

PATIENT WP3-Deliverable: Development of Learning Outcomes [Public Part]

Citation for published version (APA):

Helen, H., Pat, H., Slavi, S., Bridget, M., Orrego, C., Schroeder, H., Stieger, L., Druener, S., Sopka, S., & Drachsler, H. (2013). *PATIENT WP3-Deliverable: Development of Learning Outcomes [Public Part]*. Open Universiteit.

Document status and date:

Published: 14/11/2013

Document Version:

Peer reviewed version

Document license:

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Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
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- The final published version features the final layout of the paper including the volume, issue and page numbers.

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Patient

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

**WP3-Deliverable: Development of Learning
Outcomes [Public Part]**

Project information

Project acronym:	PATIENT	
Project title:	Improving the continuity of patient care through teaching and researching novel patient handover processes in Europe	
Project number:	527620-LLP-1-2012-1-NL-ERASMUS-FEXI	
Sub-programme or KA:	Erasmus Multilateral Projects	
Project website:	http://www.patient-project.eu	
Report Type	Public	
Reporting period:	From	01/04/2013
	To	30/09/2013
Report version:	1	Public
Date of preparation:	04/10/2013	
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This project has been funded with support from the European Commission.

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Executive Summary

Purpose

The aim of Work Package 3 of the PATIENT Project is to develop, by consultation, agreed Learning Outcomes for teaching of Handover in a healthcare context, contributing to standardization of handover procedures in Europe. These learning outcomes are to be generated using consensus from a panel of experts.

Method

The method for developing learning outcomes involved the participants in activities that most professionals are used to: idea generation, sorting of ideas into groups and rating the ideas on some values (e.g. importance and difficulty to achieve). The analysis applies multi-dimensional scaling and cluster analysis to visually depict the experts' shared representations on the learning outcomes as thematic groups. One of the distinguishing characteristics of GCM is the visualisation of the results from the analysis. Visualisation allows for grasping at once the emerging data structures and their interrelationships to support decision-making. Group Concept Mapping produces three main types of visualisations: conceptual maps, pattern matches and go-zones.

Conclusions

This study provided not only an empirical basis for identifying the main learning outcomes areas, but also suggested how to operationally define them (through the statements in each cluster).

These learning outcomes are extensive and may be more suitable for incorporation into the medical curriculum as a whole rather than simply a specific training module on handover. However those outcomes considered most important were also among those considered most difficult to deliver.

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1. Introduction

The aim of Work Package 3 of the PATIENT Project is to develop, by consultation, agreed Learning Outcomes for teaching of Handover in a healthcare context, contributing to standardization of handover procedures in Europe. These learning outcomes are to be generated using consensus from a panel of experts.

There are two major issues with online expert consultations: (a) generating a comprehensive set of learning outcomes, and (b) reaching agreement on them. During the preparation of a list of learning outcomes, participants might be focused on the current practice of a course already running. This would narrow the scope of the learning outcomes to be defined. An agreement on learning outcomes might even be more difficult to achieve: the partners represent different healthcare systems and individually they might have rather different thinking styles. The participants might also not agree on how much emphasis should be put on each learning outcome. Additionally, during live meetings there is always the phenomenon of 'groupthink', or 'peer-pressure', (the negative effect of the group on the opinions of the individual members).

Methods for expert consultation, such as Focus groups, Affinity diagram and the Delphi method are some of the most used structured approaches aimed at achieving consensus. However, the analysis of focus group data imposes pre-determined classification schemas, which can be either non-exhaustive or impose biases. In affinity diagram sessions, participants typically would suggest different clustering solutions, both in terms of number of clusters and the content of the clusters, which makes it difficult for researchers to come up with a unified vision on how best to structure the information. The Delphi method requires several iterative rounds before claiming consensus in the group. The consensus is more or less forced and the subjective approach is always there. Our solution to the issues described is Group Concept Mapping (GCM) (Kane & Trochim, 2006; Trochim, 1989). This research methodology, while building on the strengths of Focus groups, Affinity diagrams and the Delphi-method mitigates some of their weaknesses. It has been successfully applied in the medical domain in the past by (Stoyanov et al., 2012)

The primary research question for the PATIENT learning outcome study to answer is:

*How can we support partners to arrive at an agreed set of the PATIENT
Handover module learning outcomes?*

The report is structured as follows: In the method section, we introduce the design of the study using the Group Concept Mapping methodology. In the results section we present participant demographics and the results from the Group Concept Mapping on clustering and rating of aggregated learning outcome statements. The discussion section critically reflects on the outcomes. Finally, the conclusions and suggestions section presents recommendations for further development of the PATIENT Handover educational module.

2. Method

2.1 Expert Selection

The consortium members agreed on a selection framework for identifying experts to contribute to the group concept mapping (GCM) process for the identification of learning outcomes for the handover study module for undergraduate medical students.

2.2 Group Concept Mapping

Group Concept Mapping (GCM) is a structured, mixed approach applying both quantitative and qualitative measures to objectively identify an expert group's common understanding about a particular issue, in our case the PATIENT Handover module learning outcomes. The method involved the participants in a few activities that most of professionals are used to: idea generation, sorting of ideas into groups and rating the ideas on some values (e.g. importance and difficulty to achieve). The participants work individually but it is the advanced statistical techniques of multidimensional scaling and hierarchical cluster analysis that quantitatively aggregates individual inputs of the participants to reveal objective patterns in the data. One of the distinguishing characteristics of GCM is visualisation, which is a substantial part of the analysis. Visualisation allows for grasping at once the emerging data structures, their interrelationships, and their interpretation to support decision-making. Group Concept Mapping produces three main types of visualisations: conceptual maps, pattern matches and go-zones.

In contrast to the Delphi method, in GCM, there is only one round of data structuring as the participants work independently and anonymously of each other to limit the possibility of 'groupthink' or 'peer-pressure'. Unlike interviews and focus groups, GCM does not rely on pre-determined classification schemas. The method does not need inter-coder discussion to come up with an agreement. When sorting the statements into groups, the participants, in fact, 'code' the text themselves. Then multivariate statistical analysis aggregates the individual coding schemas across the participants. Consensus is not forced, but emerges from the data. Group Concept Mapping supports the researcher in dealing with diverse information, structured in various ways, which is a problem in Affinity diagram sessions.

The GCM procedure consisted of five phases: (1) idea generation (brainstorm) and idea pruning, (2) sorting of ideas into groups, (3) rating on two values (importance and difficulty to achieve), (4) analysis of the data and (5) interpretation of the results. All project members were invited to participate in the learning outcomes study through the project's online management system. See Appendix A for letter of invitation. An invitation to some external experts was sent by email. All participants were fully informed about the purpose, the procedure, and the time needed for completing the activities. The participants were provided with a link to the brainstorming page of a web-based tool for data collection and analysis (Concept System Global, 2013). They could visit the web site, as many times they needed using their own username and password. The participants were asked to generate ideas completing the following trigger statement: "One specific learning outcome of the Handover module is..." The ideas should be a short phrases or statements expressing one thought.

We purposely did not ask the participants to follow standard formats for defining learning outcomes. Introducing such a format would be counterproductive, as it would restrict the free flow of ideas. Participants were instructed that the ideas generated should take the form of short phrases or statements, each expressing a single thought. The participants were given two weeks to complete the idea generation task.

After completing the idea generation phase, a small group of professionals from the consortium was instructed to check, edit and if needed reduce the ideas to a manageable set (about 100) for the next stages of sorting and rating. The guidelines were as follows: look for statements that contain more than one idea and if needed split them; remove identical ideas; check whether the ideas address the focus prompt; make sure that each unique idea is included in the final list; and make sure that the idea is clear, concise, understandable (a criterion is how easy or difficult an idea can be rated on the two values: importance and difficulty). The final list, randomised, was made then available to the participants, firstly for the sorting of ideas into groups (based on similarity in meaning), giving names to the groups, and secondly for the rating of the ideas on two values – importance and difficulty. For the sorting, we advised the participant to not put all statements in one group and that for such sort of studies between 5 and 20 groups works well; also not to make a ‘residual’ group, “other” or “; it is better to put a statement in its own group if difficult to find place for it. For the rating we instructed the participants to rate each statement on a 5 point Likert scale, and explicitly asked them to use the full range of rating. The participants were given three weeks to complete both sorting and rating. A reminder sent after two weeks. As in the brainstorming phase, the participants could save their work and return later to continue.

The analysis includes multidimensional scaling (MDS) and hierarchical cluster analysis (HCA) for sorting the data, and means, standard deviations, correlations and significance tests for the rating data. MDS analysis takes first the total similarity matrix, which aggregates all individual matrices of the participants. The sorting of every participant is stored as an individual matrix. An individual matrix consists of 1s and 0s. 1 is put at a cross-sectional cell if two statements have been grouped together; otherwise the value given is 0. A cell in the total similarity matrix shows how many people have grouped any two statements. It can range from 0 (no one has clustered them) to the maximal number of participants (all sorted the two statements). The total similarity matrix can be represented as a coordinate matrix. From the coordinates the distances between all pairs of points can be computed and further presented as a matrix of distances between points (Trochim, 1989). Group Concept Mapping uses the Ward agglomerative hierarchical cluster analysis. It starts with the assumption that all ideas are individual clusters, Still, human experts need to look at the solution proposed and decide upon the number of clusters that represents the data in the best possible way and reflects the context of the study.

3. Results

3.1 Demographics

61 participants registered initially to the system for online data collection, supporting the GCM approach, (Concept System Global, 2013) creating a username and password. They gave their informed consent to participate. Of them 45 contributed effectively to the brainstorming session and 22 completed the sorting and rating phases.

3.2 Statements

The experts produced statements during the idea generation phase. After completing the idea generation phase, a small group of professionals from the consortium was identified for the pruning of ideas. They were instructed to check, edit and if needed reduce the ideas to a manageable set of 100 or so ideas for the next stages of sorting and rating.

3.3 Clustering Results

Clustering analysis identified clusters and rated them on importance and difficult to achieve, see figure 1 as an example of a 16 cluster solution and figure 2 as an example of merging it to a 5 cluster solution

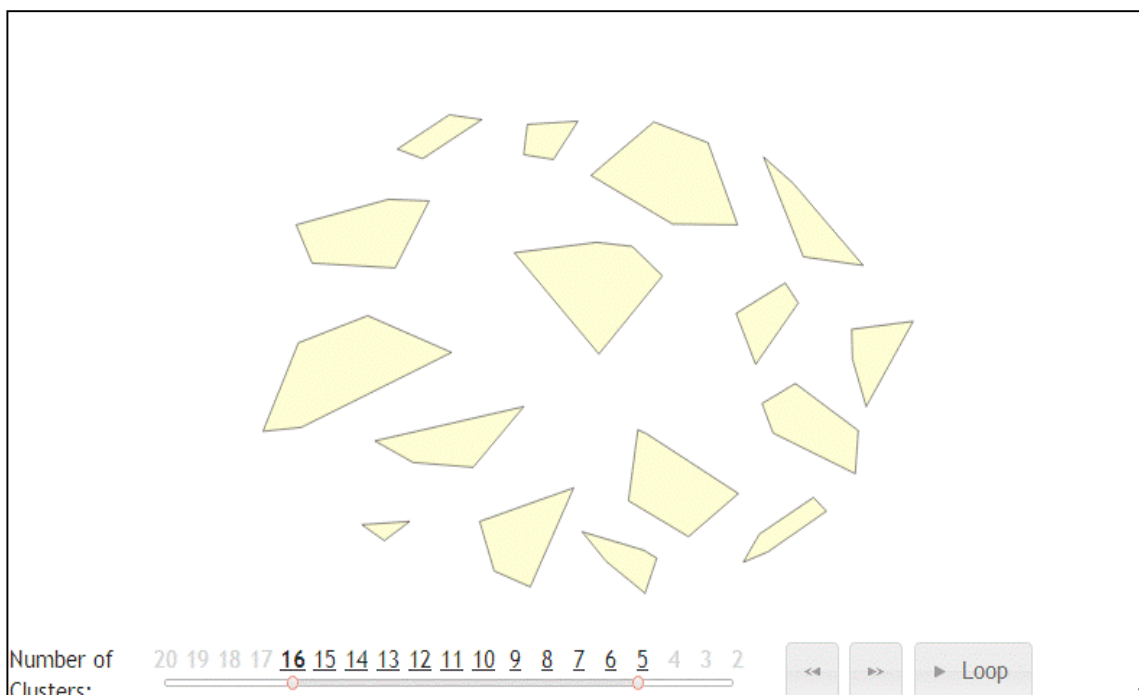


Figure 1. 16-cluster solution.

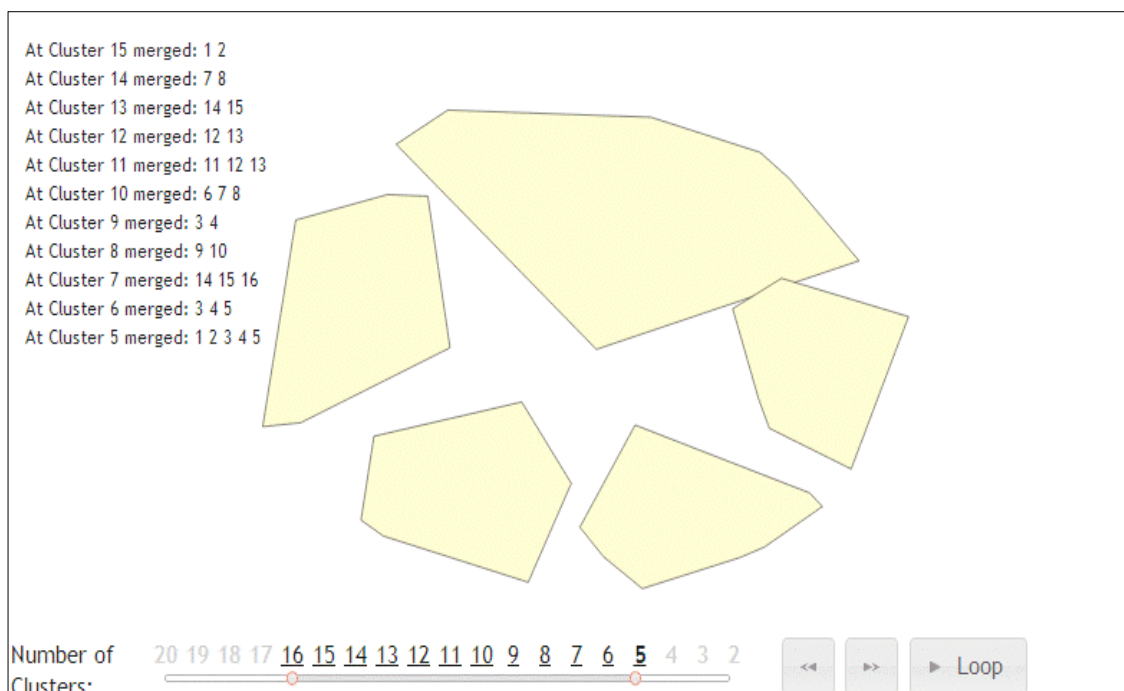


Figure 2. Merging 16-cluster solution to 5-cluster solution

The next step in making sense of the data was to attach meaningful labels to the clusters. There are three methods available for labeling. The first method is to check what the system suggests. The system suggests a label for a group of statements, based on the label given by a participant, whose centroid is the closest to the centroid of the cluster formed by the aggregation of the data from all the participants. The second method is to look at the bridging values of the statements composing the cluster. The statements with lower bridging values better represent a cluster. The third method is to read through all the statements in a cluster and to define in a label what is the story behind the statements (what is it that the cluster wants to tell us). To define the cluster labels (e.g., collective theme of the statements, or category) we combined all three methods.

4. Discussion

45 participants contributed effectively to the brainstorming session and 22 participants from 4 European countries completed the sorting and rating phases. The principle that distances between individual ideas in Group Concept Mapping matter, applies to distances between the clusters as well. The closer the clusters are to each other, the closer they are conceptually. The cluster analysis identified 10 clusters for consideration as learning outcomes for a handover training module for medical students.

It seems that 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. Drachsler et al. (Drachsler et al., 2012) already provide rich educational materials on the Handover toolbox that can be taken into account for the design of the selected learning outcomes. Maher et al. provides a suitable mobile app to train

accurate and complete handovers with medical doctors (Maher et al., 2013; Maher, Drachsler, Kalz, & Specht, 2012).

The groups of learning outcomes through the statements generated by the expert participants provide an empirical basis for defining learning outcomes of the PATIENT Handover module applying the standard of defining learning outcomes. The learning outcomes of the PATIENT project have identified learning outcomes from which a handover training module for medical students might be designed.

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