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Patient

Improving the continuity of patient care through teaching and researching novel patient handover processes in Europe

1st year Progress Report

Public Part

Project information

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Executive summary

The World Health Organization lists inaccurate handovers as one of its High 5 patient safety risks (WHO, 2011). Improperly conducted handovers lead to wrong treatment, delays in medical diagnosis, life threatening adverse events, increased health care expenditure, increased hospital length of stay and a range of other effects that impact on the health system (Kripalani et al., 2007).

The PATIENT project addresses this challenge by using innovative learning approaches in medicine with mobile devices in role-based learning scenarios to enable authentic skill development for students and the workplace. It builds on previous work on developing handover training, the FP7 HANDOVER project (FP7-HEALTH-F2-2008-223409) (Groene, Orrego, Suñol, Barach, & Groene, 2012; Hesselink et al., 2013; Kicken, Van der Klink, Barach, & Boshuizen, 2012; Stoyanov et al., 2012). Experiences and insights of medical trainers, experts in handover, and doctors from the EU and beyond, were utilized to design a learning environment, the HANDOVER Toolbox (Drachslar et al., 2012), conducive to training and learning around handover processes. In the PATIENT project the HANDOVER Toolbox is combined with mobile apps to support good handover practice in training and real settings. One of these apps is the CLAS app, a mobile application to structure handover processes between different medical departments as well as hospitals and General Practitioners (GPs) (Maher et al., 2013; Maher, Drachslar, Kalz, & Specht, 2012). The PATIENT project seeks to further enriched our knowledge on the merits of implementing highly innovative learning environments (Toolbox) that offer sophisticated ICT tools (CLAS app), to enhance interaction between students, teachers, researchers and patients, thereby encouraging the exchange of knowledge and ideas to increase awareness, understanding and pioneering solutions for this important global issue.

The primary objective of the PATIENT project is the implementation of a handover study module for undergraduate medical students on a European scale. The target study module will take advantage of innovative teaching and learning methods to improve handover procedures. Therefore, the module will combine formal, informal, problem- and role-based learning scenarios in simulation settings. It will benefit from the HANDOVER Toolbox, the CLAS mobile application, and additional apps that might be required to standardise the handover training in Europe.

Our project partner consortium consists of academic groups from EU higher education bodies who have considerable expertise in research, education and innovation in health together with a SME Partner. The PATIENT project framework for undergraduate medical students will be transferable to higher education institutes and workplace learning opportunities EU-wide. To date we have made significant progress in achieving the schedule of deliverables outlined in the initial project plan.

WP1 has taken the lead in the management and co-ordination of the project, an executive committee and external advisory group are established, and two of the executive committee meetings (including one AGM) have taken place across two of the project partner institutions (Heerlen, Barcelona). With respect to WP2, the deliverable has been sent to the

EACEA and a public report was added to the online library on the project website¹. The WP2 needs assessment survey has been completed in May 2013 and is currently in preparation for publication in an international high impact journal. WP3 completed the GCM study on potential Learning Outcomes of the handover study module in October 2013. A public summary of this study is also available online on the Patient project webpage². WP4 is currently considering these empirical evidences and just started the design of educational material according to the findings. The implementation of the pilot module at UKA, FAD, and UCC (WP5) will take place in April 2014. WP6 created a project quality assurance plan which has been disseminated between the partners. The dissemination aspect of the project (WP7) has been a key focus of the consortium since the project started. In the last year, WP7 has developed a rich online presentation of the project with the project website as a central place to distribute contents and events over various social media channels. In addition, WP7 created a dissemination strategy document including a publication agreement between the partners and potential conference and journals to present the project results.

The end product of PATIENT project will be a thoroughly validated handover study module with advanced teaching and learning methods and technologies which can be tailored to the needs of participating partners and across the EU.

¹ http://patient-project.eu/?page_id=19

² http://patient-project.eu/?page_id=19

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1. Project Objectives

The PATIENT project reinforces the contribution of higher education to the process of education, research and innovation in undergraduate medical education. It specially aims to increase patient safety on a European scale by addressing improperly conducted 'handovers'. Handover is the accurate, reliable communication of task-relevant information between doctors and patients and from one caregiver to another. This occurs in many situations in healthcare. Improperly conducted handovers lead to wrong treatment, delays in medical diagnosis, life threatening adverse events, increased healthcare expenditure, increased hospital length of stay and a range of other effects that impact on the health system (Kripalani et al., 2007).

PATIENT will develop a European study module for handover communication that will take advantage of innovative practice-oriented teaching and learning methods. The study module will combine formal, informal and problem-based learning scenarios for medical simulation centres where students can contribute empirical findings for accurate handovers. It will take advantage of the ready-to-use HANDOVER Toolbox (Drachslar et al., 2012), a virtual learning and knowledge exchange environment, and the CLAS mobile application that provides a digital handover protocol to standardise handover communication between different medical disciplines (Maher et al., 2012).

The outcomes of the project will be disseminated to allied healthcare professions e.g. nursing or retirement homes that also require accurate handover procedures.

The proposed module has a pedagogical focus which incorporates the following innovative elements:

1. Standardisation of handover training in Europe
2. Creation of an interdisciplinary and cross-country online learning environment
3. Use of mobile applications to structure the handover process and increase the effects from learning to the medical practice
4. Implementation of the study module in Germany, Spain and Ireland
5. Development of commercialisation and a business plan of the study module

PATIENT brings together a consortium of partners from medical education schools and technology-enhanced learning research institutes across several European countries as well as an enterprise partner in this field (Table 1). PATIENT combines the expertise of partners to formulate a European study module, which specifically addresses the unsolved problem of fragmented and very limited available handover training. The involvement of a small to medium enterprise (SME) partner during the development and delivery of the study module ensures the knowledge transfer from academia to potential commercial stakeholders in the medical domain.

Table 1: List of Partner Organisations

Partner	Role	Organisation	Acronym	City	Country
P1	Applicant	Open Universiteit Nederland	OUNL	Heerlen	Netherlands
P2	Partner	University College Cork	UCC	Cork	Ireland
P3	Partner	RWTH Aachen	UKA	Aachen	Germany
P4	Partner	Fundacion Avedis Donabedian	FAD	Barcelona	Spain
P5	Partner	MT – Consulting GmbH	MT	Rodgau	Germany

2. Project Approach

PATIENT started in October 2012, first OUNL invited all partners to a kick-off meeting in Heerlen, Netherlands, where the whole consortium reconsidered the project's objectives. At the kick-off, each work package (WP) was presented by the responsible lead partner: WP1 – Management (OUNL), WP2 – Needs Assessment (FAD), WP3 – Learning Outcomes (UCC), WP4 – Development (UKA), WP5 – Implementation (UKA), WP6 – Quality Assurance (OUNL), WP7 – Dissemination (UCC), WP8 – Exploitation (MT). In addition, each responsible partner presented a time planning to achieve the objectives of the WPs and how they contribute to the overall project objectives. The partners were asked to present the latest research and developments with regard to the PATIENT project's objectives that might be beneficial for the project.

At the kick-off meeting, OUNL presented the internal project management software Basecamp, and the online Video Platform Flash meeting for the bi-weekly online project meetings. In addition, OUNL introduced the initial policy document for the quality assurance (WP6) and introduced the financial and scientific reporting templates.

FAD presented the time planning and objectives of the needs assessment survey in WP2 for medical staff and students at UKA, UCC and FAD. The survey study has been completed in May 2013 and involved 677 students and 52 teachers from 3 countries. We are currently preparing a publication of the study for an international Journal.

UCC and OUNL outlined the research on learning outcomes for the handover study module within WP3. They conducted a study on learning outcomes via a Group Concept Mapping (GCM) method that was completed in September 2013. The GCM enables teachers and clinicians to rate their opinions on key learning outcomes arising over the course of the study module. In total 45 experts contributed to the brainstorming on the most important learning outcomes that produced 112 unique handover competences. 22 of the experts grouped the competences into clusters and rated them according to importance and difficulty.

There have been several other PATIENT developments which were running in parallel with the actions mentioned above. Firstly, a full dissemination plan was written describing the essential components of WP7 such as the project's website, logo, flyer, blogging strategy, social media channels such as facebook and twitter, and relevant scientific conferences and journals to present the project's outcomes. Secondly, OUNL has created a full quality assurance plan to ensure that PATIENT meets its objectives whilst maintaining a high standard of delivery (WP6). Thirdly, there have been three successful international PATIENT meetings and a workshop at the GMA conference 2013 which facilitated face-to-face discussions with stakeholders and within the project's team.

The following sections (2.1 to 2.4) provide a breakdown of the core elements of the PATIENT project approach.

2.1 Needs Assessment Survey

A systematic survey was designed in order to chart current knowledge and practice in learning and teaching good handover practices. This survey focused on curricula expectations and questions like:

1. What is a good handover practice?
2. Which competences are needed for good handover practices?
3. What are current hurdles for good handover practices?
4. What are good delivery methods for the new study module especially with respect to technology-enhanced learning methods?

Two surveys (one for students and one for teachers) have been developed and distributed among the participants to identify the training needs of the students for handover training. Both surveys had the same questions but were slightly adapted. The survey content was built upon a literature review, an experts consultation, and previous projects experience (i.e.: FP7 HANDOVER project).

The surveys were tested and fine-tuned in close collaboration with the project partners and selected students before they were distributed to the target population at UCC, UKA, and FAD. The main findings of the survey are summarized in section 3.2. The final questionnaires can be found in the needs assessment report of WP2, a public summary with the main findings is available in the online library of the PATIENT website³.

2.2 Learning Outcomes Study

For the Learning Outcomes Study, we applied the Group Concept Mapping (GCM) method to identify most relevant learning outcomes. GCM is an integrated mixed research method that applies a structured approach to objectively identify an expert group's common understanding about a particular issue (Stoyanov et al., 2012). In the PATIENT project case, GCM was used to identify and negotiate expected learning outcomes for the study module. GCM integrated input from a range of sources such as from the needs analysis report of WP2 and invited experts for the GCM brainstorming session. Multivariate statistical analysis (multidimensional scaling and hierarchical cluster analysis) reveals patterns in the collected learning outcomes. Consensus is not forced as each participant can individually cluster and rate the learning outcomes according to their expertise. During the analysis the opinions are combined to a complete picture of relevant learning outcomes for the handover study module.

With regard to PATIENT, GCM was applied as a tool to consolidate the learning outcomes of the particular module, to prioritise them, and to draw effective measures for their implementation in practice. 45 experts from within and outside the consortium were asked to generate ideas based on the following statement "One particular outcome of the handover study module is....". Each participant was given then the list of ideas collected and asked to sort them into categories that make conceptual sense. In addition, and the participants were asked to rate the ideas based on some values (e.g., importance, difficulty). The analysis identified the shared vision and differences between the three implementation sites (UCC, FAD and UKA) on the module's learning outcomes. This approach supports the

³ http://patient-project.eu/?page_id=19

project to develop educational material on agreed learning outcomes. Specifically the GCM tool supported the following 5 objectives:

1. Prioritise learning outcomes and clusters them to groups
2. Indicate areas of the module where students perceive the greatest learning effect
3. Examine the consensus between different stakeholders' groups
4. Help the PATIENT team to plan short and long term actions for the development of the study module
5. Ensure that the learning outcomes of the handover study module have been developed and validated in close cooperation with the stakeholder groups

The main findings of the GCM study are summarized in section 3.3.

2.3 Quality Assurance Plan

The purpose of the PATIENT quality assurance (QA) plan is to ensure that the project's procedures and deliverables are completed to an acceptable standard. Standards are agreed criteria designed to ensure that the PATIENT products (the study module and its tools) meet minimum thresholds on criteria such as performance, design, and impact. Meeting such thresholds inspires confidence in the target users and the target audience.

The quality assurance plan is part of WP6 which is managed by OUNL, who has expertise in the area of standards. Version 1.0 of the quality plan is distributed between the project consortium and accessible through the PATIENT project management site at Basecamp.com. Essentially the plan consists of a set of tables which describe the project deliverables and processes in fine detail. Each deliverable and process has a quality control activity in the form of a review or an audit, and a frequency or interval for that activity.

2.4 Dissemination Plan

The PATIENT consortium has identified important dissemination channels to reach the target audience. The PATIENT Dissemination Plan is distributed between the project partners and can be accessed on in the project's management tool – Basecamp. A summary of key actions from the project outset to date is presented here.

The aim of our dissemination plan is to ensure maximum use of the project results by addressing academia, policy makers and business. In order to achieve these goals the project must attract the necessary interest of potential consumers, and serve as a reference point for teaching and learning in patient safety and especially handover. To date the following dissemination channels have been established by MT for the PATIENT Project.

2.4.1 Project Website

The PATIENT website (screenshot shown in Figure 1) was designed by the SME partner MT. The website is a primary dissemination route through which PATIENT is presented. The public website serves two distinct dissemination functions. Firstly, it provides a forum for presenting the latest project related information. Secondly, it also raises awareness on the PATIENT project of those that search the Internet for keywords (e.g. patient safety, patient empowerment, medical apps, handover, mobile devices in health, knowledge triangle,

health2.0, etc.). Provision has been made in the project budget to maintain the website for at least one year after the project is completed.



Figure 1: Screenshot of the PATIENT website

As shown in Figure 1, the project website is connected to various social media channels such as facebook, twitter, LinkedIn, and the video platform Vimeo. Any blog posting is directly forwarded to the project's twitter and facebook account, which increases the virality of the information and guarantees that they directly approach the stakeholder groups of the project. Unfortunately, LinkedIn does not provide a comparable functionality and is therefore less often used so far. On twitter, PATIENT has 75 followers so far and on facebook we receive 91 likes.

On the project website interested visitors will find a broad scope of information, namely:

1. A general description of the project (LINK)

General project description with work packages that represent the PATIENT project approach. In addition, latest developments, activities, and news are blogged by the WP7 Dissemination and send over the website to facebook and twitter (<https://www.facebook.com/PatientProject> / <https://twitter.com/patientproject>).

2. Summaries of the empirical studies (LINK)

The summaries⁴ are publicly available to external parties and provide insights into the two empirical studies (WP 2 and WP 3) that the PATIENT project conducted in the first year. The findings will be used to design the handover study module according to the needs of the students and the expertise provided by handover experts.

⁴ http://patient-project.eu/?page_id=19

3. A video library with experts on the topic ([LINK](#))

The visitors of the webpage can watch a collection of expert videos regarding the importance of handover training. These videos have been made during the FP7 HANDOVER project and are not initially produced by PATIENT. The PATIENT consortium will extend this initial library. We therefore recorded additional experts at the Graz workshop that will be contributed to the video platform soon (<http://vimeo.com/user7381178>).

4. Information about the handover study module ([LINK](#))

The website provides initial information about the planned handover study module and the different media types it will involve such as the mobile applications like CLAS and e-DL, and the Handover Toolbox.

5. Dissemination materials ([LINK](#))

A first PATIENT flyer was produced by UCC (July 2012). This document has been circulated to all partners in electronic and paper format. It is being used as a way of communicating the project objectives and procedures to potential consumers, particularly medical business and relevant HEI and research institutions. In addition, it promotes specific workshops for stakeholder groups.

6. The PATIENT library ([LINK](#))

The consortium created a virtual library around the core research articles on the handover topic. The library contains the bibliography used in our reports and articles. It is an open group created at the Mendeley reference platform and will continue to be enriched with additional references
<http://www.mendeley.com/groups/2554171/patient-handover/>

We are encouraging external parties to sign up for this group and to connect to the community of people working on these topics by gaining access to the collected bibliography but also by contributing with new relevant publications in this important field of research. There are currently 121 research papers included in the Mendeley Patient-Handover group

As shown on the world map in Figure 2, the PATIENT website was well received by international audiences that are interested in the handover topic. The project seems to be relevant also beyond European countries as we got page visits from countries in North & South America, as well as Asia and Australia, and some Arab states.

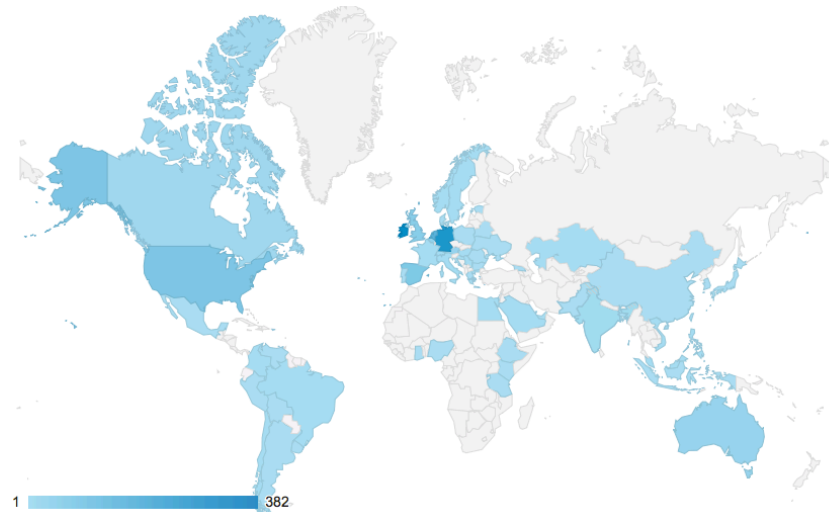


Figure 2: Visits to the PATIENT website from around the world (dark blue = highest amount of visits)

The bar chart below in Figure 3 provides an overview of the 10 countries that most frequently accessed the PATIENT website until 31.10.2013. The project seems not only to be relevant for countries from the partner organisations such as Ireland, Germany, Netherlands and Spain but also from the United States, United Kingdom, Belgium, Austria, Australia and Canada. In total we have got 1463 views so far.

		1,463 % of Total: 100.00% (1,463)	1,463 % of Total: 100.00% (1,463)
1.	Ireland	382	26.11%
2.	Germany	321	21.94%
3.	Netherlands	186	12.71%
4.	United States	101	6.90%
5.	Spain	97	6.63%
6.	United Kingdom	71	4.85%
7.	Belgium	48	3.28%
8.	Austria	41	2.80%
9.	Australia	41	2.80%
10.	Canada	21	1.44%

Figure 3: Bar chart of page visits ordered by country

2.4.2 Social Media

The project website is connected to the social media channels facebook and twitter. Any blog posting is directly forwarded to the facebook and twitter account of the project. That increases the virality of the information and guarantees that people interested in the project are approached.

Figure 4 and Figure 5 provide an overview of the people we have reached until October 2013 over facebook and twitter. Figure 6 shows the facebook timeline that also provides a chronology of activities of the PATIENT project since its kickoff.

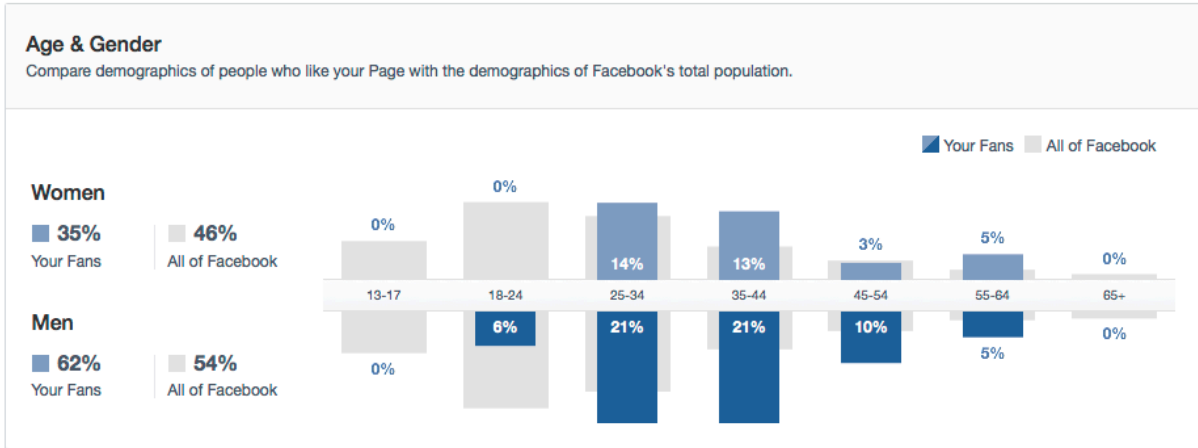


Figure 4: Overview of people reached on Facebook until October 2013

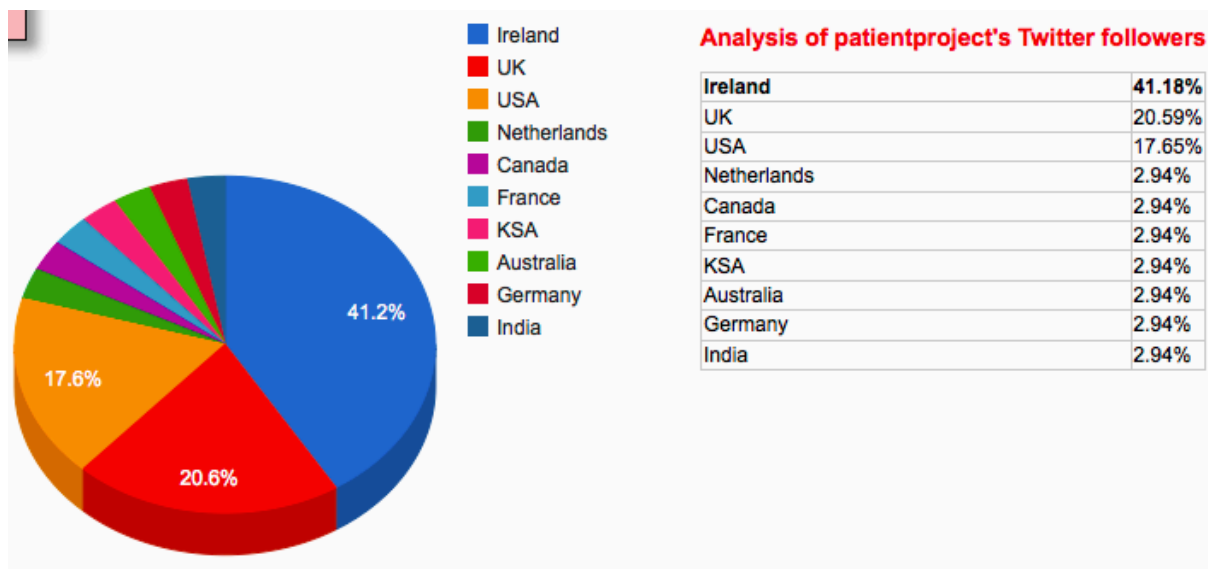


Figure 5: Distribution of followers of the PATIENT twitter account by country

We hope with this modern communication approach to reach a) more stakeholders and b) the students subscribed to the handover module in the three European countries involved (Germany, Ireland, and Spain). Within the Dissemination WP, we are considering to use the social media channels to involve the students in the evaluation of the study module. We want also to forward the blog posts created at the project's website to the Business LinkedIn thus increasing the chance of reaching potential business partners.

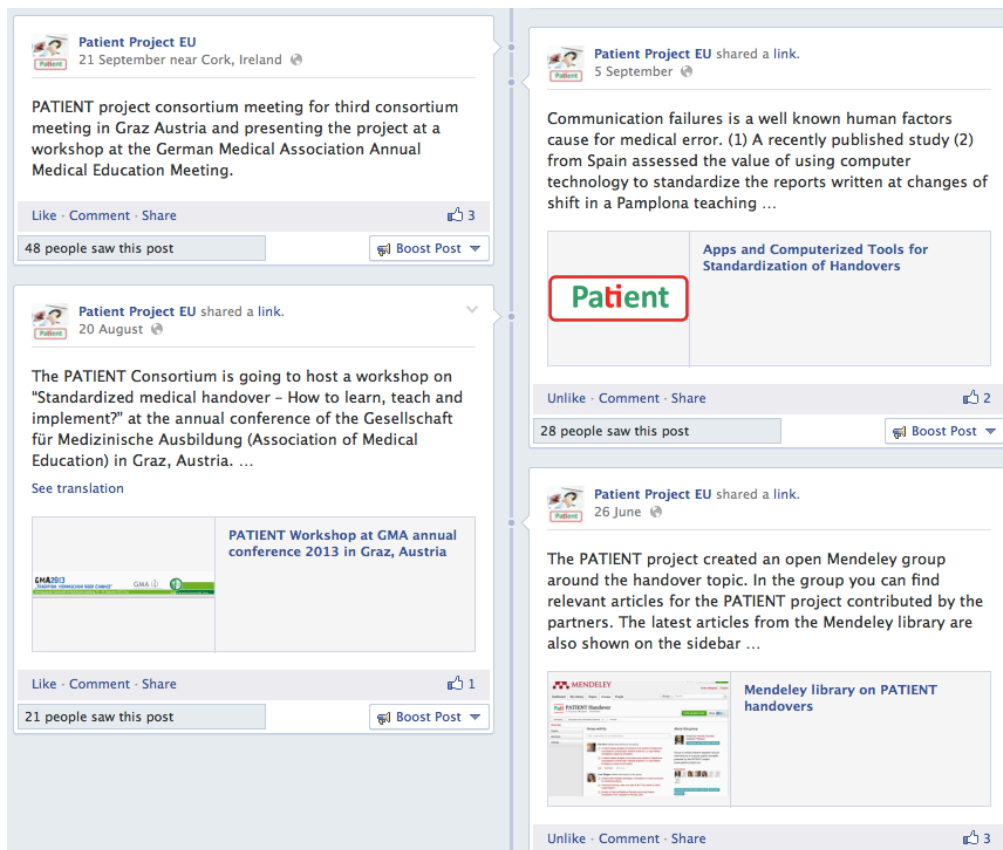


Figure 6: Screenshot of the timeline of activities of the PATIENT project on facebook

2.4.3 Publications

Publications at international conferences and scientific journals attract especially academic stakeholders of the project. Until October this year, papers in 1 journal and 2 conferences proceedings have been published. In addition, 2 poster presentations have been given. We are aware that publications in high impact factor journals are very important for the dissemination of the project's outcomes. One reason for not being able yet to submit manuscripts for such journals is the need to first collect strong empirical evidence. An overview of all publication & dissemination activities in the first year of the PATIENT project can be found on the project website: http://patient-project.eu/?page_id=19

In addition, we submitted two more poster presentations, and 3 journal articles are in preparations based on the WP2 and WP3 empirical findings, and the development of the e-DL app. Furthermore, the CLAS app won Crystal Clear MSD Health Literacy Award 2013 (see further details in section 3.3.1). A workshop devoted to implementation of the study module was given at the GMA conference in September 2013 in Graz, Austria.

3. Project Outcomes & Results

Table 2 provides a summary of PATIENT deliverables from October 2012 to October 2013. Each of the relevant deliverables have been uploaded to the outputs section of the project's website.

Table 2: Summary of PATIENT Project Deliverables as specified in the original project plan (October 2012 – October 2013)

Summary of Deliverables in Year 1			
Deliverable number	Deliverable title/description (max 200 characters)	Work package most contributing to this deliverable	Date completed
M1.01	Establishment of Executive Board	WP1	April 2013
D1.01	Annual Reports According to Reporting Guidelines	WP1	October 2013
D2.01 / D2.02	Full Needs Assessment Survey Report	WP2	April 2013
D3.01	Generation of WP3 Report Document	WP3	October 2013
M6.01	Development of Quality and Assessment Plan	WP6	April 2013
M6.02	Recruitment of expert Advisory Panel	WP6	April 2013
M7.01 M7.03	Establishment of Project Website	WP7	November 2012
M7.02	Dissemination Plan	WP7	April 2013

3.1 Summary of the Needs Assessment Survey

The main findings from the PATIENT needs assessment survey can be downloaded from the project website http://patient-project.eu/?page_id=19.

The survey was structured within the framework of 4 handover related dimensions assessing the opinion of the respondents about:

1. The importance of and skill abilities related to handover
2. Experience in clinical practice
3. Curriculum content
4. Preferences about handover and level of confidence related to learning environment

The in-depth analysis of all the items from each dimension enabled the project to compare results among students and academic staff as well as countries. The results reflect the needs of the students in regard to handover process, as well as identification of the teaching priorities that are considered useful for addressing learning outcomes and designing of the study module.

3.1.1 Demographics

The survey study was completed in May 2013 and involved 677 students and 52 teachers from 3 countries as shown in Figure 8. We are currently preparing a publication on the study results for an international journal.

Table 2. Response Rate per survey type						
Country	Student Survey			Academic staff survey		
	Surveys Distributed (n)	Surveys Completed (n)	Response Rate (%)	Surveys Distributed (n)	Surveys Completed (n)	Response Rate (%)
Ireland	495	262	52.9	50	19	38.0
Germany	515	240	46.6	80	10	12.5
Spain	481	175	36.4	120	23	19.16
Total	1491	677	45.4	250	52	20.8

Figure 7: Screenshot of demographic table from WP2 report

3.1.2 Survey results

The main findings and priority areas related to study needs of medical students on handover are summarised below:

- There is a consensus among students on the skills and knowledge important for handover training and specific areas that need to be prioritized.
- Students are keen on using e-learning resources for knowledge acquisition, but acknowledge that handover training requires a certain amount of 'hands-on', experiential learning.
- Students identify team-working and inter-personal skills as areas they wish to receive training in, and it would be wise to address these concerns as they are prime causes of medical mishap.
- Simulation could be useful for handover training, but both students and teachers have limited experience in this area.
- Improving students' induction into the clinical environment, helps for their adaptation, increases their knowledge of the policies and standards of clinical practice at local level and encourages and engage students to be more active in communicating with healthcare professionals during their clerkships.
- Medical students need to be taught about handover processes and to learn key skills important to Handover.

3.1.3 Main findings

Interventions that should be addressed are:

- Improve students' skills in the management of stress and critical situations, conflict resolution, responding to medical errors.
- In terms of behaviours, students should be able to conduct and monitor the whole discharge process, patient follow-up process with other providers and other levels of care, overall referrals processes, also performing a correct (and safe) handover communication with other team professionals (non-medical).

- From the knowledge perspective, the curriculum should provide sufficient room for improvement in areas such the use of standardized strategies for patient registration, patient referrals and medication, review correct handover protocol and procedure and the use of standardized tools as checklists.

This analysis has enabled us to identify key features integral to handover educational programs, which will contribute to the success of the study module development and its acceptability for students and academic staff.

3.2 Summary of the Learning Outcomes Study

The WP3 learning outcomes study applied the Group Concept Mapping (GCM) approach. It is an integrated mixed research method that applies a structured way to objectively identify an expert group's common understanding about a particular issue (Stoyanov et al., 2012). In the case of the PATIENT project, GCM was used to identify and negotiate expected learning outcomes for the handover study module.

This section describes the purpose, the method for data collection, structuring and analysis, and the results from an online experts' consultation on the learning outcomes of the handover module, conducted within the framework of PATIENT project. The online consultation is aimed at facilitating a group of experts to (a) collect opinions on expected learning outcomes of the handover module (b) structure the ideas generated, (c) identify a group of issues, trends, or challenges related to handover learning outcomes; (d) show how the ideas are related; and (e) prioritize these ideas. It was expected that the empirical evidence produced would inform the decision making on selecting and operationally defining learning outcomes in a later stage of the project.

3.2.1 Demographics

61 participants registered (creating a username and password) to the system for online data collection that supports the GCM approach,. They gave their informed consent to participate. Of them 45 contributed effectively to the brainstorming session and 22 completed the sorting and rating phases. 45 participants generated 204 ideas, which for a topic such as learning outcomes of a module on handover is a good result. 107 ideas remained after idea cleaning, editing and synthesis.

3.2.2 Clustering results

Figure 9 shows the first outcome of the multidimensional scaling – a point map. The two-dimensional graphical configuration represents the learning outcomes (as points on the map) and shows how they are related. The closer the points are to each other, the closer in meaning they are. This is a result of more people grouping them together during the sorting.

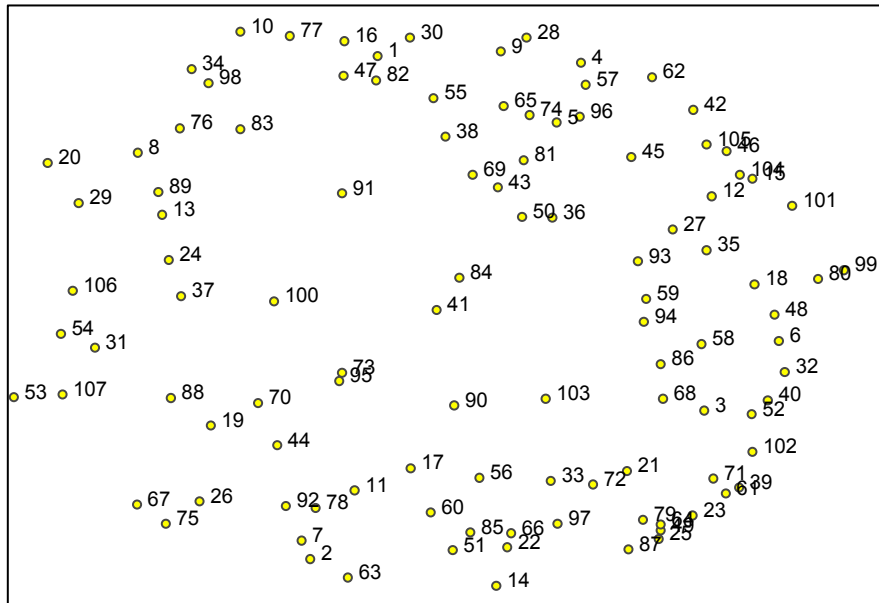


Figure 8: Point map showing the position of all statements after multidimensional scaling

Based on the replay map (see Figure 10) we prepared a checklist with the suggestions made by the Hierarchical Clustering Analysis for merging clusters and asked a small group from the consortium to help with deciding upon the ‘best’ fitting solution. At each step of the merging the participants had to indicate whether they ‘agreed’, ‘undecided’, or ‘disagreed with the suggestion. In deciding if they should merge two clusters (or keep them together), we advised them to think about how easy or difficult it would be to ‘name’ or label that cluster with an overall theme that captures the majority of the statements’ content. Also that they may find that they agree with a merger, with one or two statements serving as the exception.

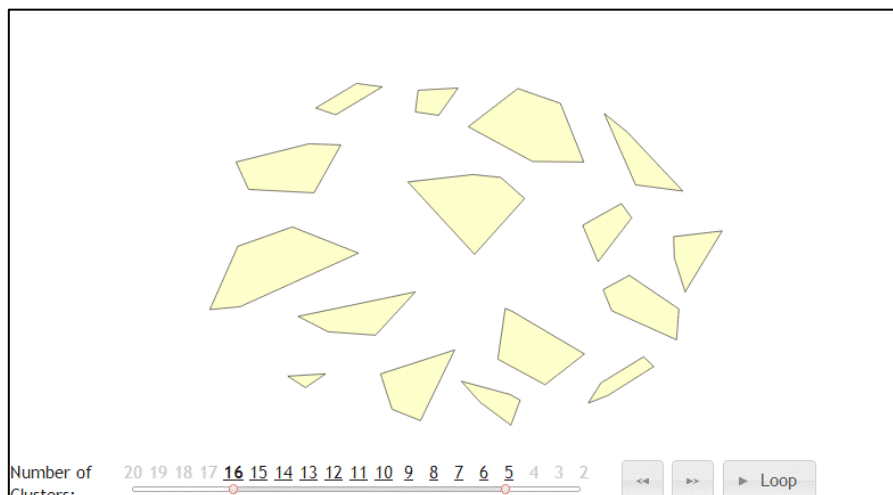


Figure 9: Replay map shows initial 16-cluster solution

After completing the assignment, the analysis team look at their worksheets to determine the final solution for clustering the learning outcomes. At the end the 10-cluster configuration was selected as the ‘best fitting’ solution (see Figure 11).

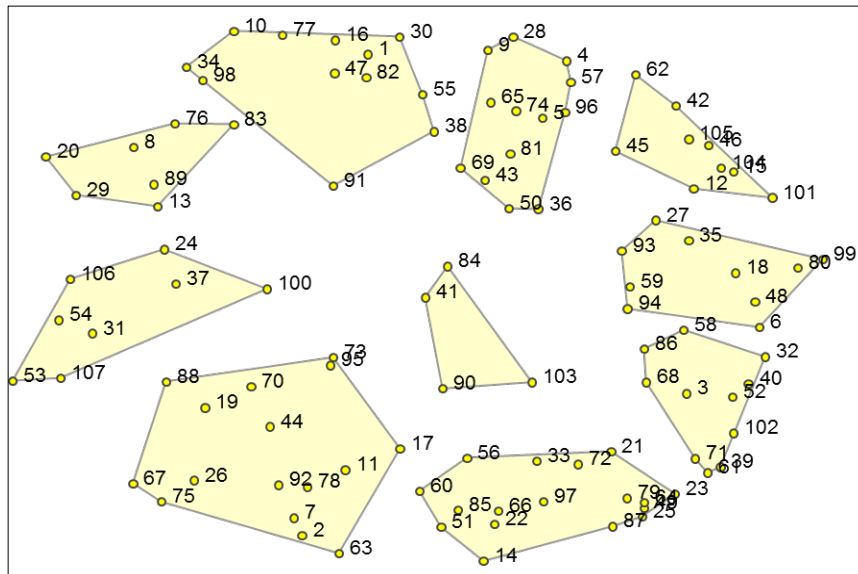


Figure 10: The 10-clusters solution

The next step in making sense of the data was to attach meaningful labels to the clusters. The following clusters were identified: 1. Use of handover tools, 2. Perform handover in real settings, 3. Enable handover accuracy, 4. Perform handover in simulated environment, 5. Learn how to communicate, 6. Prepare clinical documentation, 7. Collaborate with colleagues, patients, careers, 8. Identify errors and risks, 9. Understand effects of handover, and 10. Clinical performance (see Figure 12).

3.2.3 Rating results

Figure 12 also visualises how the participants rated the clusters on the rating criteria Importance.

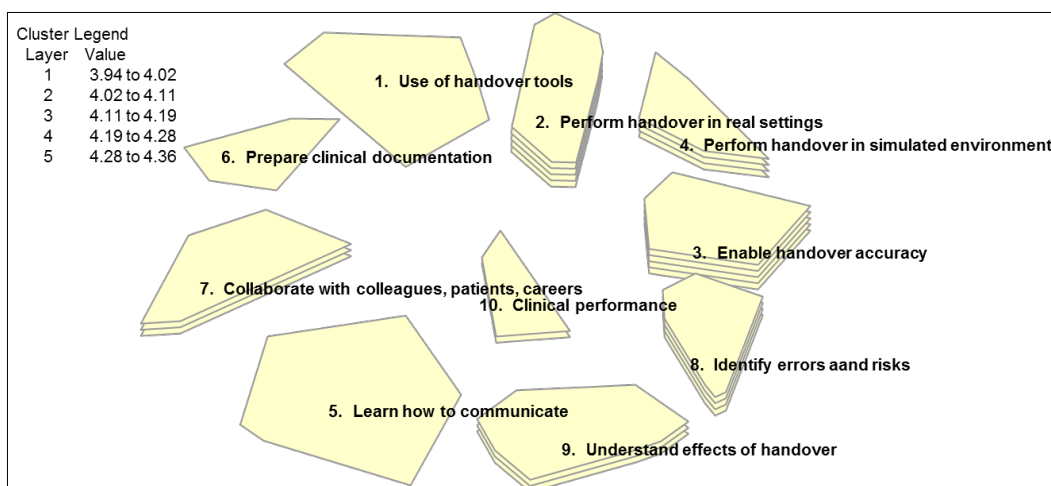


Figure 11: The 10-cluster map on Importance

The highest score received the clusters 'Perform handover in real setting' and 'Enable handover accuracy' with five layers each, followed by 'Perform handover in simulated environment' with 4 layers. 'Understand effects of handover' and 'Collaborate with colleagues, patients and careers' got 2 layers, 'Clinical performance' with 2 layers. 'Use of handover tools', 'Prepare clinical information' and 'Learn how to communicate' scored the

lowest with one layer.

In the full WP3 report, we also describe the rating for Difficulty and Importance and correlate both rating data sets with each other to get further insights into the implementation of the learning outcomes in short and long term.

3.2.4 Main findings

- The PATIENT GCM study identified learning outcomes not only for a single module on handover but also for a whole curriculum on handover that gradually can be developed in the future.
- The GCM study depicts areas of interest/themes from which to select learning outcomes and operationally define them. The study suggests what we could expect from learners in terms of knowledge, skills and attitudes but the level of these categories needs to be determined (e.g. using taxonomies in cognitive and affective domains).
- In contrast to the traditional position on learning outcomes seen as only expected results of the teaching and learning, the current study emphasized on the need to consider also means for achieving learning outcomes (see the two clusters on performing in simulated and real settings).
- The results of the current study are in line with some other studies on the handover topic (Kicken et al., 2012; Stoyanov et al., 2012). It identifies similar issues such as handover tools, standardisation, communication, and collaboration but at the same time it extends the scope of handover topics and teaching methods.

3.3 Summary on developments

3.3.1 The Handover Toolbox

There have been no changes so far to the Handover toolbox. The toolbox is so on hold for the moment as the project first needs to finalise the decision on relevant learning outcomes. When the educational material development starts in WP4, the toolbox and its rich resources will be reconsidered and parts of it will be used to design the educational material for the study module.

3.3.2 CLAS app - The Cork Letter Writing Assessment Scale app

The CLAS app (Maher et al., 2012) is an itemised checklist and scoring system to help medical students and junior doctors write better discharge letters. The CLAS app is the subject of an article 'Mobile applications in medical education' accepted for publication in the International Journal of Mobile and Blended learning' (Maher et al., 2013).

The app is explained and promoted to fourth year medical students in UCC as part of a Writing Skills in Medicine workshop and the newly qualified doctors at UCC are also introduced to the CLAS app at their intern induction day. The source code for the CLAS app has been sent to our partners OUNL and MT for extending it to German and Spanish language.

The CLAS team at the School of Medicine at UCC were one of the contributors to the consultative process regarding the HIQA (Health Information and Quality Authority) standard

discharge letter template and many of our suggestions have been incorporated in the final template, which closely mirrors the CLAS checklist.

We are also proud that the CLAS app recently won the Crystal Clear MSD Health Literacy Award 2013 in the category General Practitioners (<http://www.healthliteracy.ie/2013-health-literacy-award-winners/>). Each year, NALA, the National Adult Literacy Agency in Ireland, along with a judging panel from a broad spread of healthcare organizations, choose projects which they consider make a difference to communication of healthcare information.

The CLAS app project was selected from nearly 130 entries which had to demonstrate how they addressed the issue of health literacy. Ms Ciara O'Rourke, judge and Access, Policy & Communications Director at MSD commented that 'everyone working within the healthcare sector has a role to play in ensuring information provided to service users is accessible and clear.' Inez Bailey, Director of the National Adult Literacy Agency (NALA) commented that "the initiatives that have been recognised here today show what can be accomplished when clear communication is used in healthcare.'

The judging panel for the awards is represented by individuals from NALA, MSD, the Health Service Executive (HSE), the Health Information and Quality Authority (HIQA), the Irish Practice Nurses Association (IPNA), UCD, General Practice, PracticeManager.ie and University College Cork.

3.3.3 E-DL app - The Electronic Discharge Letter App

The E-DL app supports the exchange of medical discharge letters from one mobile device to another by using NFC technology. In contrast to Bluetooth or any kind of messaging application through Internet such as email, NFC does not require the devices to pair before communicating nor sender and receiver addresses to be defined. The only requirement is maximum distance of 4cm between devices. This provides the same level of privacy of the health care information like a traditional discharge letter.

In the latest version the e-DL app provides a semantic enrichment feature that offers descriptions of the clinical concepts described in the discharge letter in order to support the awareness of the patient about the diagnose. The semantic enrichment of the discharge letter text is done with medical databases from authority in the health care sector such as:

- UMLS: <http://www.nlm.nih.gov/research/umls/>
- SNOMED-CT: <http://www.ihtsdo.org/snomed-ct/>
- Medline-Plus: <http://www.nlm.nih.gov/medlineplus/>
- UMLS + RX-NORM for medication:
<http://www.nlm.nih.gov/research/umls/rxnorm/>

In order to improve the app usability, as well as the feasibility of its integration in the handover workflow, 15 hospitals and healthcare organizations are being surveyed.

The Beta version of the app was presented at the Medicine 2.0 conference, 23.09.2013 (<http://www.medicine20congress.com>).

3.4 Other Outputs

In preparation for the WP4 and WP5, the UKA Team already conducted an initial survey to identify the status-quo situation for implementation of the study module within the partner organisations. The questionnaire assessed items as listed below (Table 3)

Table 3: State of the art survey for implementation at local Hospitals

Items of analysis	Options to choose (always with free answer option)
Preferred or feasible course type	E.g. block course, weekly, obligatory, elective, integrated into any other course;
Timeframe	Hours per semester/week
Target Group	Number and level of education
Lecturer qualification	MD, PhD, non PATIENT academic staff, consortium members, peer teachers
Learning environment	Classroom, e-learning, simulation, real patients
ECTS credits	
Assessment	Relevance for exam, type of assessment (OSCE, MC, e.g.)

The questionnaire provided an overview on local resources and has shown that partners agree in quite a lot of the aspects. The following facts summarise the outcome:

- Educational level of students should be at least 5th year or even last year (assuring a some clinical experience)
- Handover training will be integrated into already existing course concepts either as a weekly or an on-block intervention
- Lecturer qualification will vary from PhD, PATIENT consortium members, non-PATIENT academic staff up to peer teachers (including students)
- Learning environment will be flexible from actual classroom lecturing, supported by e-learning tools, simulated scenarios or even real patient handovers
- Assessment has not been discussed sufficiently yet, but seems to be an important topic that need to be considered from the very beginning of the course design.

4. Partnerships

The PATIENT consortium is a group with extensive experience in the development and evaluation of educational programmes. Several partners have previously, or are currently collaborating on EU projects including

1. HANOVER (FAD, OUNL)
2. BioApp (OUNL, UCC)

Members of the consortium currently chair relevant international and national societies across the areas of medical business and education thus consolidating mutual information transfer which facilitated building of this consortium. This alliance brings together university and business organisations, allowing for knowledge and skills transfer across these entities. The HEI component to the partnership is trans-disciplinary and cross-country while the enterprise partner approaches the alliance from a business perspective thus enabling true interdisciplinary knowledge exchange.

At the halfway point, it is clear that the partnership works well, as evidenced by the timely delivery and dissemination of project deliverables, and the results of the interim quality assurance report. The sustainability of this consortium is evident in that several partners have collaborated more extensively and have applied subsequently to other Erasmus and LLP funding programmes [e.g. LLP Knowledge Alliance call]. Furthermore, the whole consortium applied together with additional partners for a new FP7 proposal that aims to extend the standardisation of medical handovers and patient safety procedures in Europe. If granted the new project is could strongly built upon the outcomes of the PATIENT project (handover study module, HANOVER Toolbox, CLAS app, and e-DL app).

5. Plans for the Future

The PATIENT consortium will continue to operate according to the work plan outlined in the project proposal. Adherence to the project planning and quality assurance monitoring will result in successful completion of project deliverables and the creation of the handover study module.

The PATIENT Consortium hosted a workshop on “Standardized medical handover – How to learn, teach and implement?” at the annual conference of the Gesellschaft für Medizinische Ausbildung - GMA (Association of Medical Education) in Graz, Austria. The workshop focused on several standardized tools developed by the project for giving accurate medical handovers, with an emphasis on teaching and learning. The participants were asked to discuss feasible options for implementing handover courses within given curricula. The workshop took place on Friday, 27.09.2013: 8:30 – 12:00 as a joint event to the 3rd project’s meeting.

The German team UKA is considering the outcomes of the workshop in preparation of the curriculum development phase of WP4. The major objectives, as described in the project application, are based on development of a handover study module and necessary educational materials. The existing materials will be reviewed and adapted to be integrated into modules for the different partner countries. As UKA already conducted an analysis of the partners’ local resources and infrastructure for implementation of a handover module, next steps will include the preparation of an overview of methods and materials for curriculum design. Following Kern’s principles of curriculum development (Kern, Thomas, & Hughes, 1998) a pilot curriculum will be designed with respect to local resources and didactical approaches.

The transition to WP5 will focus on implementation and a feasible transfer to practice. UKA will facilitate the adaptation of the pilot curriculum to partners’ local needs and support the partners in the concrete carrying-out of scheduling. Meanwhile a scientific analysis of the pilot course will be prepared and proposed to be discussed and further developed by the PATIENT consortium. Furthermore, training for the clinical mentors, peer teachers and course supervisors will be organised to standardise the educational process.

6. Contribution to EU policies

Recent EU-level developments, notably the Horizon 2020⁵ initiative and Innovation Union⁶, indicate that smart growth in research and innovation is crucial to generating technological breakthroughs to tackle societal challenges like patient safety in Europe. With a demand in Europe for highly qualified workers projected to rise to 16 million in 2020⁷, the EU has presented a reform strategy for modernizing higher education which includes adapting curricula and delivery of education programmes to reflecting changing labour requirements, and strengthening the links between the three sides of the knowledge triangle – research, education, and innovation. The emphasis is on increased support for innovation initiatives close to the market, providing a direct route to economic benefit.

The medical sector is a sector with quick wins through advanced learning technology to innovate medical procedures like handovers. European Council conclusions on innovation in this sector recommend an integrated approach across sectors⁸, thus combining medical and IT experts for a pressing topic. The potentials of developed tools and procedures by such a consortium are high as Europe comprises 18.000 small and medium sized enterprises (SMEs) in the medical domain that could directly benefit from the outcome of the PATIENT project.

In addition, it is increasingly unacceptable for medical students and trainees to practice skills and procedures on patients without prior simulated experience⁹. Likewise the United Kingdom's Department of Health's 2011 document 'A framework for technology enhanced learning' states as a first recommendation "As part of a managed learning process and where appropriate, healthcare professionals should learn skills in a simulation environment and using other technologies before undertaking them in supervised clinical practice". Thus, training medical doctors will change tremendously due to new technological training facilities and tools.

The PATIENT project contributes directly to the realization of the European Research Area by bringing together centres of excellence, hospitals, and SMEs from across the EU to undertake research and cooperation activities in this field. Furthermore, it aims to support medical students and patients to provide / receive better medical treatment through well skilled medical doctors. More specifically it targets the following aims:

1. To share knowledge and facilitate existing and new European networks particularly in relation to initiatives for innovative medical education
2. To encourage shared innovative practice in handover
3. To link research, education and innovation
4. To promote research excellence and outputs, enabling international research community and peer-review

⁵ http://ec.europa.eu/research/horizon2020/index_en.cfm

⁶ http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication-brochure_en.pdf

⁷ http://www.forfas.ie/media/egfsn080205_medical_devices.pdf

⁸ http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/lsa/122397.pdf

⁹ http://www.gmc-uk.org/State_of_medicine_Final_web.pdf_44213427.pdf

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