

Research Paper ■

ICT Support for Collaborative Learning in Parkinson's Disease Summer School

Informacijsko-komunikacijska tehnologija za podporo sodelovalnemu učenju na Poletni šoli o Parkinsonovi bolezni

Paul D. G. de Roos, Krzysztof Nesterowicz, Sebastjan Šlajpah

Abstract. The 9-day international interdisciplinary Summer School on Parkinson's Disease was designed around Education 3.0 principles with the aim to create realistic and relevant research projects on Parkinson's Disease and to improve teamwork skills in participants. The educational process was supported by WEB 2.0 technologies, academic experts, patients and generic skills trainers. The technologies were used to improve collaboration, facilitate sharing of knowledge and increase quality of Summer School outcomes. The organizational infrastructure and academic programme were entirely designed and carried out by students and young professionals.

Izveček. Devetnevna mednarodna interdisciplinarna Poletna šola o Parkinsonovi bolezni je bila zasnovana na načelih Izobraževanja 3.0 z namenom ustvariti realistične in pomembne raziskovalne projekte o Parkinsonovi bolezni ter izboljšati zmožnosti udeležencev za timsko delo. Izobraževalni proces so podprle tehnologije WEB 2.0, akademski strokovnjaki, pacienti in učitelji splošnih veščin. Informacijsko-komunikacijske tehnologije smo uporabljali za izboljšanje sodelovanja, olajšanje izmenjave znanja in izboljšanje končnih izdelkov Poletne šole. Organizacijsko infrastrukturo in akademski program so v celoti zasnovali in izvedli študenti in mladi strokovnjaki.

■ **Infor Med Slov:** 2010; 15(1): 1-9

Authors' institutions: Amstelland Ziekenhuis, Amstelveen, The Netherlands (PDGdR); Unit of Pharmacoepidemiology and Pharmacoeconomics, Faculty of Pharmacy, Jagiellonian University Medical College, Kraków, Poland (KN); Faculty of Electrical Engineering, University of Ljubljana, Slovenia (SŠ).

Contact person: Paul de Roos, email: paulderoos@gmail.com, web: www.paulderoos.com, Twitter: paulderoos / Pdsummerschool, #PDSS.

Prejeto / Received: 30.07.2010
Sprejeto / Accepted: 05.08.2010

Introduction

The Parkinson's Disease Summer School is based on Education 3.0 principles as posed by Keats et al¹ and Getideas.org.² The event underpins the policy framework of WHO on multi-professional education³ and supports the European Commission agenda by stimulating innovation and creativity in education.⁴

The Summer School is embedded in an informal campaign programme to improve collaboration between European students' associations of pharmacy,⁵ psychology,⁶ nursing⁷ and medicine,⁸ and to push for innovation in education with the aim to promote teamwork in healthcare. Numerous events are organised with this purpose, the largest one being the World Healthcare Students' Symposium, organised every two years.

As a motivation for the reader, we can summarise the Summer School in the following sentence: twelve participants from eight countries with backgrounds in physiotherapy, medicine, technical medicine, neuroscience, psychology and pharmacy spent nine days to design relevant and realistic research projects on Parkinson's disease, whereby the outcomes were presented to international peer reviewers who represented all stakeholders involved in Parkinson's disease treatment, namely patients, carers and experts.

The team environment is designed to provide a realistic, yet safe working context with natural stressors of time pressure, deadlines, various cultural backgrounds, differences in knowledge, skills and attitudes. Our understanding of team performance⁹⁻¹² and skills needed to work in a team,^{13,14} together with observation of different aspects of social effectiveness^{15,16} was our guide to development of training interventions. Social effectiveness constructs, including emotional intelligence, are gaining influence in healthcare. In the context of public accountability and increasing patient safety,¹⁷⁻²⁰ social effectiveness constructs are being included in healthcare curricula (e.g., emotional intelligence in medicine²¹).

Our choice to produce realistic and relevant research project proposals as Summer School outcomes stems from the fact that exposure to research may encourage choice for an academic career path, yet the literature is not conclusive on this topic and exact factors influencing this choice remain unknown.²²⁻²⁵

The teamwork process is supervised by trainers with expertise in transfer of generic skills and coaching based on training tradition of international students' associations.

Web 2.0 as defined by O'Reilly²⁶ is rapidly permeating the field of education. The educational community seems open to explore the new opportunities, yet confused and concerned on which road to take.^{27,28}

Computer self-efficacy is determined by prior exposure, positive attitude and curiosity.²⁹ In the Summer School, we did not offer formal training in use of the tools which are used as part of the programme. This decision was based on the assumption that the blend of competencies in each team will suffice to optimally use the technology.

Objectives

The following objectives were set:

- Create a relevant and realistic research project proposal on Parkinson's Disease in 9 days;
- Increase teamwork skills;
- Encourage students from different healthcare professions and different cultural backgrounds to collaborate;
- Improve students presentation skills.

Methods

Participants

Participants were recruited through student networks and their mailing lists, the newsletter of the European Parkinson's Disease Association and extensive paid Facebook advertisements. Upon registration to the Summer School website, applicants were asked to send in a resume and/or a letter of reference, giving the impression of a rigorous selection process.

Of the 45 website registrations, 14 applicants complied with our request for additional information and were therefore selected to participate in the Summer School. Of those, two dropped out due to difficulties to obtain a visa to travel to Slovenia.

Trainer selection

The trainers were recruited through the Zero Generation trainers network. The organization is a multidisciplinary team of professional trainers, with European and Worldwide NGO experience in leadership, international project management, training and consultancy; with special interests in healthcare, engineering and organisational development.¹⁷

Reviewer selection

International experts and local experts were recruited based on personal interest to review the Summer School outcomes. A panel of patients and carers was recruited through the mailing list of the Dutch Parkinson's Association; 150 patients and carers responded. These responders received a short e-mail and a detailed guide with additional instructions. The complexity of the task filtered the initial response down to 50 reviewers who had sufficient English language skills to complete the review task. It should be noted that many patients and carers felt disappointed and discouraged by the fact that English language skills were needed to complete the task.

Training materials

Training materials had been gathered through the international collaboration of students' associations in the Leadership Summer School project³⁰ in which best practices of leadership training is shared among all international students' associations.

Teaching materials

Professor Erik Wolters, Chairman of the World Federation of Neurology Research Group on Parkinsonism and Related Disorders generously donated copies of his book *Parkinsonism and Related Disorders* to all participants.

In addition, "sticky notes", pens and a whiteboard were used, as well as a room setup with movable chairs and sufficient power supplies. All participants brought their laptops and the hosting institution provided wireless internet connection.

IT tools selection

The key to selection of tools was that they should support teamwork, exchange of knowledge and ideas, and sharing of information. Free or inexpensive availability of the technology was also a key point of consideration. The final selection of the IT tools for the Summer School was based on personal experience and feedback of participants during the first Parkinson's Disease Summer School. It should also be noted that the participants did not receive formal training in any of the tools used.

- *Dropbox* – Dropbox is a file sharing solution which allows to synchronise a folder on the user's computer with an internet server, detect changes in files and keep a version history. The files stored in the Dropbox folder can be accessed via a web interface or via the dropbox software. Folders can also be shared among different users. For the Summer School, one folder was made which could be accessed by all participants.

As this tool supports file sharing, it is essential that all participants update their virus scanner and scan their computer for viruses before entering a shared environment.

- *MindMeister* – MindMeister is a collaborative and interactive mind-mapping solution which allows mind-maps to be created by teams of people. Mind-maps are a hierarchical collection of concepts related to the main topic. The outcome of brainstorm and thinking processes during the Summer School exercises was adapted to this format in order to encourage the students to see the relations from main to subtopics.

The mind-maps may contain links and attachments to create rich shared content and they can be shared among co-workers as well as be published on the web. When published in the web, the mind-map may also be embedded on websites. One particular feature is to publish a “Live Mind Map”, which allows the observers to see the contents of the mind-map grow live.

- *Google docs* – Google docs is an online service offered by Google which provides a set of office applications to create spreadsheets, text documents and presentations. Documents can be edited by many people at the same time, shared and published to the web.
- *Adobe Connect* – At the end of the Summer School, an online conference was organised to which reviewers and interested observers were invited in an online conference room, where they could listen and respond to presentations of the Summer School participants. Moderation of the discussion and set-up of the online conference requires some expertise. The Summer School participants were fully supported in the use of this technology.
- *Additional tools* – A part of the Summer School participants also engaged in a pre-summer-school workshop on literature searching skills and database use. These participants also got

accounts to the EndNoteWeb reference manager.

- *Getting Started* – Before start of the Summer School, all participants engaged in preparation of their laptops that comprised:
 - Up to date virus scanner (e.g. AVG antivirus Free);
 - Up to date internet browser;
 - Install Dropbox software (www.dropbox.com);
 - Verified presence of a desktop office application (e.g. Microsoft Office or Open Office);
 - Verified presence of a mind-mapping tool (e.g., Freemind).

Furthermore, students created accounts on the following services:

- www.gmail.com, for use with google documents and google reader;
- www.mindmeister.com, for the online collaborative mind-mapping tool.
- *Teamwork* – in order to make the group of participants a team³¹, a variety of measures were taken with the following aims:
 - Promotion of shared leadership roles;
 - Individual and mutual accountability;
 - Specific team purpose that the team itself delivers;
 - Collective work products;
- Encouraging open-ended discussion and active problem-solving;

- Measurement of performance by assessing collective work products;
- Assuring that discussions, decision making and work are done together.

day for experts to review the outcome of the work and to help participants improve, as well as the choice to develop three research projects during the Summer School. These were specific measures to assure that team dynamic would emerge.

A result of the measures stated above was our choice to create presentations at the end of every

The whole educational process is summarised in Figure 1.

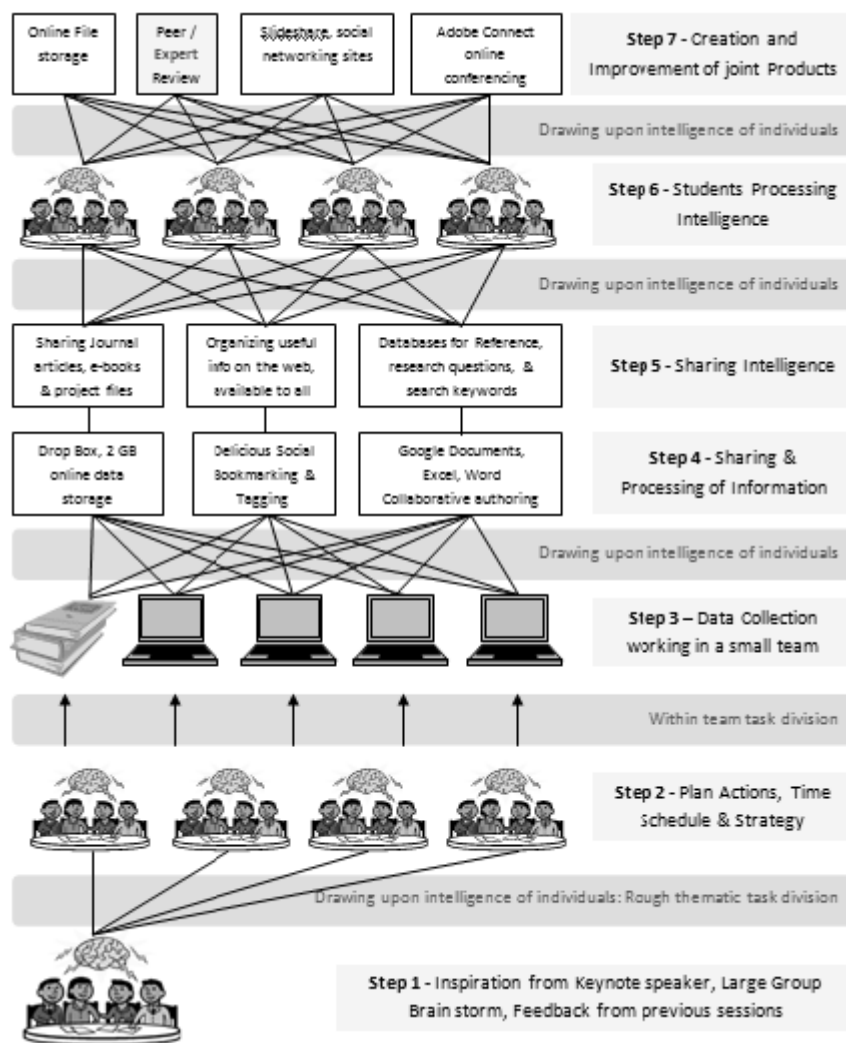


Figure 1 Educational process description.

Results

After an initial brainstorm on sticky notes (where students had to write down everything they knew about Parkinson’s disease, one item per note), the notes were attached to a whiteboard and organised

thematically. Afterwards, the themes were fitted into an online mind-map (on www.mindmeister.com) by three students during a coffee break.

In the next assignment, students had to make up a logical task division in which three groups would

elaborate on what was written on the mind-map. Once more, this process was first done individually and the outcomes were then sorted in order to get an overview on how the students analysed the situation.

Based on a consensual decision, the groups moved forward into their first assignment: *Present by the end of the day to an expert on "What is known about Parkinson's disease?"* In the subsequent days, the questions were *"What is not known about Parkinson's disease"* and *"What research question seems relevant for you to address? How would you do this? – Write a research project proposal!"*

In order to complete this task, the students chose to elaborate on the mind-map as it provided a structure for their knowledge. The MindMeister mind-map remained the tool of choice, while during a temporary internet black out offline mind-mapping with FreeMind was chosen.

There were no guidelines given on how to use the Dropbox shared folder, yet the groups decided to make a folder for each team. Some added subfolders to their main folder to organize their data in more depth, others did not. Articles and references were collected. By the end of the Summer School, the Dropbox contained 505 files with 324 MB of data. The organisation of this data has a very organic character and has limited accessibility beyond the team use. The data generated in the mind-map seems more accessible for use outside the Summer School context.

Some participants made notes using the Google docs text editor and shared these within their team. For creation of presentations, PowerPoint was the tool of choice for most students. In some groups, one person was appointed to make the slides; in other groups, everyone made their own slides and then they were put together shortly before onset of the presentation. The presentations were generally done by all group members so that the persons who felt most comfortable with the topics studied in the afternoon would be the presenters.

Although Facebook and Twitter use was encouraged, Summer School participants were so engaged in their tasks that they had limited public communication with the world outside the Summer School. During the Summer School, #PDSS was used as Twitter channel and PDSummerschool is the Twitter account associated with the Summer School Facebook page.

The final presentations were broadcasted as online conference via Adobe Connect online education platform, as well as presented in front of an expert panel audience. The participants at the online conference were patients, carers, the professionals who took part in the review of the Summer School outcomes, as well as friends curious about our work.

The Adobe Connect tool is not freely available. We used two of its layouts (Figure 2):

- Presentation layout, showing slides of the presenter and a webcam broadcast;
- An interaction layout showing a list of conference participants as well as a chat screen. We deliberately avoided using Voice over IP and Videochat capabilities as we did not have the time and/or manpower to handle any technical difficulties on the participant side.

The layout was moderated by the conference chair and the students were asked to repeat any questions from the audience in front of their microphone so that the online listeners would be aware of the ongoing discussion. Especially long questions needed to be summarised and rephrased. We also monitored the quality of the audio and video signal with friends active outside the Adobe Connect platform using Google Talk. We also monitored the broadcast with an extra laptop on site. This yielded a relatively flawless experience for the conference participants. The students struggled mainly with the procedure that required repeating and/or summarising the questions.

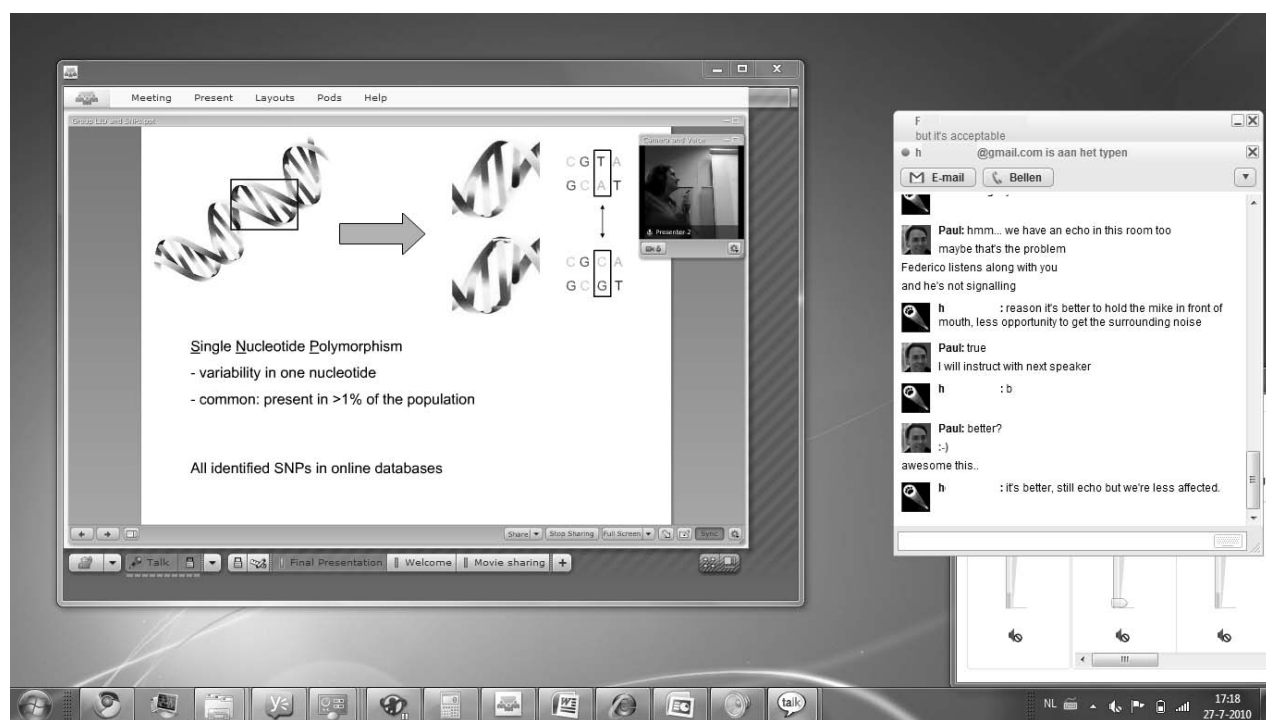


Figure 2 Screenshot of the online conference: slides, a small video broadcast window and an external observer commenting on broadcast quality through Google Chat.

Discussion

The results describe preliminary observations on the use of ICT during the Parkinson's Disease Summer School. A comprehensive evaluation of the experience and the outcomes, including a detailed comparison with the first edition of the Summer School, is still pending.

The process of recruitment of the right participants for this summer school is evolving, but it is still far from perfect. Ideally, a competition for participation would take place, yet we are still struggling to find a sufficient number of suitable candidates. We may need to engage into market research in combination with our current robust evaluations in order to gain a deeper insight into how we can target the right student population. One potential solution which is currently being explored is to increase our network affiliations and expand the organisational structure of the summer school with representation from every academic field which we wish to include.

It is hard to predict whether the outcomes of our summer school, i.e., "three realistic and relevant research project proposals", could be replicated in a university setting due to our "selection bias" for highly motivated students. The level of engagement of the students was so high that they spent 12-16 hours a day on the work aspect of the programme. Further research needs to be done to fully understand which parts of the programme contributed to this end to what extent.

The use of e-learning elements appears to have supported the learning process. We received a positive feedback from the participants on the choice of the tools (mainly MindMeister and Dropbox). Creating online shared mind-maps made the collaborative work more structured and encouraged the members of a team to cooperate with each other by creating common outcomes of their daily work.

The description and analysis of the role of the trainer in context of the summer school as observer and coach in the group dynamic and as

moral and emotional supporter during the stressful and intense assignments of the Summer School is also a point that deserves attention. A “Work hard, play hard” cultural norm was established as students also joined an extensive social programme daily after work.

An overwhelmingly positive reaction from the patient and carer community was the feedback to our inquiry for reviewers for the Summer School. This creates the need to deepen our understanding of how we can create an optimal interaction between patient and carer communities and young researchers to engage in a team effort in our quest for solutions in Parkinson’s disease research.

Regarding the online conference, it may be noted that participation of patient and carer reviewers was limited. Lay participation invited through Facebook and Twitter was also limited. Professional participation in the online conference was modest. The professionals taking part in the conference meeting (face to face) were very engaged in the discussion about the Summer School outcomes, which seemed to contribute to the learning experience.

One of the potentially most powerful outcomes of the Summer School is the community of practice which is built as a network of students (soon-to-be professionals) sharing a similar interest. Further efforts need to be put into optimising the communication infrastructure and increasing the added value of this network.

Regarding our use of technology, one might ask if there are better ways to use the selected technologies, or if other technologies would have improved the learning experience even further. From the social science perspective, it would be interesting to deepen our insight into how the software contributed to the team dynamics and the collaboration process.

In conclusion, it should be emphasised that this paper presents merely a proof-of-concept of a summer school format that merges the traditional

academic work with the use of new technologies and gives an unconventional role to professional experts, as well as to patients and carers. The paper represents the starting point of an academic journey into the combination of information technology, education and social sciences that provides the principles upon which the Parkinson’s Disease Summer School is built. It is our hope that this journey will be as rewarding as the experience from the Summer School itself.

Acknowledgements

The World Federation of Neurology Parkinson’s Disease and Related Disorders Research Committee provided generous financial support, as well as expertise. Our partners from the industry who offered financial support were Solvay Pharmaceuticals, Orion Pharma and Boehringer Ingelheim. Organisational support was obtained from European Parkinson’s Disease Association, Slovenian Parkinson’s Disease Association Trepetlika, Ljubljana Neurological Clinic, Faculty of Medicine in Ljubljana, and the Dutch Parkinson’s Disease Association.

We are also grateful to the Editor-in-Chief, Gaj Vidmar, who participated at the Summer School as academic expert, encouraged us to write the paper and helped us to greatly improve its quality.

References

1. Keats D, Schmidt JP: The genesis and emergence of education 3.0 in higher education and its potential for Africa. *First Monday* 2007; 12(3). <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1625/1540>
2. Cisco Systems: *Equipping Every Learner for the 21st Century*. San Jose 2008: Cisco Systems. http://newsroom.cisco.com/dlls/2008/ekits/Equipping_Every_Learner_for_21st_Century_White_Paper.pdf
3. World Health Organization: *Framework for action on interprofessional education and collaborative practice*. Geneva 2010: WHO Press. http://whqlibdoc.who.int/hq/2010/WHO_HRH_HPN_10.3_eng.pdf
4. Ferrari A, Cachia R, Punie Y: *Innovation and creativity in education and training in the EU member*

- States: fostering creative learning and supporting innovative teaching. Literature review on innovation and creativity in E&T in the EU Member States (ICEAC). Seville 2009: European Commission Joint Research Centre, Institute for Prospective Technological Studies.
5. European Pharmaceutical Students' Association. <http://www.epsa-online.org>, 2010.
 6. European Federation of Psychology Students' Associations. <http://www.efpsa.org>, 2010.
 7. European Nursing Students Association. http://www.rcn.org.uk/development/students/european_nursing_students_association_ensa_agm_2008, 2009.
 8. European Medical Students' Association. <http://www.emsa-europe.org/>, 2010
 9. Stewart GL: A meta-analytic review of relationships between team design features and team performance. *J Manage* 2006; 32(1): 29-55.
 10. Mathieu J, Maynard MT, Rapp T, Gilson L. Team effectiveness 1997-2007: a review of recent advancements and a glimpse into the future. *J Manage* 2008; 34(3): 410-476.
 11. Wageman R: How leaders foster self-managing team effectiveness: design choices versus hands-on coaching. *Organ Sci* 2001; 12(5): 559-577.
 12. Wilson V: Developing a vision for teamwork. *Pract Dev Health Care* 2005; 4(1): 40-48.
 13. Stevens MJ, Campion MA: The knowledge, skill, and ability requirements for teamwork: implications for human resource management. *J Manage* 1994; 20(2): 503-530.
 14. Lizzio A, Wilson K: Enhancing the effectiveness of self-managed learning groups: understanding students' choices and concerns. *Stud High Educ* 2006; 31(6): 689-703.
 15. Assaf S, Garry R, Gerald RF: Comparing the validity of multiple social effectiveness constructs in the prediction of managerial job performance. *J Organ Behav* 2006; 27(4): 443-461.
 16. Ferris GR, Perrewé PL, Douglas C: Social effectiveness in organizations: construct validity and research directions. *J Leader Organ Stud* 2002; 9(1): 49-63.
 17. Stern DT, Papadakis M. The developing physician – becoming a professional. *N Engl J Med* 2006; 355(17): 1794-1799.
 18. Hauer KE, Ciccone A, Henzel TR, Katsufakis P, Miller SH, Norcross WA, Papadakis MA, Irby DM: Remediation of the deficiencies of physicians across the continuum from medical school to practice: a thematic review of the literature. *Acad Med* 2009; 84(12): 1822-1832.
 19. Papadakis MA, Teherani A, Banach MA, Knettler TR, Rattner SL, Stern DT, Veloski JJ, Hodgson CS: Disciplinary action by medical boards and prior behavior in medical school. *N Engl J Med* 2005; 353(25): 2673-2682.
 20. Papadakis MA, Arnold GK, Blank LL, Holmboe ES, Lipner RS: Performance during internal medicine residency training and subsequent disciplinary action by state licensing boards. *Ann Intern Med* 2008; 148(11): 869-876.
 21. Arora S, Ashrafian H, Davis R, Athanasiou T, Darzi A, Sevdalis N: Emotional intelligence in medicine: a systematic review through the context of the ACGME competencies. *Med Educ* 2010; 44(8): 749-764.
 22. Laskowitz DT, Drucker RP, Parsonnet J, Cross PC, Gesundheit N: Engaging students in dedicated research and scholarship during medical school: the long-term experiences at Duke and Stanford. *Acad Med* 2010; 85(3): 419-428.
 23. Green EP, Borkan JM, Pross SH, Adler SR, Nothnagle M, Parsonnet J, Gruppuso PA: Encouraging scholarship: medical school programs to promote student inquiry beyond the traditional medical curriculum. *Acad Med* 2010; 85(3): 409-418.
 24. Borges NJ, Navarro AM, Grover A, Hoban JD: How, when, and why do physicians choose careers in academic medicine? A literature review. *Acad Med* 2010; 85(4): 680-686.
 25. Bierer SB, Chen HC: How to measure success: the impact of scholarly concentrations on students – a literature review. *Acad Med* 2010; 85(3): 438-452.
 26. O'Reilly T: What is Web 2.0: design patterns and business models for the next generation of software. *Communications & Strategies* 2007; 65: 17-37.
 27. Greenhow C, Robelia B, Hughes JE: Learning, teaching, and scholarship in a digital age. *Educational Researcher* 2009; 38(4): 246-259.
 28. Cain J, Fox BI: Web 2.0 and pharmacy education. *Am J Pharm Educ* 2009; 73(7): 120.
 29. Moos DC, Azevedo R: Learning with computer-based learning environments: a literature review of computer self-efficacy. *Rev Educ Res* 2009; 79(2): 576-600.
 30. *International Leadership Summerschool*. <http://www.leadershipsommerschool.eu>, 2010.
 31. Katzenbach JR, Smith DK: The discipline of teams. *Harvard Bus Rev* 1993; 71(2): 111-120.