

# LapForm

Online Vocational Training course on laparoscopy's ergonomics for surgeons and laparoscopic instruments' designers (LapForm)

Progress Report

Public Part

## Project information

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## Executive Summary

LapForm project aims to create, implement and set the basis for a European exploitation of a new online VET courses in laparoscopy ergonomics applied to product development (instruments and equipment) addressed to designers of laparoscopic instruments, and posture and workplace-related ergonomics for laparoscopic surgeons. For this purpose, a consortium comprised of 6 members ([IBV](#), [CCMIJU](#), [KOMAG](#), [SUT](#), [BGU-MURNAU](#), [SECLA](#)) with a wide expertise on laparoscopy, ergonomics and virtual modelling and simulation was created. In addition to their complementary technical capabilities, it is worth to note their experience working together in previous projects at national and European level, in R+D and transfer of formative contents.

During the first year of the project, the consortium has been mainly working detecting formative needs in ergonomics for laparoscopic surgeons and instruments designers, using qualitative and quantitative research methodologies used in social sciences (focus groups, in-depth interviews and questionnaires). These detected needs were considered the starting point for the elaboration of VET curriculums of two training courses, the first one addressed to laparoscopic surgeons and the second one addressed to laparoscopic instruments designers, as well as for the setup of an e-learning platform for their implementation.

In parallel to the technical tasks, dissemination activities were performed during this period to improve the visibility of LapForm project in social networks, laparoscopic associations and industry. Among others, we can highlight the creation of LapForm website (<http://www.lapform.eu>), a LapForm Facebook profile (<https://www.facebook.com/LapformProject>), and the LapForm e-newsletter (<http://www.lapform.eu/index.php/en/newsletters>), as well as its presence in National and International meetings and related to ergonomics, laparoscopy, virtual modelling and safety at work.

Regarding prospects for the future, planned short-term actions include the development of training materials, the implementation, monitoring and evaluation of the two pilot courses and the translation of final contents to Spanish, Polish and German.

In order to assure the sustainability of the project results, their wider and broad adoption and their continuous update beyond the life of the project, the whole consortium will work on the elaboration of the exploitation agreement which will contain the future steps to follow, ensuring successful exploitation of results.

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# 1. Project Objectives

The main objective of LapForm project is the development of an online training course to ensure that surgeons and instruments designers have a valuable education along their professional career regarding ergonomics applied to laparoscopy, matching product innovation with the needs of laparoscopic surgeons and with their working environment. The e-learning tools resulting from the project will be available online in four European languages (English, Polish, German and Spanish) for raising acceptance of the course.

The main objective will be achieved through the following partial objectives:

- Definition of the training needs based on target groups opinions across Europe, and definition of VET curriculum.
- Development of formative contents which satisfy needs of surgeons and designers.

In general, the contents will include knowledge related to ergonomics and laparoscopic surgery, for training the following professionals:

## Laparoscopic surgeons:

- Ergonomic posture. What are the positions that cause less fatigue and biomechanical rationale?
- Ergonomic environment. How should be some elements (screens, table, surgical team) be positioned in an operating room so that their work be more efficient and require less effort?
- Instrument ergonomics. To know; from an ergonomic point of view, how the instruments should be used in surgery, and how to use them properly.

## Instruments designers:

- Ergonomic design requirements for laparoscopic instruments, considering the surgeon's preferences and experience.
- Assessment methods for ergonomic validation of the different kind of instruments.

Training contents will be updated on-line in the future, integrating the knowledge resulting from the R&D activities of the project partners.

## 2. Project Approach

The project aims to create, implement and set the basis for an European exploitation of a new online VET course in laparoscopic ergonomics applied to product development (instruments and equipment) for designers, and posture and workplace-related ergonomics for surgeons. The project consortium brings together partners from different countries which have different academic cultures, but all of them were committed to bring specialised knowledge to create a learning course with a high quality level.

In order to accomplish the key objectives, the project is divided into two phases. The **main phase**, carried out during this first year, has developed three parallel but connected activities.

Firstly, from national surveys carried out in 3 countries (Spain, Poland and Germany), we knew that large gaps exist between and within countries concerning the health professionals training in this specific field. Different questionnaires were designed to collect detailed information about formative needs in laparoscopic surgery ergonomics for surgeons and designers. Results from these surveys have been helpful support for the identification of the learning outcomes and enabled the development of a balanced course that not only met the needs but was also within the limitations in different countries.

Secondly, learning objectives have been formulated by the consortium. In order to approach a joint map of competences, a convenience sample of stakeholders in every partner country was invited by letter to complete an open answer questionnaire. They were asked about which competencies are important according to their opinion. And next, to prioritise their answers. By examining their opinions, it has been possible to discuss the direction the course should take. Thus, the training course programme responded to the needs perceived and recognised important needs by professionals.

Thirdly, the elaboration of the overall structure and content of the module based on the results of the above mentioned research. This is the core of the project. The issues covered in the course modules are areas of interest in many European countries and workplaces. Each partner has prepared didactic products according to their expertise. The integration between individual course packages has been guaranteed as each partner acted as co-author in multiple packages and they have met regularly.

Pedagogical aspects have not been neglected. Quality assurance mechanisms were included: a quality system has been developed, and has regulated partners' performance in the whole process and guaranteed outcomes and implementation.

In the **second phase**, the pilot module will be implemented and tested: an online evaluation questionnaire will be set up to evaluate the adequacy and quality of the modules' content and the layout of the website. Critical evaluation by small groups will permit the last corrections and creation of new materials before opening the contents to all interested students. In addition to the content validation, increase in knowledge and self-efficacy beliefs will be assessed by English speaking professionals from different countries (Spain, Germany and Poland). By engaging many interested educators and learners in the evaluation and discussions, disseminations of the projects' outcomes will be continuously promoted and the impact strengthened.

Finally, the project approach will generate a course that will be a quality reference and benchmark for improving formation of qualified laparoscopic professionals.

### 3. Project Outcomes & Results

During the first year, all of the tasks performed were mainly focused on detecting formative needs about ergonomics of laparoscopic surgeons and laparoscopic instrument designers. For this purpose, several qualitative and quantitative research methodologies used in social sciences were applied. Among them, we can highlight the use of discussion groups or in-depth interviews, in which the laparoscopy practitioners (surgeons and instruments designers) were asked about their training and knowledge on ergonomics, focusing on its implementation in the course of their work.

As a result of this phase, ergonomic formative needs were detected and described, finding clear differences between those detected for laparoscopic surgeons and those detected for designers. These differences are broadly based on their professional activity. Surgeons, as final users of laparoscopic instruments, reveal formative needs related to posture and body positioning in the surgical environment, instrumental handling, etc., while designers needs are mainly related to the ergonomic criteria implementation during the design process.

Given this fact, the consortium decided to develop two different training courses. On the one hand, a course specifically designed to address formative needs of laparoscopic surgeons, which will focus on current and new laparoscopic instruments, surgical environment and other aspects as cognitive ergonomics, and giving general ergonomic recommendations. On the other hand, a course addressed to designers, focused on fundamentals of the ergonomic design, ergonomic design requirements and tools for the integration of ergonomics in the design of laparoscopic instruments. This distinction enables to deal with the ergonomic training gaps defined by the main target groups.

After vocational educational training curricula of both courses were defined, the consortium started with the development of training contents during the last quarter of the year, to address, on the second year, with the pilot courses which are planned to be carried out between February and April 2014. For this purpose, the multi-language e-learning platform of LapForm project was setup. This platform is based on a free, open-source PHP web application for producing modular internet-based courses that support modern social constructionist pedagogy (i.e. MOODLE). For these pilot courses, the e-learning platform will be hosted at IBV virtual campus and all the partners will have granted free access to the course.

During the first twelve months, the consortium has also focused their efforts on dissemination activities of LapForm project. The LapForm' website ([www.lapform.eu](http://www.lapform.eu)) was, among others,

result of these efforts. This website was created at the beginning of the project with a two-fold aim, on the one hand to constitute the main platform for dissemination activities through its public content; and on the other hand, to use it as exchange repository and as internal communication tool for partners. At this website, people can find general information about the project and partners involved, as well as periodic information about the project progress, events of interest and news through the quarterly e-newsletter (<http://www.lapform.eu/index.php/en/newsletters>), which currently publishes 4 issues. In addition to the website, LapForm project is also present in social networks with a specific profile (<https://www.facebook.com/LapformProject>), in which all followers can be updated with all news, events and progress of LapForm project.

These actions are not only circumscribed to online dissemination. Technical dissemination is also one of the main objectives of the project, thus LapForm project has been present in several national and international conferences through oral presentations, posters and papers. LapForm project has been presented at the 10th International Conference on Systems Supporting Production Engineering (02-05 September 2013, Przemyśl/Lviv) and at the Annual national meeting of endoscopic surgery section (24th to 26th of April in Murcia, Spain), as well as in scientific publications, with two papers and some press notes.

## 4. Partnerships

The partnership counts with all the required expertise to implement this project. The consortium has partners with a great pedagogical experience in development and evaluation of methodologies for training and there are partners with a large experience in Occupational Safety in the laparoscopic surgery sector and, directly, involved in vocation training in that industry. Their roles in the project are directly related with their expertise.

The partnership was also established respecting some basic criteria:

- The definition of a partners core with a previous that guarantees the process stability, communication and the delivery of results.
- The inclusion of countries where the occupational safety and innovation issues have pointed out accentuated problems.
- Partners with a strong involvement in the occupational safety in the laparoscopic surgery sector, which can contact industries and other occupational safety organizations for advice and support.
- To keep the partnership in a reasonable dimension, it was decided to concentrate the partners in central activities where their expertise is most crucial, and leave secondary tasks to subcontracted organizations or individuals. Thus, it is possible to assure a coherent partnership, keeping a consistent activity between all partners.
- Partners with an extensive experience in the introduction and successful implementation within the enterprises of modern computer supported technologies for the development of high quality and technologically advanced products and services.

Partners involved in the project proved to have strong relationships with some Universities, in the business world at their regions, as well as with Local and Regional Authorities. This contact network developed by each partner will be very important for the dissemination and exploitation of the results.

Each partner will set up a project team for supporting the activities assigned to them. It should correspond to a flexible, effective and efficient structure, which will ensure close communication.

All partners have the necessary skills, knowledge, expertise and experience in the field of transnational cooperation. Some of them are very experienced in coordinating/participating in European projects.

Consortium management will be assured by the Steering Committee (SC), composed and represented by one-person from each partner. The SC is responsible for keeping the project ongoing, without major problems or deviations from the work plan. The coordinator (IBV) will lead the SC. The coordinator is also responsible for financial and technical reporting to the Agency. The SC also is responsible to promote and monitor the results of dissemination actions but it also is expected that partners develop local dissemination strategies. This ongoing process is supported by an electronic platform with project workflow functionalities. The platform will also include administrative and communication roles.

Meetings are used to prepare future tasks, evaluate what has been accomplished and to decide on corrective measures if the project monitoring signals point out that need. Between meetings, desktop videoconference is used for online meetings.

The consortium established a detailed description of the project with the responsibilities of each partner, according to the work plan, budget and task definition. Each WP has a leader according to the expertise of each partner. Measures and consequences of failing to respect these agreements were included in the Quality Plan.

The partners involved in this project are presented below:

#### Instituto de Biomecánica de Valencia - SPAIN

IBV is a Technological Centre whose aim is the promotion and practice of scientific research, technological development, technical assessment and training in Biomechanics. Engineers, medical doctors, physical therapists, biologists, informatics, and experts in training, design and social work compose its interdisciplinary staff, with large experience in European, national and regional projects.

IBV, in addition to project management, will focus its work on detecting formative needs of laparoscopic surgeons and laparoscopic instruments designers, as well as on the development of formative materials for designers, due to its expertise in ergonomic design and product development.

#### Minimally Invasive Surgery Centre Jesús Usón - SPAIN

The Jesús Usón Minimally Invasive Surgery Centre, CCMIJU, is a multidisciplinary institution dedicated to excellence in research and training in minimally invasive surgical. Thanks to the

available facilities and equipment, it is possible to develop less invasive surgical treatments by applying combined techniques and multidisciplinary equipment for treatment approach, thus benefiting the patient and providing higher precision to the surgeon. Similarly, the Centre is committed to technological development and innovation in health care, and for its advancement, it works closely with companies from all over the world.

Due to its proximity to laparoscopic surgeons and its expertise in professional training, CCMIJU will lead the development of formative materials, focusing on laparoscopic surgeons. In addition, CCMIJU will lead dissemination activities together with SECLA.

#### Institut Techniki Gorniczej KOMAG - POLAND

KOMAG is a state-owned research and development organization, subordinated to and supervised by the Ministry of Economy, employing 125 scientific research and technical specialists (total 225 employees), offering new, competitive technical solutions in the branch of mechanical systems. An interdisciplinary knowledge of KOMAG specialists, their high scientific, research and technical qualifications create a significant potential, enabling to develop the best-advanced technologies.

Its efforts will be addressed to support the consortium in the development of formative contents, in matters specially related to workplace ergonomics through the conception of virtual prototyping.

#### Silesian University of Technology. Faculty of Organization and Management - POLAND

The Faculty of Organization and Management is an entity of the Silesian University of Technology (1935 employed researchers), one of the largest higher education institutions in Poland having long scientific and didactic traditions. It is one of the leading scientific entities located in the region of Upper Silesia. Their activities are focused on enhancing work conditions and ergonomics in health care.

SUT will cooperate in supporting the consortium and developing material, in matters specially related to multimedia, interactive information and training materials. Spatial models for presentation of surgery. Analyses of surgeon's postures during surgery based on input data from motion capture.

Institute of Biomechanics, Trauma Center Murnau and Paracelsus Private Medical University Salzburg - GERMANY

The Institute of Biomechanics Murnau is a research institute for orthopaedic disorders. Key activities are biomechanical research, product development, clinical research, training and education, and gait analysis. The research institute is associated to the Trauma Center Murnau, which is known for their expertise in trauma surgery. The primary research focus is mechanical testing and numerical evaluation of the interaction between implants and biological tissues in order to improve osteosynthesis techniques.

BGU-MURNAU will collaborate in all work packages, being its main role is the assessment of the course, from the beginning to the validation of the pilot course, because previous experience in the field as well as for representing both profiles of the LapForm target groups.

Sociedad Española de Cirugía Laparoscópica y Robótica - SPAIN

The Spanish Society of Laparoscopic Surgery and Robotic (in Spanish SECLA –Sociedad Española de Cirugía Laparoscópica y Robótica-) was founded in 2000. Its main purpose was to bring together in one organism the different surgical specialties that have in common the use of endoscopic approach as surgical instrument. These specialties include General Surgery, Gastroenterology, Gynecology, Obstetrics, Urology, Pediatric Surgery, Thoracic Surgery, Vascular Surgery, Neurosurgery, and Traumatology, among others.

SECLA will have presence in the definition of VET curriculum and recruitment of trainees for the international pilot course. However, their main role will be to participate in the Dissemination Committee. They will be responsible of WP6 (Dissemination manager), together with CCMIJU, because the professionals they represent, and the European networks for dissemination, as well as participation in workshops.

## 5. Plans for the Future

To achieve the remaining project objectives during the second half of the project, all the efforts will be addressed to carry out the following tasks:

- **Completion of training materials development.** As mentioned before, the consortium started the development of training materials at the end of the first project year. The main objective is finishing this task at the beginning of the second year to start with the pilot courses as soon as possible.
- **Pilot courses, monitoring, evaluation and adjustments.** The aim of this task is to prepare the pilot courses the development of training materials and the e-learning platform, to evaluate if these materials address the formative needs detected for both target groups. Once finished the evaluation of pilot courses, adjustments of formative contents and e-learning platform will be performed to maximize their adequacy.
- **LapForm courses translation.** After completion of the evaluation and adjustment of the pilot courses into definitive courses, these will be translated into the involved partner languages; Spanish, Polish and German.

Aiming to address potential end-users and stakeholders, dissemination activities will also be performed during the second year of the project. Main common dissemination channels will be Facebook, LapForm website and LapForm e-Newsletter, as well as participation in national and international meetings (at least, participation in 3 events during this year is planned) and elaboration of scientific and technical articles.

In order to assure the sustainability of the results, their wider and broad adoption and their continuous update beyond the life of the project, the whole consortium will work on the elaboration of the exploitation agreement which will contain the future steps to follow to assure appropriate exploitation of results. This objective will be achieved through the elaboration of an exploitation plan, which will include, among others, the following actions:

- **Incorporation of LapForm course to training offer of partners.** Along the project, each partner has to adapt its website to host the course after the completion of LapForm project.
- **Integration of the content and dissemination activities and products of the project through the LapForm website.** During and after the Project, the website [www.lapform.eu](http://www.lapform.eu) will be setup to host the developed courses. At the same time, this

website will be the main dissemination platform of the LapForm Project products, general information about the project, newsletters, results, events, etc.

- **Search of alliances with European institutions and/or associations to ensure a mid-term exploitation of courses.** These alliances will enable routes to target groups, laparoscopic surgeons and laparoscopic instruments designers, for LapForm courses. Between these European institution we could consider:
  - Industrial associations gathering health care companies employing design professionals.
  - Professionals associations gathering laparoscopic surgeons and design companies or self-employed designers.
  - Training centres that currently offer informal vocational courses related to laparoscopy.
  - Hospitals with an intensive activity of laparoscopic surgery.

To this end, the consortium is continuously working on a Stakeholder registry, a database of potential industrial stakeholders and associations which currently counts with more than 30 industries, 5 associations and 1 hospital.

- **Creation of a Valorisation Committee to coordinate dissemination and exploitation actions.** This committee will be composed by a representative of each partner.

## 6. Contribution to EU policies

The LapForm project takes care to contribute to a variety of European Union policies in the area of the Objectives of the LifeLong Learning Programme.

***To improve the quality and to increase the volume of co-operation between institutions or organisations providing learning opportunities, enterprises, social partners and other relevant bodies throughout Europe***

Work achieved by the network members and their client groups, and in turns their audiences, has the potential to offer a multiplier effect on the core learning outcomes that have emerged from this project. From a policy perspective, the project results supports learning that is open, self-directional and social while encouraging cross fertilisation of positive and effective ideas across Europe.

This project guarantees that the project results, among others the online training course, can be available to the potential users by means of institutions close to them. The potential users are all members involved in the laparoscopic surgery (trainers, designers, surgeons and technicians in occupational risk prevention).

In this sense, LapForm project intends a threefold development:

1. Knowledge about ergonomic risks in laparoscopic surgery sector and recommendations to decrease the impact of Musculoskeletal Disorders (MSDs). Therefore the project exploits the knowledge generated in previous projects developed by all partners.
2. The project pursues a geographical development and transference of contents of high benefit for the European countries (Poland, Germany and Spain) with the aim of homogenize the technical level in the ergonomics VET programs in all Europe.
3. Adaptation, translation and transformation of the content in an online training course format in the languages and specific sectorial conditions of the partners 'countries.

LapForm project intends to develop and transfer the contents to other countries not included in the consortium, and disseminate ergonomics best practices to reduce the large rates of musculoskeletal disorders in laparoscopic surgery sector.

***To facilitate the development of innovative practices in the field of vocational education and training other than at tertiary level, and their transfer, including from one participating country to others***

This project is highly innovative in different and complementary aspects:

- The final users of contents are designers and surgeons, providing specific training contents for preventing MSDs.
- LapForm courses provide guidelines in adult learning in order to assure a quality and effective training.
- LapForm courses have a flexible structure, offering the possibility of self-design of contents and different formative paths.
- LapForm training contents and developed assessment methodology are based on job shadowing as effective methodology for vocational training.
- LapForm is fully utilised in an intensive use of the ICT environment. It will contribute to a quality education and it will fit adequately to the needs of the knowledge society in a lifelong learning context.

In terms of quality and innovation in vocational training, this project will contribute to improve the qualifications and competences of the designers and surgeons in this field and this has only been possible due to the well-designed and well-programmed curriculum proposed.

***To encourage the learning of modern foreign languages***

The platform that supports the Virtual Campus and the contents will be initially developed in English but it will also be available in the native languages of the partner countries: Spanish, Germany and Polish.

The languages in which develops the training course are one of the most spoken at European level, with a very large number of speakers worldwide so that the results of this project can be sent to a large number of people.

***To support the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning***

This project promotes innovation in e-learning content, through the educational programme and new teaching methods developed and implemented into a virtually designed and served training centre that is accessible over internet.

The project promotes and reinforces the contribution of vocational training to the process of innovation through the virtual training centre and its application set up a new good example for virtual learning in national vocational training systems.

