data was screened according to the following groups:

- sleep medicine experts
- specialized physicians
- general practitioners
- students
- medical-technical assistants
- nurses
- others

In the analysis, differentiations between countries were not considered due to the limited number of quantifications. For the same reason, the above mentioned person groups except the group "Others" are not regarded separately in the analysis because the number of completed questionnaires is ranging between 1 and 3 test users per e-lection. Complete data providing the assessment results of each person group is presented in Annex V.

The results derived from questionnaires completed by the person group "Others" confirms the high acceptance and good ratings by Portuguese users related to Portuguese versions.

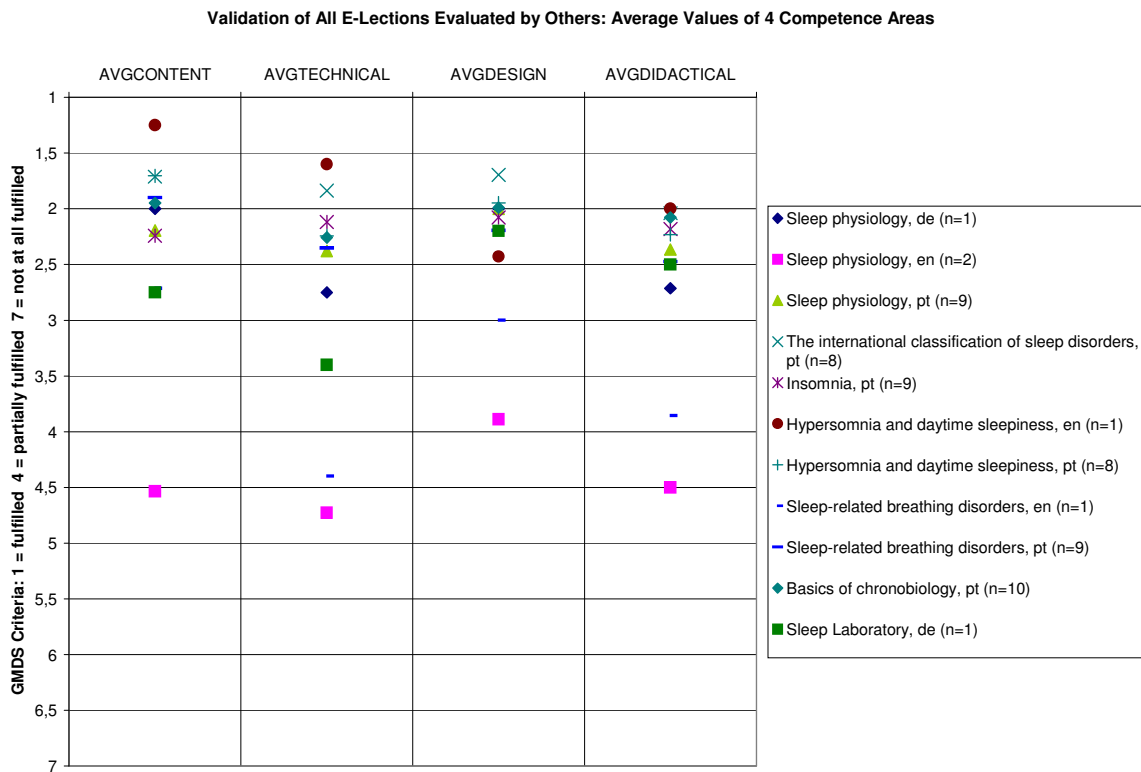


Fig. 20: Average values of the four areas (content, technique, design and didactics) of all courses assessed by users of the person type "Others".

Validation of All E-Lectons Evaluated by Others: Average Value and Standard Deviation

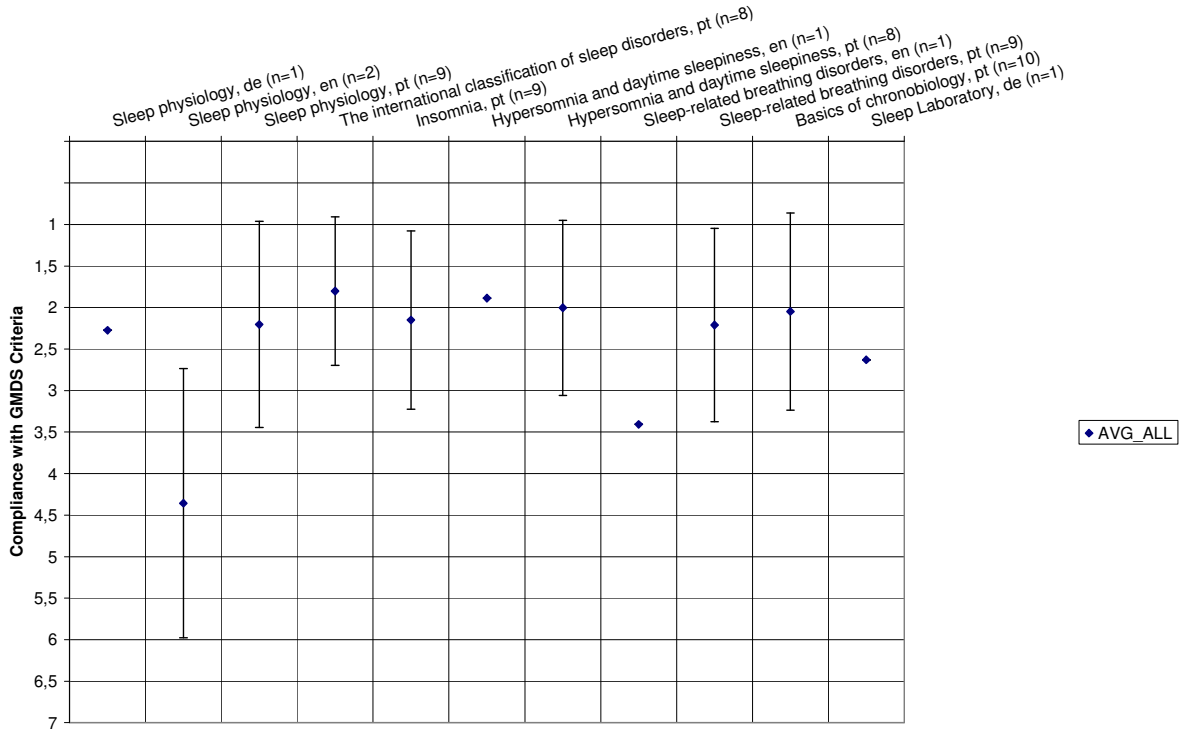


Fig. 21: Average value and its standard deviation of all courses assessed by the person type "Others".

9.5.5 Customers' Survey

The online questionnaire for the customers' survey could be accessed by potential users at ENN-ICS web portal without registration. The inquiry based upon the following set of questions:

1. Do you think that doctors and nurses at your organisation working with sleep disorders can use easily ENN-ICS services?
2. Do you think that the content and materials presented in ENN-ICS portal are appropriate?
3. Are the content and materials presented in ENN-ICS portal relevant to current work of healthcare professionals at your organisation?
4. Do you think that the contents and materials presented in ENN-ICS portal are well structured?
5. Do you like the look and feel of ENN-ICS portal?
6. Do you find the navigation in ENN-ICS portal easy to understand?
7. Do you think healthcare professionals at your organisation will be interested to take online courses at ENN-ICS portal?
8. Do you think healthcare professionals at your organisation would learn better from ENN-ICS portal compared to traditional method of learning in classes?
9. Having looked at ENN-ICS portal, do you think your organisation would benefit from using this service?
10. Which format do you prefer for contents presented in the courses?

10a.	- CD-ROM
10b.	- Paper based
10c.	- All web based
10d.	- Hybrid
11.	Will you pay for ENN-ICS services?
12.	Do you think your organisation will pay for ENN-ICS services?
13.	In general, do you think that hospitals and clinics will pay for ENN-ICS services?
14.	Do you think that pharmacy industries will pay for ENN-ICS services?
15.	Do you think that insurance companies will pay for ENN-ICS services?
16.	Do you think that publishers related to the medical field will pay for ENN-ICS services?
17.	Would you recommend the use of ENN-ICS services as it is?
18.	Would you introduce some enhancements before purchasing the product?
19.	Do you use other CD-ROM or web based learning services already?

Table 13: Business oriented questionnaire

The user statistics is presented in the following table:

COUNTRY	COUNT_FILLED_OUT
Germany	10
Sweden	8
Portugal	6
Spain	1
Europe	0
outside Europe	1
Total	26

PERSON_TYPE	COUNT_FILLED_OUT
individual	26
hospital based medical service	0
medical service outside the hospital	0
company	0
other organization	0
Total	26

Table 14: Statistical results based on the questionnaire of Table 13

The total number of questionnaires filled in by potential customers is 26. All persons chose the person type "individual". Some users did not answer all questions which are considered in the data presentation. The customers' estimation on the upraised questions without differentiating between person groups and origin is as follows:

Results of Customers' Survey (all potential clients): Average Values and Standard Deviation

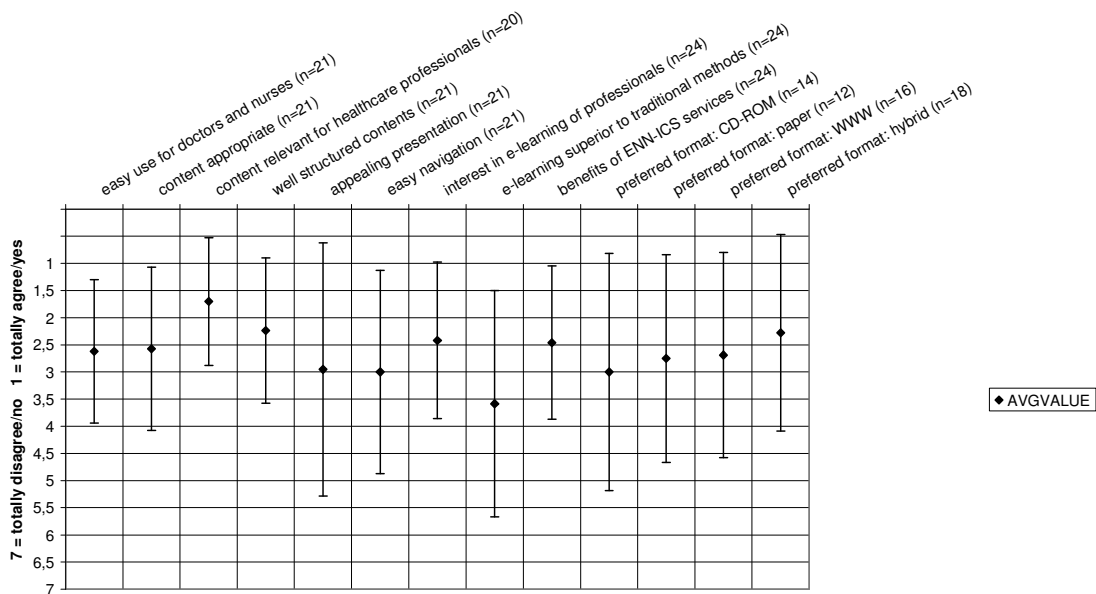


Fig. 22a: Customers' estimation related to Questions 1 to 10d (without differentiating between person groups and origin).

Results of Customers' Survey (all potential clients): Average Values and Standard Deviation

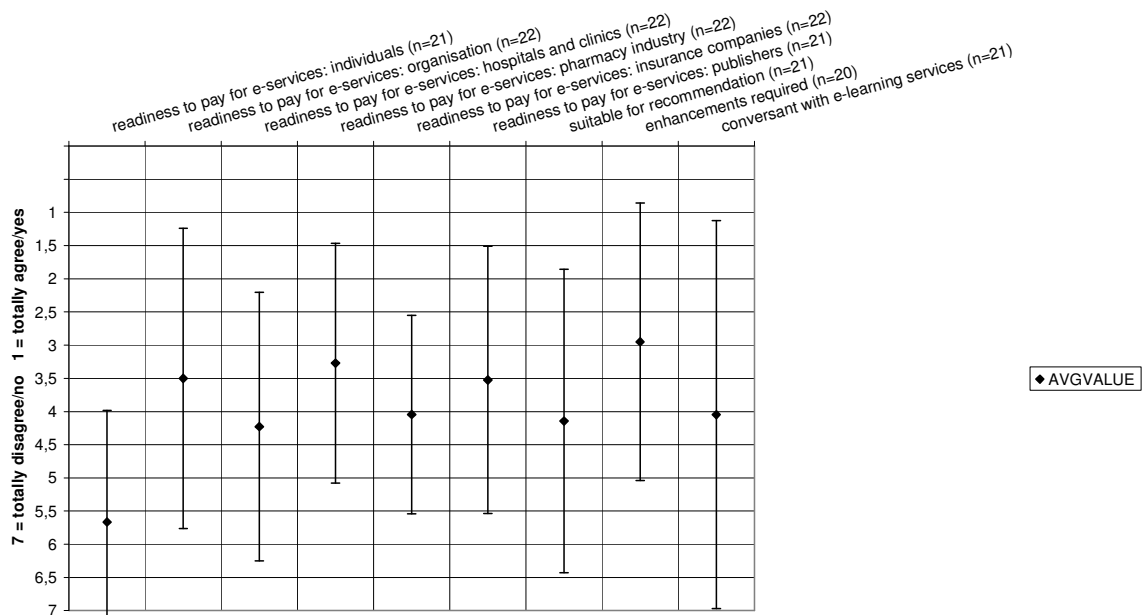


Fig. 22b: Customers' estimation related to Questions 11 to 19 (without differentiating between person groups and origin).

The standard deviation of most average values is quite high which does not allow reliable estimations. Nevertheless, general tendencies can be made out. The average values of questions relating to the presentation and use of ENN-ICS services and products (fig. 22a) certify rates of solid acceptance. The interest of professionals in e-learning and their believe in its benefits are high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference regarding the format of presented contents is quite balanced, but web based presentation and hybrid presentation using all formats (paper, web, CD) are slightly favoured.

Average values of questions related to the readiness for paying e-services show moderate rates (fig. 22b). Organizations, pharma industries and publishers are estimated to show middle-rated readiness. Hospitals, clinics and insurance companies are still ranging in the medium scale but their readiness to pay is estimated to be lower than the readiness of the before mentioned groups. Costumers estimate that the willingness to pay of individuals is very low. According to the average values, the suitability for recommendation of ENN-ICS services is moderate and enhancements are required to some extent. These results must be relativized in view of the fact that the familiarity with e-learning is stated being low. In addition, there is a high standard deviation which puts the relevance of the results into question.

The tendencies detected in the above presented analysis are confirmed by the estimation of German users with some downward trend. In view of the high standard deviation detailed analysis is not presented but all charts can be viewed, together with all other diagrams, in Annex VI. For the same reason, the interpretation of the results derived from Swedish customers is not presented in detail here, but can be looked up in the annex.

Portuguese costumers showed upward trends in their estimations.

Results of Customers' Survey (potential portuguese clients): Average Values and Standard Deviation

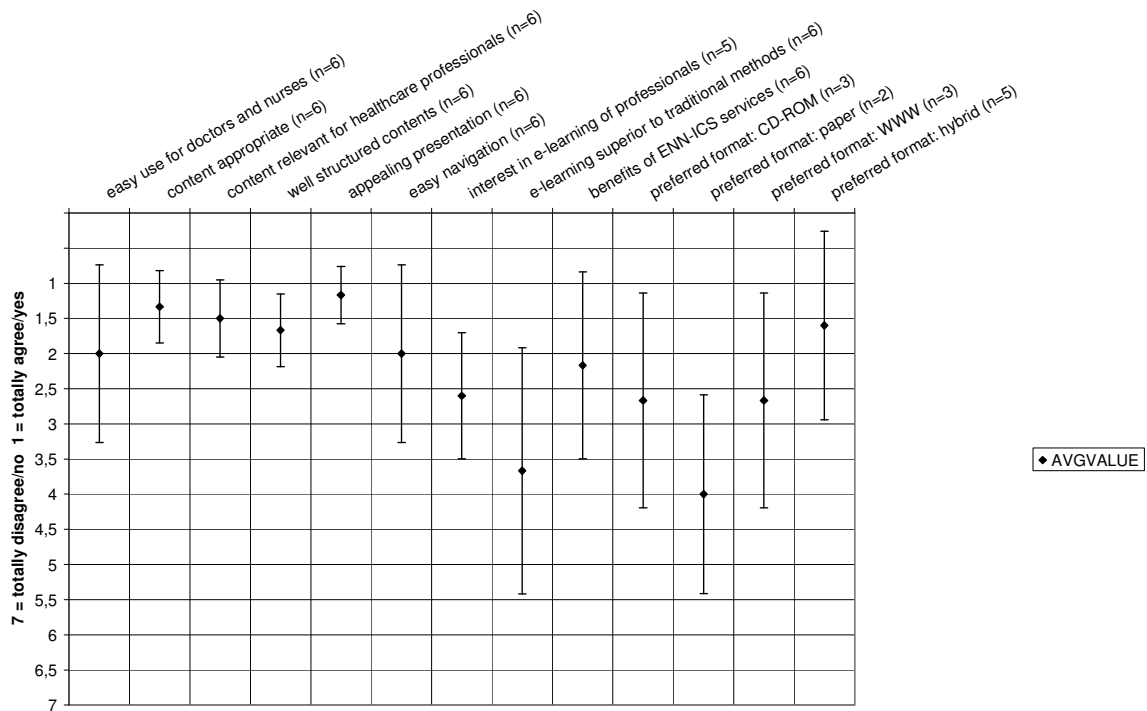


Fig. 23a: Customers' estimation related to Question 1 to 10d (Portugal)

Results of Customers' Survey (potential portuguese clients): Average Values and Standard Deviation

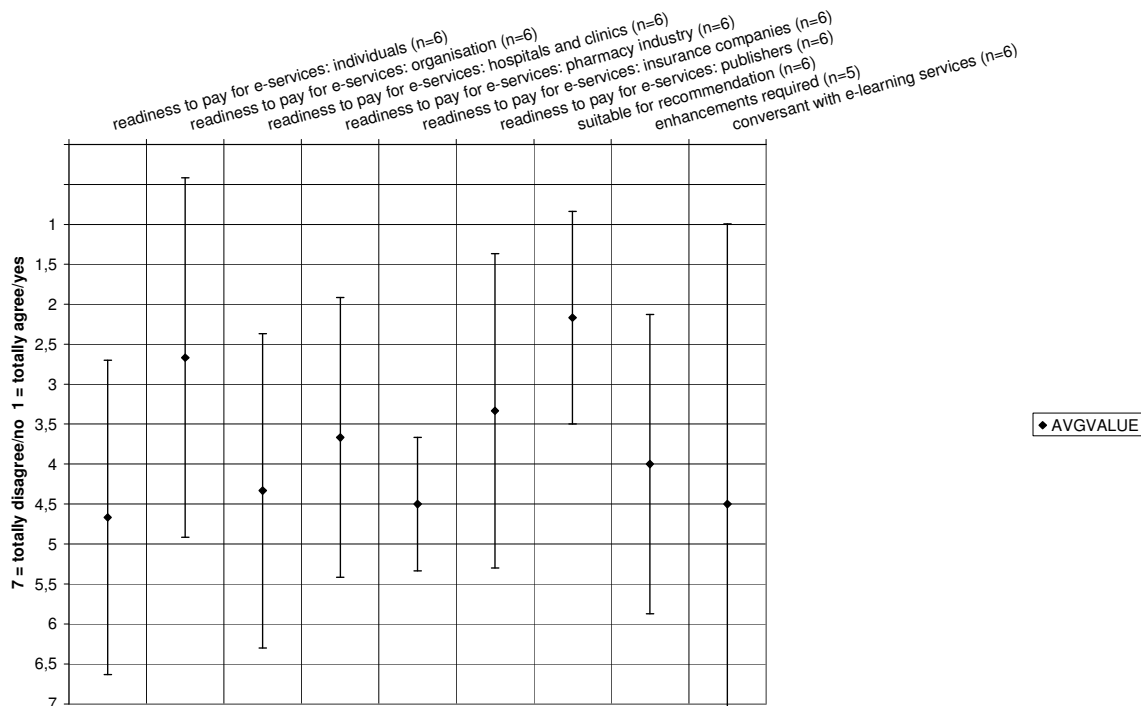


Fig. 23b: Customers' estimation related to Question 11 to 19 (Portugal)

The average values of questions relating to the presentation and use of ENN-ICS services and products (fig. 23a) certify rates of high acceptance. The interest of professionals in e-learning and their believe in its benefits are relatively high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference regarding the format of presented contents is unequally distributed. Clearly preferred is web based and hybrid presentation.

Average values of questions related to the readiness for paying e-services show moderate rates (fig. 23b). Organizations, pharma industries and publishers are estimated to show good or middle-rated readiness. The readiness of hospitals, clinics and insurance companies is estimated to be lower. Costumers estimate that the readiness to pay of individuals is rather low. According to the average values, the suitability for recommendation of ENN-ICS services is given, but enhancements are required. These results must also be relativized in view of the fact that the familiarity with e-learning is stated being low. In addition, there is a high standard deviation which puts the relevance of the results into question.

Estimations by the person group "Individuals" independent from origin confirm good use and presentation of ENN-ICS contents. The interest of professionals in e-learning and their believe in its benefits are high, but they do not believe to the same degree that e-learning is superior to traditional methods. The preference of the format is balanced, but the hybrid presentation is slightly favoured.

Results of Customers' Survey (potential individual clients): Average Values and Standard Deviation

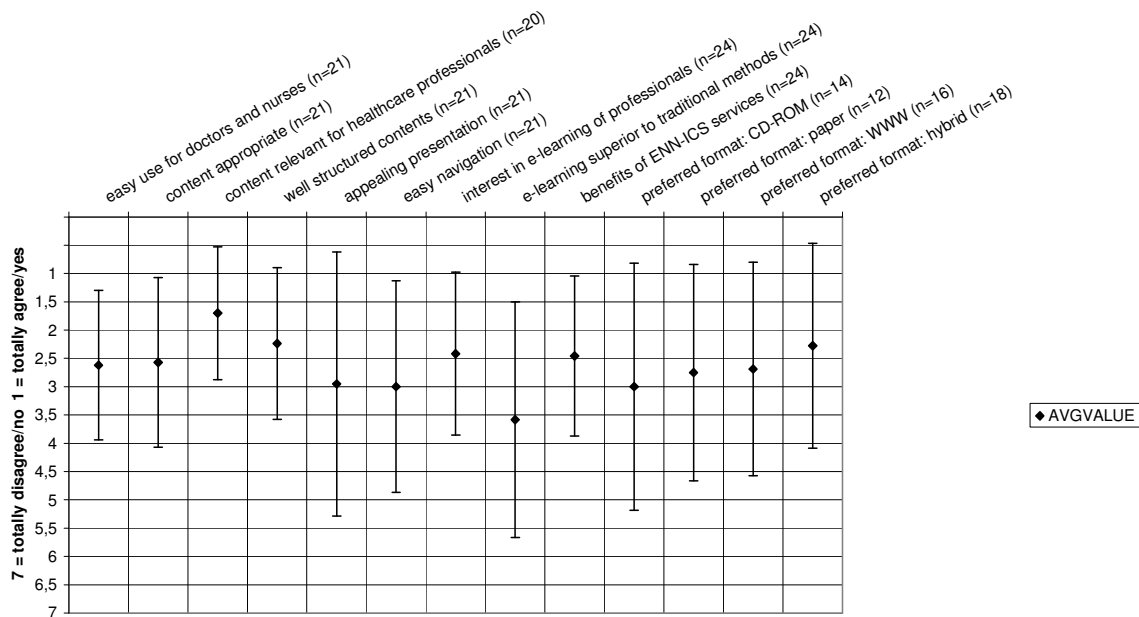


Fig. 24a: Customers' estimation related to Question 1 to 10d considering person groups independent from origin (person group = individual)

Average values of questions related to the readiness for paying e-services show moderate and low rates (fig. 24b). Organizations, pharma industries and publishers are estimated to show medium readiness. The readiness of hospitals, clinics and insurance companies is estimated to be lower. Customers estimate that the readiness to pay of individuals is very low. According to the average values, the suitability for recommendation of ENN-ICS services is moderate and some enhancements are required. Due to the low familiarity with e-learning as being stated by the customers, the estimation can not be regarded as reliable judgement. In addition, there is a high standard deviation which puts the relevance of the results into question.

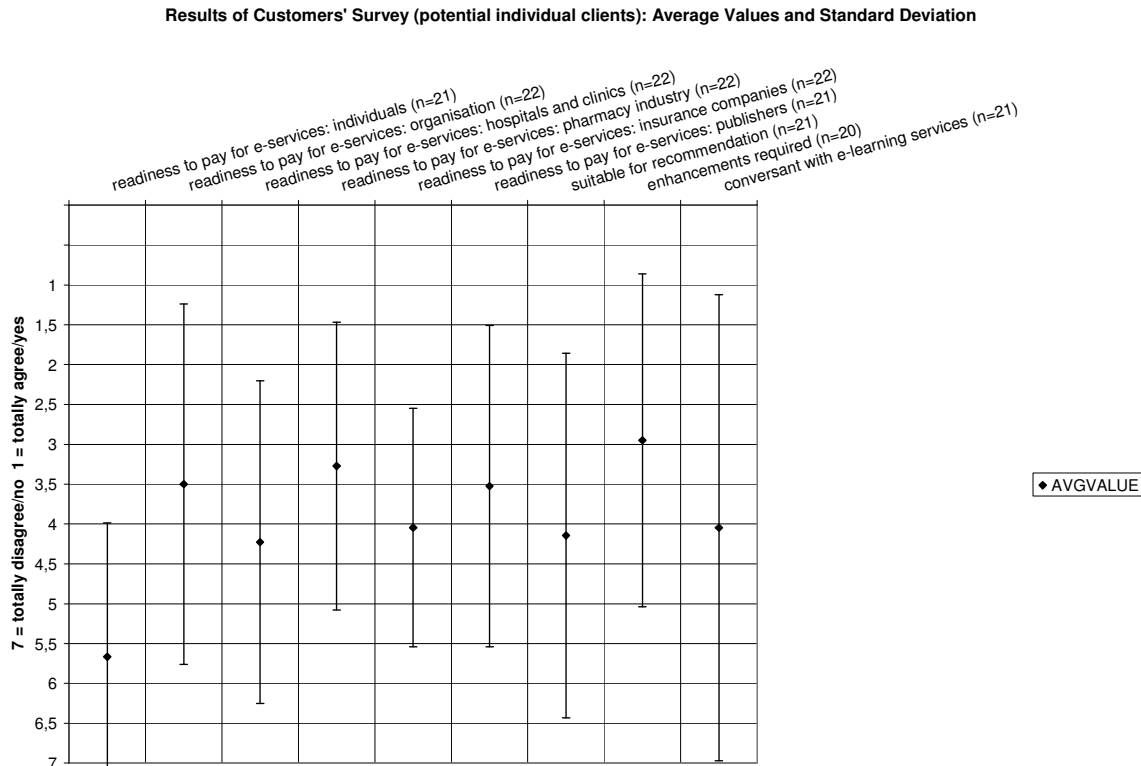


Fig. 24b: Customers’ estimation related to Question 11 to 19 considering person groups independent from origin (person group = individual)

9.5.6 Identification of Needs for Optimization

In general, many e-lections received very good or good results. In particular, Portuguese versions achieved very good results in the evaluation by Portuguese users. However, the results of the evaluation of LMS and contents do not allow statistically significant interpretations in view of the low quantifications of each e-lection. Nevertheless, some tendencies can be made out that allow the project partners to detect general needs for improvement within their competence areas that will be observed in future revisions and further content contributions.

9.5.7 Conclusion and Considerations

ENN-ICS Centre was validated by user groups in Germany, Portugal and Sweden. The scope of the validation as carried out in ENN-ICS was on the medical contents and on the tools. The results of the self-assessment of ENN-ICS services allowed to continuously revise contents, editorial and technical aspects, ergonomics, design, and didactics during the phases of development and implementation. All ENN-ICS partners contributed to the stepwise refinement of the system development using their specific competence area in accordance with the quality requirements defined by DISCERN, HON, and GMDS.

The public validation showed good ratings, in particular related to Portuguese versions of

e-lections. Nevertheless, only general tendencies could be concluded in view of the limited number of users.

Following high quality standards according to HON principles and GMDS criteria, the system architecture and its applications can be used as a model for future e-health related websites dealing with neurological and other medical topics.

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