

European Biomedical Engineering e-learning

Survey report of existing and planned BME distance courses in Europe

Prepared by:

E. Göran Salerud

Håkan Petersson

Michail A. Ilias



Linköping University
INSTITUTE OF TECHNOLOGY

Preface

The project European Virtual Campus for Biomedical Engineering (EVICAB), funded by the European Commission, commenced on January 2006. The objective of EVICAB is to develop, build up and evaluate sustainable, dynamical solutions for virtual mobility and e-learning that, according to the Bologna process, (i) mutually support the harmonization of the European higher education programmes, (ii) improve the quality of and comparability between the programmes, and (iii) advance the post-graduate studies, qualification and certification. These actions concern the field of biomedical engineering (BME) and medical physics and are coordinated by the Ragnar Granit Institute at Tampere University of Technology, Tampere, Finland.

The term e-curricula, as defined within the framework of EVICAB, refers to courses available to off-campus students by means of computer and internet technologies, including audio-visual aids. Off-campus implies that students do not need to be physically situated at the campus from where the course is initiated.

About this report

This report summarizes a questionnaire on existing and planned European distance education courses. The underlying questionnaire exists in two versions, an extended version that was answered by EVICAB members and a shorter one for the rest of the asked educational centers, demanding less effort and time to complete. Both versions address the courses' compliance to Bologna directives that we believe are important and applicable to the field of BME e-learning, e.g. quality assurance, educational transparency, student mobility etc. Also, more practical issues are addressed such as course scheduled start/duration and expected number of students. The overall goal is to assess the possibility of bringing it altogether through a common platform, EVICAB, where participants share the Bologna values and work towards the EVICAB objectives as declared above.

This report is based on data gathered by questionnaires sent (April - July 2006) to European educational centers offering BME courses. These educational centers were primarily found in the report "Biomedical Engineering Education in Europe – Status Reports" (BIOMEDEA, July 2005, edited by Prof. Joachim H. Nagel). Complementary addresses were found by inspecting the national BME societies that are published on the World Wide Web. Data has not been omitted or in any other way modified. However, comments have been added in some cases where we feel that some kind of misunderstanding have affected the presented answers. Wherever the answers refer to the extended questionnaire version this is pointed out and handled accordingly.

More project related information and the complete list of partner institutions can be found on EVICAB's official site www.rgi.tut.fi/evicab. Questions regarding the present survey and report may be addressed to evicab@imt.liu.se.

*E. Göran Salerud
Håkan Petersson
Michail A. Ilias*

Linköping, September 2006

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Introduction

EVICAB, aiming at building a platform for virtual mobility and e-learning, cannot afford to neglect nor exclude earlier initiatives that have resulted in distance BME courses. Possible experiences gained during this earlier work must be brought to our attention, serving as paradigms of good or poor practice as judged having the Bologna values and directives in mind.

The harmonization of the European higher education area according to the Bologna declaration incorporates distance education and poses the same demands on e-curricula as it does on any other curricula. These demands concern e.g. quality assurance, student mobility, and lifelong learning. Therefore, this initial survey on existing and planned distance BME-courses needs to address these issues rather than merely concentrate on technical solutions and tools for e-learning, that aren't a subject of harmonization or even regulation. In other words: We may choose whatever tools we want but we cannot choose to ignore the Bologna process, which we already have agreed upon and form a part of.

Fortunately, valuable experience does exist as reported here, and people possessing this experience are willing to share it with us. The present report helps us answer the following questions that concern learning the lessons from the past and getting prepared for our own contribution in the harmonization process.

1. Who has experience on distance BME courses in Europe?
2. Is there an interest among educational centers to cooperate in building a platform, defined by common Bologna values, for e-learning?
3. To what extent do the existing courses comply with the Bologna declaration? What are the possible pros and cons of the earlier work?
4. What are the means used until now to reach Bologna compliance regarding the most important aspects of the Bologna process?

Hopefully the answers to these questions will bring us closer to the overall goal of building the EVICAB platform.

In the pages to follow, we have chosen to cluster the answers to form groups based on their inter-connections. Thus the report is structured according to the following sections:

- **Practical issues**, containing information about e.g. course duration, workload, operative language, topic and cycle classification according to BIOMEDEA and the Dublin descriptors respectively.
- **Internal and external quality assurance** revealing whether the courses comply with the standards set by the European Association for Quality Assurance in Higher Education (ENQA) or not.
- **Student mobility, lifelong learning and transparency**, revealing the expected nationality and age distribution of the enrolled students. Transparency of educational contents is included since it is expected to affect the student choices and thus the above mentioned distributions.
- **Other issues**, such as the interest of educational centers in pedagogical approaches and in promoting their courses through the EVICAB platform.

Practical issues

The questionnaire was sent out to a total of 263 persons (both EVICAB and non-EVICAB members) in order to identify the responsible personnel for the BME e-curricula at 181 educational centers around Europe (only countries belonging to the European Union were selected). The whole list of asked persons is presented in Appendix 1. We received 62 answers, corresponding to ~23 percent of the asked persons. 16 of the answers (~26 percent) were positive, stating that BME distance courses existed or was planned at the addressed university, summing up to a total of 20 courses, since some universities offer 2 or 3 courses. The information presented in the pages to follow concerns these 20 courses. Since two questionnaire versions exist some of the information is only relevant for the courses offered or planned by EVICAB members that answered the extended version. The number of courses by EVICAB members equals 7, and each time information is based on those courses but not the others, this will be denoted by “EVICAB #7” (see Chart 1). Otherwise, it should be understood that the information is based on all 20 courses.

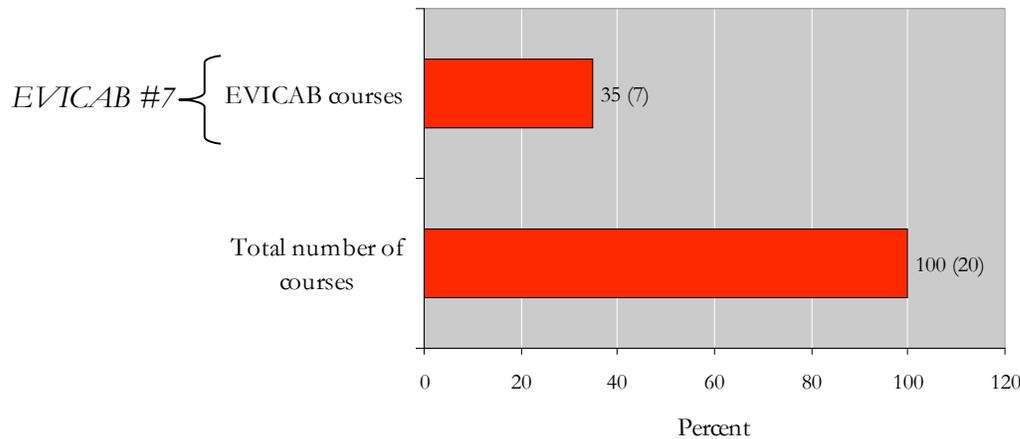


Chart 1: *The share of courses offered or planned by EVICAB-members and the total number of courses. “EVICAB #7” denotes that the information is based on the EVICAB courses only. The numbers in parentheses reveal the true numbers behind the percentages.*

Basic course information

Most of the courses (65 percent) already exist while the rest of them are planned to be offered within the next couple of years. A large portion (40 percent) is still using the native language of the country the universities belong to. Courses belong predominantly (75 percent) to the second cycle of qualification while two courses are thought to qualify as both second and third cycle and one as both first and second cycle. The above information is summarized in Chart 2.

EVICAB #7: All EVICAB courses but one belong to a BME programme and in 3 out of 7 cases also to a specific track within the programme.

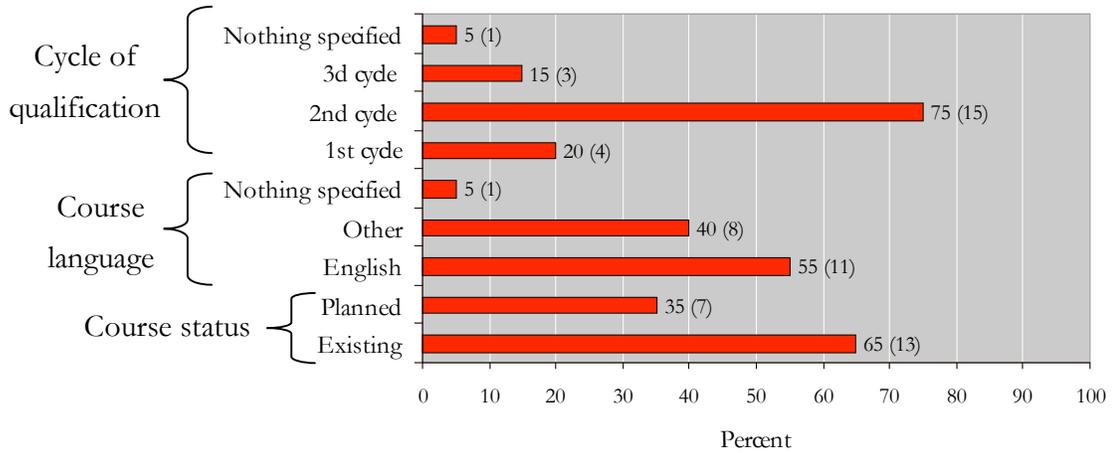


Chart 2: Basic course information concerning the distribution of courses regarding the course status, language and cycle of qualification. Numbers in parentheses reveal the true number of courses in every case.

Topics according to BIOMEDEA

The courses seem to cover the majority of the BME topics as defined by BIOMEDEA. Only two topics are not mentioned at all, while the responders needed to define their own topics and description of the course contents in 6 cases. The exact topic distribution is shown in chart 3. Many of the courses cover two or more topics.

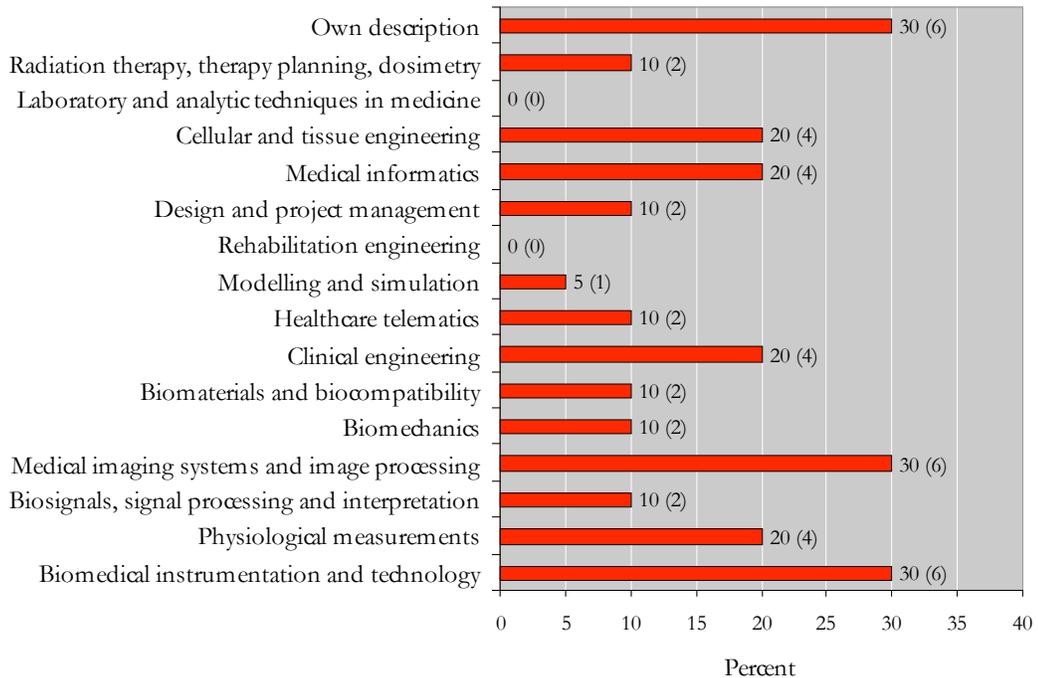
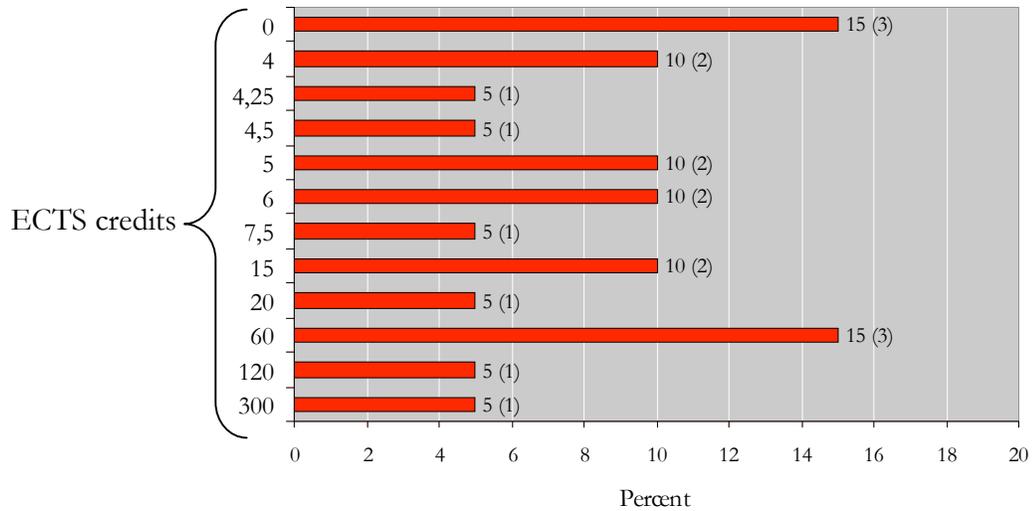


Chart 3: Course contents description as distributed over the topics defined by BIOMEDEA. 6 of the responders chose to add their own course description, 4 of them as a complement to the standard topics. 2 of them didn't choose any of the standard topics, solely stating their own description. Numbers in parentheses reveal the true number of courses covering each topic.

Workload and schedule characteristics of courses

It is stated that the majority (85 percent) of courses uses ECTS-credits, even though the number of credits in some cases seems highly unlikely (see comment under Conclusions-



chapter). The distribution of courses regarding ECTS-credits is presented in Chart 4.

Chart 4: *The distribution of courses regarding ECTS-credits. "0" means that ECTS-credits are not used at all. Numbers in parentheses reveal the true number of courses in every case.*

EVICAB #7: The majority of course duration lies between 10 and 15 weeks (~57 percent), one being a part-time course (24 weeks), and the rest being short courses, 4 to 7 weeks long. Most of the courses (~57 percent) are run during fall semester while only one of the courses runs independently of time.

Enrolled students and important resources

Chart 5 shows the distribution of courses regarding expected number of students to be enrolled. The chart also includes the course distribution concerning the most important resources for the support of student learning as judged by those offering the course. For a clear majority of courses (80 percent), the tutors were stated to be the most important resource, with course literature being the second most important resource in this context.

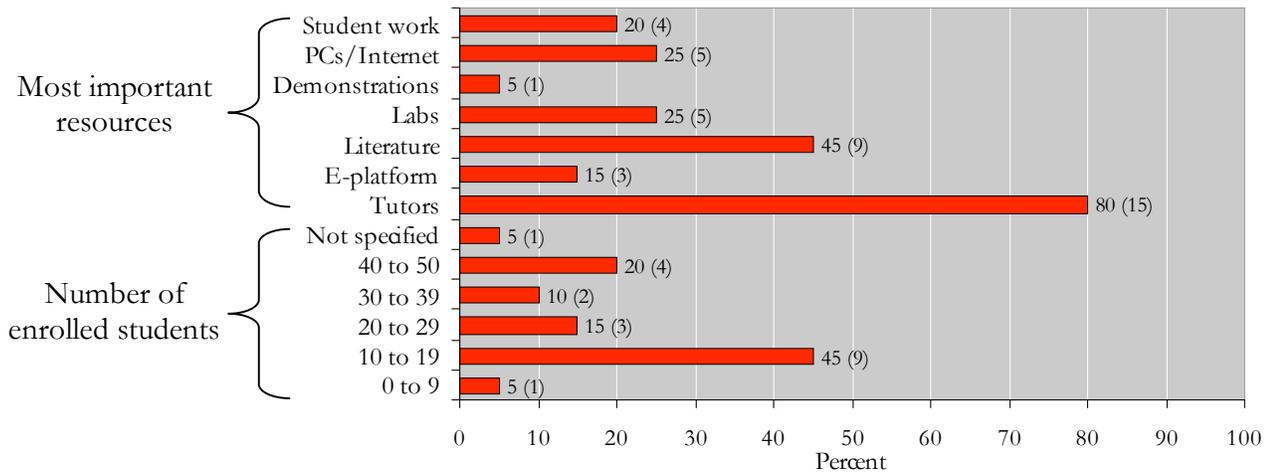


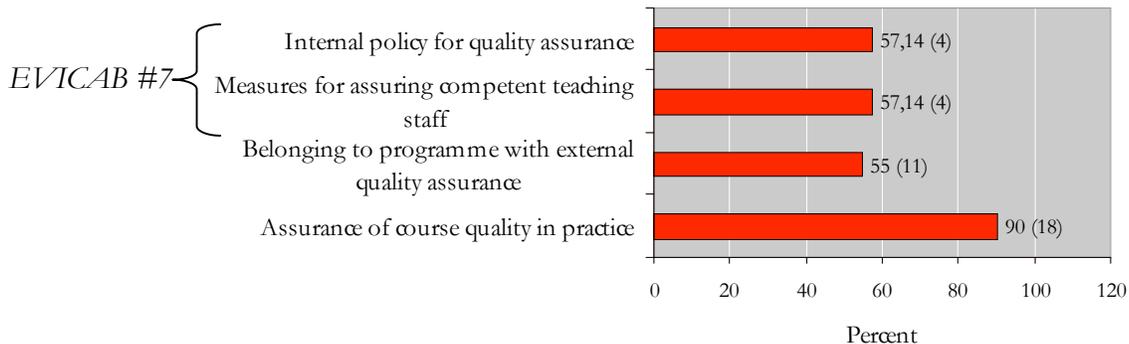
Chart 5: Course distribution regarding number of enrolled students and important resources supporting student learning. Numbers in parentheses reveal the true number of courses in every case.

Quality assurance

The distribution of courses regarding measures taken for quality assurance is presented in Chart 6. A clear majority of courses (90 percent) was, according to those who responded, subject of measures assuring course quality in practice. The most common measures are:

1. Feedback by students, as stated for 60 percent of the courses
2. Internal quality controls at a university level (40 percent)
3. Peer review and internal work at an institutional level (40 percent)

Controls by external bodies or reviewers could also be found among the description of measures as well as the use of field expertise in an educational context, assuring the quality



of teaching or tutoring.

Chart 6: The distribution of courses according to measures taken for quality assurance. ENQA standards lie behind the definitions used. Numbers in parentheses reveal the true number of courses employing the different measures of quality assurance.

Fifty five percent of the courses were stated to belong to programmes that are subjects of external quality assurance by quality assurance bodies. Most often the quality assurance bodies acted on a national level (~80 percent) while a couple of cases reported an international association (i.e. ENQA) as the controlling body.

EVICAB #7: Approximately 57 percent of the EVICAB courses were reported to be subjects for continuous measures assuring a competent teaching staff. Participation in relevant seminars and standardization initiatives, visits to other universities, and other teacher education were the measures stated. The existence of an internal policy for quality assurance was reported in ~57 percent of the courses, but no policy was actually ever revealed.

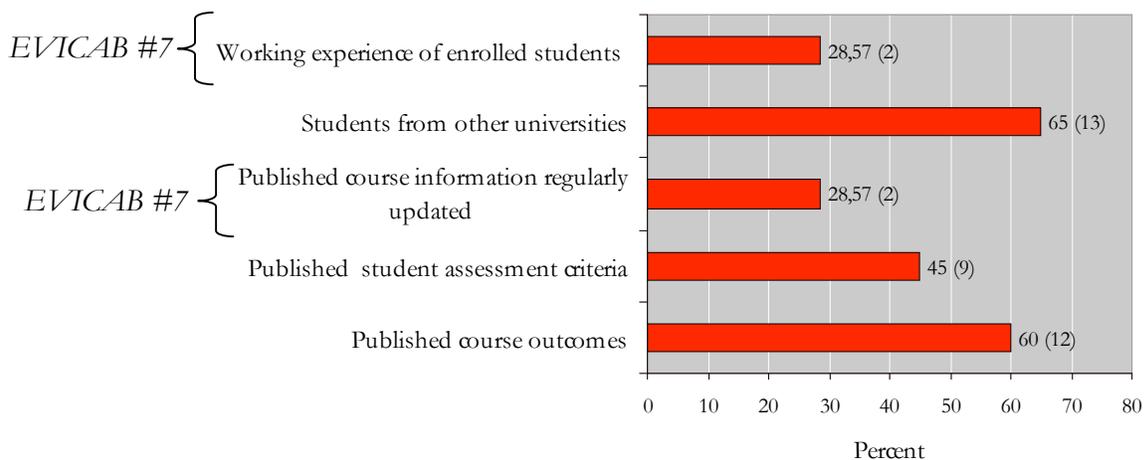
Student mobility, lifelong learning and transparency

The questions concerning transparency showed that course outcomes were publicly available for 60 percent of the cases. The most frequent means of publication was the World Wide Web, and course home pages with the available information were reported. For a minority (15 percent) of the courses, outcomes were delivered to the students directly, by means of handouts. Even fewer courses (45 percent) were stated to have published assessment criteria to value the students’ performance and no explanations or examples were given for those criteria.

EVICAB #7: Only two of the EVICAB courses were stated to provide regularly updated course information that is publicly available. The update frequency was only reported for one of those courses, and it was stated to be annually.

When it comes to enrolled students, most of the courses (65 percent) were reported to have students from other universities. These students represent over 40 percent of the total student number in a couple of courses, but as a rule that number won’t exceed 30 percent.

EVICAB #7: Only two of the EVICAB courses reported to have enrolled students with working experience within the BME field. Approximately 12 percent of the students were stated to have up to 2 years and another 12 percent over 2 years of working experience.



The following chart provides a broad outline of the above information.

Chart 7: Summary of the distribution of courses regarding availability of outcomes, student assessment criteria and course information. Data on enrolled students from foreign universities and with working

experience within the BME field is also presented. Numbers in parentheses reveal the true number of courses in every case.

Other issues

Great interest was shown among non-EVICAB members (representing a total of 13 courses) in the EVICAB project. Almost 70 percent of those asked stated that they were interested to promote their distance courses through the EVICAB platform based on comparable and mutually recognized qualifications. Even greater (80 percent) was the interest among those asked (both EVICAB and non-EVICAB members) in answering a follow-up questionnaire concerning pedagogical issues in e-learning.

Conclusions and comments

This report summarizes the EVICAB questionnaire sent to project participants but most importantly to non-EVICAB members. When reading this report it must be remembered that the answers concern both existing and planned courses. In other words, some of the data presented reflect intentions rather than actual practice. The following conclusions and remarks can be done when examining the presented material.

When asked to list the three most important resources in order to facilitate students' learning, tutors and literature were repeatedly reported. From a pedagogical point of view this could be a sign for a teacher centered approach to learning. However, students' work, labs and demonstrations could be found among the answers in this context, supporting a more student centered approach instead.

Even though ECTS credits were widely used, we suspect that courses with over 60 ECTS-credits indicate some kind of misunderstanding since the workload would translate to full time studies of a year or more!

The existing and planned courses seem to cover the whole map of BME courses as defined by BIOMEDEA. BME people seem to, in majority, comply with the BIOMEDEA description. There would be so much to gain if all these courses could be brought together building an extensive e-curriculum.

Most of the courses are said to be second cycle courses, meaning that they are courses on a Master level, and that studies in BME should be a continuation from cycle one. Non-English courses cannot be used directly in EVICAB, still the experience from these courses could prove to be valuable. Thus we shouldn't disregard these persons and courses. Maybe we (within EVICAB) should discuss the distribution of our courses in time, so that the majority of courses aren't delivered during fall.

All educational centers seem to work with quality assurance issues on a local, department level. The routines for external quality assurance aren't that clear and some of the persons who responded stated their will to comply with the ENQA directives but without a declared way of doing so. Thus external quality assurance constitutes a field where more need to be done; however, some educational centers report that they have experience on these matters and could hopefully share their knowledge.

No internal policy of quality assurance was actually stated, even though some reported that they had one. It cannot be considered a fact that a clearly stated policy exist. The continuous measures for quality and competence of teaching staff should apply all courses in EVICAB

and we seem to need time and effort to manage those issues according to the Bologna directives.

Awfully few students with working experience in BME were reported. And more can be done to attract a larger number of international students. The transparency shows frightening low scores which can be one of the explanations for the results regarding students with working experience and an international background.

We may attract competence and experience from the persons who responded positively to the questionnaire. Some of them truly show interest in our work. A possibility could be to invite them to our Linköping-meeting, where a more general symposium on e-learning will be held during November.

Appedices:

A: List of educational centers interested in joining EVICAB

B: Institutions and people in the survey

C: Survey on European Biomedical Engineering e-curricula, EVICAB members

D: Survey on European Biomedical Engineering e-curricula, non-EVICAB members

E: Explanatory sheet for the survey.

F: Questionnaire for EVICAB members

G: Questionnaire for non-EVICAB members

Appendix A

List of educational centers interested in joining EVICAB

Prof. Paolo Inchingolo
University of Trieste (Italy)
Higher Education in Clinical Engineering (SSIC-HECE), DEEI
Telephone: +39 040 558 3419
E-mail: paolo.inchingolo@ssic.units.it
Position: Director SSIC-HECE
Number of courses: 3

Prof. Damijan Miklavcic
University of Ljubljana (Slovenia)
Faculty of Electrical Engineering
Telephone: +386 1 4768 456
E-mail: damijan@svarun.fe.uni-lj.si
Position: Head of the lab
Number of courses: 2

Prof. Dr. H. Planck
University of Stuttgart (Germany)
Chir for Textile Technology
Telephone: +49 711 9340 216
E-mail: heinrich.planck@itv.denkendorf.de
Position: Director ITV Denkendorf
Number of courses: 1

Prof. Vesna Spasic Jokic
University of Novi Sad (UNS, Yugoslavia)
Faculty of technical sciences UNS
Telephone: +381-11-244-77-00
E-mail: svesna@vin.bg.ac.yu
Position: Head of Radiation Protection Department in Laboratory of Physics INN VInca
Number of courses: 1

Prof. Pascal Verdonck
Ghent University (Belgium)
Institute of Biomedical Technology
Telephone: +32 9 264 32 81
E-mail: Pascal.Verdonck@UGent.be
Position: Director
Number of courses: 1

W. M. Molenaar
University of Groningen (The Netherlands)
Institute for Medical Education
Telephone: +31 50 363 2887
E-mail: w.m.molenaar@med.umcg.nl
Position: Project coordinator CASECUBE project
Number of courses: 1

Appendix B

The total list of persons asked to participate in the questionnaire, sorted by country of origin.

COUNTRY	UNIVERSITY	CONTACT PERSON	E-MAIL
Austria	Vienna University of Technology (TUW)	Schmiedmayer Heinz-Bodo (Prof)	Heinz-Bodo.Schmiedmayer@tuwien.ac.at
	Univ. Vienna	Gilly, Hermann (Prof)	Hermann.Gilly@akh-wien.ac.at
	Graz University of Technology (TUG)	Scharfetter, Hermann (Prof)	hermann.scharfetter@TUGraz.at
		Rieger, Maria (Administrator)	maria.rieger@TUGraz.at
	Vienna University of Technology (TUW)	Rattay, Frank (Prof)	frank.rattay+e101@tuwien.ac.at
		Badurek, Gerald (Prof)	gerald.badurek+e141@tuwien.ac.at
		Buchberger Brigitta (Administrator)	buchberger@ati.ac.at
	University of Innsbruck	Ritsch-Marte, Monika (Prof)	monika.ritsch-marte@i-med.ac.at
		Thurner, Ute (Administrator)	ute.thurner@i-med.ac.at
	University for Health Informatics and Technology, Tyrol	Tilg, Bernhard (Prof)	bernhard.tilg@umit.at
	Baumgartner, Christian (PhD)	christian.baumgartner@umit.at	
Belgium	Ghent University	Verdonck, Pascal (Prof)	pascal.verdonck@rug.ac.be
	Catholic University Leuven, KULeuven	Vander Sloten, Jos (Prof)	Jos.VanderSloten@mech.kuleuven.be
		Puers, Bob (Prof)	Bob.Puers@esat.kuleuven.be
		De Moor, Bart (PhD)	Bart.DeMoor@esat.kuleuven.be
	Free University Brussel, VUB	Bruyninckx, Tanja (Mrs)	Tanja.Bruyninckx@vub.ac.be
	Université Catholique de Louvain (UCL)	Plevoets, Martine (Mme)	plevoets@adre.ucl.ac.be
		Bol, Anne (PhD)	anne.bol@imre.ucl.ac.be
Université Libre de Bruxelles, ULB	Student information centre	etudes@ulb.ac.be	
Bulgaria	Medical University, Dept. of Physics and Biophysics	Todorov, Ventzeslav	
	Centre of Biomedical Engineering Bulgarian Academy of Sciences	Dotsinsky, Ivan	iadoc@argo.bas.bg

	National Center of Hygiene, Physical Factors Dept.	Ivanova, Michaela (Res Ass, Secret)	m.ivanova@nchmen.government.bg
	National Center of Hygiene, Physical Factors Dept.	Israel, Michel (Ph.D.)	m.israel@nchmen.government.bg
	National Center for Radiobiology and Radiation Protection	Slavtchev, Athanas (Ph.D.)	ncrrp@medicalnet-bg.org
Croatia	University of Zagreb, Faculty of Electrical Engineering and Computing	Magjarević, Ratko (Prof)	Ratko.Magjarevic@fer.hr
	University of Zagreb, Faculty of Electrical Engineering and Computing	Bilas, Vedran (Prof)	vedran.bilas@fer.hr
	University of Zagreb, Faculty of Electrical Engineering and Computing	Kos, Mladen (Prof)	mladen.kos@fer.hr
	University of Zagreb, Faculty of Electrical Engineering and Computing	Rumac, Marija (Administrator)	marija.rumac@fer.hr
	University of Split	Puljak, Ivica (PhD)	puljak@fesb.hr
	University of Osijek	Zagar, Drago (PhD, studierektor)	drago.zagar@etfos.hr
Czech Republic	Brno University of Technology	Holčík, Jiří (Prof)	holcik@dbme.fee.vutbr.cz
	Czech Technical University in Prague	Lhotská, Lenka (Prof)	lhotska@fel.cvut.cz
	Czech Society for Biomedical Engineering and Medical Informatics	Cmíral, Jaromír (PhD)	cmiralj@army.cz
	Brno University of Technology	Jirí, Jan (Prof)	ubmi@feec.vutbr.cz
Denmark	Aalborg University, Department of Health Science and Technology	Struijk, Johannes (PhD)	jj@smi.auc.dk
	Technical University of Denmark (DTU), Electronics & Signal Processing	Wilhjelm, Jens E. (PhD)	jw@oersted.dtu.dk
	Technical University of Denmark (DTU), Electronics & Signal Processing	Jensen, Jørgen Arendt	jaj@oersted.dtu.dk
	Technical University of Denmark (DTU), Electronics & Signal Processing	Thomsen, Anne Marie (Stud. Admin.)	at@oersted.dtu.dk
Estonia	Tallinn Technical University	Hiie, Hinrikus (Prof)	hiie@bmt.cb.ttu.ee
	Tallinn Technical University	Meigas, Kalju (Prof)	kalju@bmt.cb.ttu.ee
	Tallinn Technical University	Fridolin, Ivo	ivo@cb.ttu.ee

Finland	Finnish Society for Medical Physics and Medical Engineering	Viik, Jari (Prof)	jari.viik@tut.fi
	Tampere University of Technology	Lindroos, Kari (PhD)	kari.lindroos@tut.fi
France	Atomic energy agency, (CEA)	Valet, Christiane (Administration)	christiane.valet@cea.fr
	French Society for Biomedical Engineering		sfgbm@enst-bretagne.fr
	Universite Victor Segalen, BORDEAUX	Durrieu, Marie-Christine (Prof)	marie-christine.durrieu@bordeaux.inserm.fr
	Centre René Huguenin - St Cloud	Valinta, Danièle (Prof)	d.valinta@stcloud-huguenin.org
	Université de Technologie de Compiègne		genie.biologique@utc.fr
	Laboratoire d'Optique et Biosciences, Ecole polytechnique	Delsart, Christian (Prof)	Christian.Delsart@lac.u-psud.fr
	Laboratoire Ondes et Acoustique	Tanter, Mickael (Prof)	michael.tanter@espci.fr
	Laboratoire Optique Physique	Forget, Benoit (Prof)	benoit.forget@espci.fr
	Universite Louis Pasteur, Emerging Imaging Techniques	Heider, Nathalie (Administration)	heider@ipb.u-strasbg.fr
	Universite Louis Pasteur, Emerging Imaging Techniques	Rousseau, François (Prof)	francois.rousseau@ensps.u-strasbg.fr
Germany	DGBMT Deutsche Gesellschaft für Biomedizinische Technik im VDE		dgbmt@vde.com
	Institute of Biomedical Engineering, Universität Karlsruhe (TH)	Dössel, Olaf (Prof)	od@ibt.etec.uni-karlsruhe.de
	RWTH Aachen	Schmitz-Rode, Thomas	smiro@hia.rwth-aachen.de
	RWTH Aachen	Leonhardt, Steffen	medit@hia.rwth-aachen.de
	Technische Universität Berlin	Boenick, U.	medtech@bmt1.kf.TU-Berlin.de
	Technische Universität Berlin	Orglmeister, R.	orglm@tubife1.ee.tu-berlin.de
	Ruhr-Universität Bochum	Ermert, H.	helmut.ermert@ruhr-uni-bochum.de
	Ruhr-Universität Bochum	Werner, J.	werner@biomed.ruhr-uni-bochum.de
	Technische Universität Braunschweig	Varchim, J.-U.	www-emg@tu-bs.de
	Hochschule Bremerhaven	Dammer, Rainer	dammer@ttz-bremerhaven.de

Hochschule Bremerhaven	Eick, Olaf	olaf.eick@hs-bremerhaven.de
Hochschule Bremerhaven	Rascher-Friesenhausen, Richard	richard.rascher-friesenhausen@hs-bremerhaven.de
Hochschule Bremerhaven	Lichtblau, Ulrike	ulrike.lichtblau@hs-bremerhaven.de
Interstaatliche Fachhochschule für Technik Buchs	Zweifel, H. J.	zweifel@ntb.ch
Interstaatliche Fachhochschule für Technik Buchs	Schwab, U.	schwab@ntb.ch
Technische Universität Darmstadt	Isermann, R.	RIsermann@iat.tu-darmstadt.de
Technische Universität Darmstadt	Leonhardt, Steffen	sleonhardt@iat.tu-darmstadt.de
Technische Universität Darmstadt	Walter, M.	mwalter@iat.tu-darmstadt.de
Technische Universität Dresden	Freyer, R.	freyer-r@rcs.urz.tu-dresden.de
Technische Universität Graz	Hutten, H.	hutten@ibmt.tu-graz.ac.at
Medizinische Hochschule Hannover	Hartung, C.	hartung.christoph@mh-hannover.de
Universität Heidelberg / Fachhochschule Heilbronn	Dickhaus, H.	Hartmut.Dickhaus@med.uni-heidelberg.de
Technische Universität Ilmenau	Henning, G.	ghenning@informatik.tu-ilmenau.de
Universität Kaiserslautern	Weiß, P.	ZFUW@rhrk.uni-kl.de
Universität Kaiserslautern	Schleppy-Rech, Roswitha	schleppy@rhrk.uni-kl.de
Universität Kaiserslautern	Decker, Peter	decker@rhrk.uni-kl.de
Universität Kaiserslautern	Ziegler, Christiane	cz@physik.uni-kl.de
Technische Universität Karlsruhe	Dössel, O.	Olaf.Doessel@ibt.uni-karlsruhe.de
Medizinische Universität Lübeck	Martinetz, Thomas	martinetz@informatik.uni-luebeck.de
Medizinische Universität Lübeck	Birngruber, Reginald	birngruber@mll-luebeck.de
Medizinische Universität Lübeck	Pöppel, Siegfried J.	poeppel@imi.uni-luebeck.de

Technische Universität München	Schmitt-Landsiedel, Doris	dsl@tum.de
Friedrich- Alexander Universität Erlangen-Nürnberg	Fabry, Ben	bfabry@biomed.uni-erlangen.de
Friedrich- Alexander Universität Erlangen-Nürnberg	Hensel, Bernhard	Bernhard.Hensel@biomed.uni-erlangen.de
Universität Rostock	Schmitz, Klaus-Peter	klaus-peter.schmitz@uni-rostock.de
Universität des Saarlandes, Saarbrücken und Homburg/Saar	Fuhr, Günter	guenter.fuhr@ibmt.fraunhofer.de
Universität des Saarlandes, Saarbrücken und Homburg/Saar	König, Karsten	karsten.koenig@ibmt.fraunhofer.de
Universität Stuttgart	Nagel, J.	jn@bmt.uni-stuttgart.de
Universität Stuttgart	Planck, H.	heinrich.planck@itvd.uni-stuttgart.de
Universität Ulm	Franke, Ralf-Peter	ralf-peter.franke@zibmt.uni-ulm.de
Technische Universität Wien	Pfundner	pfundner@ps1.tuwien.ac.at
ETH und Universität Zürich	Bösiger, P.	boesiger@biomed.ee.ethz.ch
Hochschule für Technik und Wirtschaft Zwickau (FH)	Heiland, L.	leonore.heiland@fh-zwickau.de
Hochschule für Technik und Wirtschaft Zwickau (FH)	Füßel, J.	jens.fuessel@fh-zwickau.de
Hochschule für Technik und Wirtschaft Zwickau (FH)	Jacobi, P.	peter.jacobi@fh-zwickau.de
Fachhochschule Aachen-Jülich	Weber, H.-J.	weber@fh-aachen.de
Technische Fachhochschule Berlin	Schuhmacher, H.	Dr.Schuhmacher_Heinz@gmx.de
Fachhochschule Bern	Fuhrer, Stelia	stelia.fuhrer@hta-be.bfh.ch
Fachhochschule Bern	Diermann, Uli	Uli.diermann@hta-be.bfh.ch
Fachhochschule Furtwangen	Friedmann, Bruno	friedmann@fh-furtwangen.de

Fachhochschule Gelsenkirchen	Bärmann, Frank	frank.baermann@fh-gelsenkirchen.de
Fachhochschule Gelsenkirchen	Schröder, Christian	christian.schroeder@fh-gelsenkirchen.de
Fachhochschule Gießen-Friedberg	Pfeiff, H.	hans.Pfeiff@tg.fh-giessen.de
Fachhochschule Hamburg	Stettin, Jürgen	juergen.stettin@rzbd.haw-hamburg.de
Fachhochschule Hamburg	Ueberle, Friedrich	friedrich.ueberle@rzbd.haw-hamburg.de
Fachhochschule Jena	Bellemann, M. E.	matthias.bellemann@fh-jena.de
Fachhochschule Jena	Feller, K. H.	karl-heinz.feller@fh-jena.de
Fachhochschule Jena	Hansen, Ellen	ellen.hansen@fh-jena.de
Hochschule Anhalt	Hoffmann, K.-P.	hoffmann@et.hs-anhalt.de
Fachhochschule Lübeck	Englisch, Uwe	englisch@fh-luebeck.de
Fachhochschule Lübeck	Klein , Stephan	klein@fh-luebeck.de
Hochschule Mittweida (FH)	Schüler, W.	wschue@htwm.de
Fachhochschule München	Wondrazek, F.	fwondra@fb06.fh-muenchen.de
FH Münster		phystech@fh-muenster.de
FH Münster	Mittmann, Karin	mittmann@fh-muenster.de
FH Münster	Hölscher	uvo.hoelscher@fh-muenster.de
FH Münster	Stöber, U.	stoerber@fh-muenster.de
RheinAhrCampus Remagen der FH Koblenz	Buzug	buzug@rheinahrcampus.de
RheinAhrCampus Remagen der FH Koblenz	Hartmann	hartmann@rheinahrcampus.de
RheinAhrCampus Remagen der FH Koblenz	Holz	holz@rheinahrcampus.de
RheinAhrCampus Remagen der FH Koblenz	Schmitz	schmitz@rheinahrcampus.de

	Fachhochschule Ulm		feinwerktechnik@fh-ulm.de
	Fachhochschule Ulm	Keck,W.	Keck@fh-ulm.de
	Fachhochschule Wilhelmshaven	Anna, T.	anna@fbf.fh-wilhelmshaven.de
	Fachhochschule Wilhelmshaven	Hinz, R.	hinz@fbf.fh-wilhelmshaven.de
Greece	Dept. of Medical Physics, Faculty of Medicine, University of Patras	Pallikarakis, Nicolas (Prof)	nipa@bme.med.upatras.gr
Hungary	Budapest University of Technology and Economics (BUTE)	Jobbágy, Ákos (PhD)	jobbagy@mit.bme.hu
Ireland	Beaumont Hospital	Smith, Meabh	meabh.smith@beaumont.ie
	Department of Mechanical and Manufacturing Engineering	Bryan, K. (Dr)	kbryan@cit.ie
	University College Galway, Department of Mechanical Engineering	McHugh, P. (Dr)	peter.mchugh@nuigalway.ie
	Dublin City University	McNamara, Brian	brian.mcnamara@dcu.ie
	University of Limerick	McGloughlin, T. (Dr)	tim.mcgloughlin@ul.ie
	University College Dublin	de Paor, Annraoi (Prof)	annraoi.depaor@ucd.ie
		Alternativeperson	mark.omalley@ucd.ie
	Trinity College, Dublin	Kelleher, Dermot P. (Prof)	dermot.kelleher@tcd.ie
		Alternativeperson	medicine@tcd.ie
	University College Dublin	de Paor, Annraoi (Prof)	annraoi.depaor@ucd.ie
	Dublin Institute of Technology	Coyle, Eugene (Dr)	eugene.coyle@dit.ie
	Trinity College Dublin	Prendergast, Patrick (Dr)	pprender@tcd.ie
	Trinity College Dublin	Grimson, Jane (Prof)	jane.grimson@tcd.ie
Israel	Israel Institute of Technology	Adam, Dan (Prof)	dan@biomed.technion.ac.il
Italy	University of Naples "Federico II"	Bracale, Marcello (Prof)	bracale@unina.it
	Università Politecnica delle Marche	Fioretti, Sandro (Prof)	s.fioretti@univpm.it
	Università Politecnica delle Marche	Burattini, Roberto (Prof)	r.burattini@univpm.it
	University of Bologna	Cavalcanti, Silvio (PhD)	silvio.cavalcanti@unibo.it
	Laboratorio di bioingegneria e bioimmagini, University of Genoa	Beltrame, Francesco (Prof)	francesc@dist.unige.it

	Politecnico di Milano	Ferrigno, Giancarlo (Prof)	ferrigno@biomed.polimi.it
	University of Padova	Ruggeri, Alfredo (Prof)	alfredo.ruggeri@unipd.it
	Università degli Studi di Pavia	Bellazi, Riccardo (PhD)	riccardo.bellazzi@unipv.it
	University of Pisa	De Rossi, Danilo (Prof)	d.derossi@ing.unipi.it
	Università Campus Bio- Medico di Roma	Lorenzelli, Vincenzo (Prof)	v.lorenzelli@unicampus.it
	Politecnico di Torino	Knaflitz, Marco (Prof)	marco.knaflitz@polito.it
	Università Campus Bio- Medico di Roma	Zennaro, Enrica (Administration)	segreteriastudenti@unicampus.it
	University of Trieste		mic-segr@ssic.units.it
	University of Trieste	Inchingolo, Paolo (Prof)	paolo.inchingolo@anl.units.it
Latvia	University of Latvia	Spigulis, Janis (Prof)	janispi@acad.latnet.lv
	Riga Technical University	Knets, Ivars (Prof)	knets@latnet.lv
	Riga Technical University	Viba, Janis (Prof)	janis.viba@rtu.lv
	Riga Technical University, Institute of Biomaterials and Biomechanics	Kasyanov, Vladimir (Prof)	kasyanov@latnet.lv
Lithuania	Kaunas University of Technology	Lukosevicius, Arunas (Prof)	arunas.lukosevicius@tef.ktu.lt arunas.lukosevicius@ktu.lt
Norway	Dept. of Informatics, University of Oslo	Lande, Tor Sverre (Prof)	bassen@ifi.uio.no
	Norwegian University of Science and Technology, (NTNU)	Angelsen, Bjorn A. J. (Prof)	bjorn.angelsen@medisin.ntnu.no
Poland	Silesian University of Technology, Division of Biomedical Electronics	Tkacz, Ewaryst (Prof)	et@biomed.iele.polsl.gliwice.pl ewaryst.tkacz@polsl.pl
	Polish Society of Biomedical Engineering	Maniewski, Roman (Prof)	Roman.Maniewski@ibib.waw.pl
	Warsaw University of Technology	Pawlicki, Wladyslaw Grzegorz (Prof)	wegla@mchtr.pw.edu.pl
	Inst. of Precision & Biomedical Engineering, Warsaw University of Technology	Palko, Tadeusz (Prof.)	palkot@mchtr.pw.edu.pl
	Inst. of Biocybernetics & Biomedical Engineering, Warsaw University of Technology	Zalewska, Ewa (Dr.)	e.zalewska@astercity.net
	Bialystok technical university	Krupicz, Bazyli (Prof)	prorektor.dydaktyka@pb.edu.pl
	Departament of Computer Science, Bialystok Technical University	Kretowski, Marek (Prof)	mkret@ii.pb.bialystok.pl
	Department of Biomedical Engineering, Gdansk University of Technology	Nowakowski, Antoni (Prof)	antowak@biomed.eti.pg.gda.pl

	Department of Biomedical Engineering, Gdansk University of Technology	Szynicka, Beata (sekretariat)	kib@biomed.eti.pg.gda.pl
	Koszalin University of Technology	Jasiulewicz, Michal (Dr.)	jasiulewicz@poczta.fm
	Cracow University of Technology	Palej, Rafal (Prof)	pd@pk.edu.pl
	Centre for Bioengineering in Gliwice	Marciniak, Jan (Prof)	rmt1-3.kierownik@polsl.pl
	Technical University of Wroclaw	Kurzynzki, Marek W. (Prof)	ar@i17unixb.ists.pwr.wroc.pl
	University of Mining and Metallurgy, Faculty of Mining and Metallurgy Electrical Engineering	Tadeusiewicz, Ryszard	rtad@agh.edu.pl
	Szcecin university of technology	Weinert-Raczka, Ewa (Prof)	ewa.raczka@ps.pl
Romania	Technical University of Cluj-Napoca	Ciupa, Radu V. (Prof)	Radu.Ciupa@et.utcluj.ro
	Technical University of Iasi	Dobrea, Dan-Marius (Dr.)	mdobrea@etc.tuiasi.ro
	Politehnica University of Bucharest	Cristea, Paul (Dr)	pcristea@paul.dsp.pub.ro
	Facultatea de Electronica si Telecomunicatii Timisoara	Lascu, Mihaela (Dr)	mihaela.lascu@etc.utt.ro
	The University of Oradea, department of electronics	Gordan, Cornelia	cgordan@uoradea.ro
	The University of Oradea, Faculty of Electrical Engineering and Information Technology	Generell information	oneam@uoradea.ro
Slovakia	Institute of Measurement Science, Slovak Academy of Sciences	Tyšler, Milan (Dr)	umertysl@savba.sk
	Faculty of Mechatronics, University of Trenčín,	Kneppo, Peter (Prof)	peter.kneppo@nexta.sk pkneppo@tnuni.sk
	Faculty of Mechanical Engineering, Technical University of Košice	Šimšík, Dušan (Prof)	Dusan.Simsik@tuke.sk
	Department of instrumental and biomedical engineering, Technical University of Košice	Zivcak, Jozef (Prof)	Jozef.Zivcak@tuke.sk
	Department of Electromagnetic and Biomedical Engineering, University of ilina		ktebi@fel.utc.sk
	Faculty of Electrical Engineering, University of ilina	Klara Capova (Prof)	capova@fel.utc.sk
Slovenia	University of Ljubljana, Faculty of Electrical Engineering	Miklavcic, Damijan (Prof)	damijan@svarun.fe.uni-lj.si

Spain	Biomedical Engineering Group, Engineering School of the University of Seville	Roa, Laura M. (Prof)	laura@esi.us.es
	Bioengineering and Telemedicine Universidad Politecnica de Madrid	Gomez, Enrique J. (Prof)	egomez@gbt.tfo.upm.es
	Universidad de Zaragoza	Mena, Eduardo (Dr)	emena@unizar.es
	Universidad de Zaragoza	Bonifacio, Martín del Brío (Prof)	bmb@unizar.es
	Biomedical Engineering Research Centre, Technical University of Catalonia (UPC)	Campos, Raimon Jane	jane@creb.upc.es
	Universidad Politecnica de Madrid	Santos, Andres (Dr.)	andres@die.upm.es
	Universidad Politecnica de Cartagena	Information	gestion.academica@upct.es
	School of Industrial Engineering Polytechnic University of Valencia	Ferrero Corral, José María (Prof)	jmferrer@eln.upv.es
	Department of Computer Science Faculty of Informatics University of A Coruña	Betanzos, Amparo Alonso (Dr)	ciamparo@udc.es
	Universidad Nacional de Educación a Distancia	Marcos del Cano, Ana María (Secretary)	
Sweden	Institutionen för medicinsk teknik, Linköpings universitet	Salerud, Göran	goran.salerud@imt.liu.se
	Umeå University	Lindahl, Olof (Prof.)	olof.lindahl@tfe.umu.se
	Högskolan i Borås, Institutionen Ingenjörshögskolan	Bengtsson, Charlotte (Prof)	charlotte.bengtsson@hb.se
	Lunds tekniska högskola	Andersson-Engels, Stefan (Prof)	Stefan.Andersson-Engels@fysik.lth.se
	Institutionen för medicinska vetenskaper, Biomedicinsk informatik och teknik, Uppsala universitet	Erlandson, Björn-Erik (Prof)	bjorn-erik.erlandson@ehealth.uu.se
	Division of Biomedical Research Sciences	Lundqvist, Hans (Prof)	hans.lundqvist@bms.uu.se
	Institutionen för Datavetenskap och Elektronik, Mälardalens högskola	Lindén, Maria (Dr.)	maria.linden@mdh.se
	Göteborgs universitet, avdelningen för radiofysik	Isaksson, Mats	Mats.Isaksson@radfys.gu.se
	Chalmers, Signaler och system, Medicinsk teknik	Håkansson, Bo	boh@chalmers.se
	Chalmers, Signaler och system, Medicinsk teknik	Gustavsson, Tomas	gustav@chalmers.se

	Blekinge Tekniska Högskola, Medicinsk teknik	Melgaard, Rasmus	info.medicinteknik@bth.se
	Högskolan i Halmstad	Anderberg, Cecilia	Cecilia.Anderberg@ide.hh.se
	Luleå tekniska universitet	Löfqvist, Torbjörn (Dr.)	Torbjorn.Lofqvist@ltu.se , Torbjorn.Lofqvist@sm.luth.se
	Kungliga tekniska högskolan, Teknik och Hälsa	Nilsson, Mats	mats.nilsson@syd.kth.se
	Karolinska institutet, Kungliga tekniska högskolan, avdelningen för medicinsk teknik	Elmqvist, Håkan (Prof)	hakan.elmqvist@ki.se
	Södertörns Högskola	Bollmark, Marie	marie.bollmark@sh.se
	Södertörns Högskola	Hellström, Gösta (Prof)	gosta.hellstrom@labmed.ki.se
	Luleå tekniska universitet	Löfqvist, Torbjörn (Dr.)	Torbjorn.Lofqvist@ltu.se , Torbjorn.Lofqvist@sm.luth.se
		Alternativa adresser	ronny.pekkari@ltu.se
			olov.marklund@ltu.se
Switzerland	Institute of Biomedical Engineering, University and ETH Zürich	Meier, Dieter (Dr)	dieter.meier@biomed.ee.ethz.ch
	Institute of Biomedical Engineering, University and ETH Zürich	Müller, Ralph (Prof)	ralph.muellerbio@med.ee.ethz.ch
	Ecole Polytechnique Federale de Lausanne	Swartz, Melody (Prof)	melody.swartz@epfl.ch
	Interstate University of Applied Sciences of Technology Buchs NTB	Adank, Monika (Secretary)	monika.adank@ntb.ch
The Netherlands	Faculty of Biomedical Engineering of the Technical University of Eindhoven	Slaaf, Dick W.	DW.Slaaf@bf.unimaas.nl
	Institute for BioMedical Technology, University of Twente	Wiehink, Miranda (Secretary)	info@bmti.utwente.nl
	University of Twente	Olthuis, Wouter (Prof)	w.olthuis@ewi.utwente.nl
	University of Groningen	Busscher, H.J. (Prof)	h.j.busscher@med.umcg.nl
Ukraine	Donetsk Medical University, Medical Physics Department	Liakh, Yu. (Prof.)	liakh@dsmu.donetsk.ua
United Kingdom	University of Strathclyde, Glasgow	Barbenel, Joseph Cyril (Prof)	J.C.Barbenel@strath.ac.uk
	Department of Mechanical Engineering, University of Bath	Cunningham, James L. (Dr)	j.l.cunningham@bath.ac.uk

University of Birmingham	Cripps, Robert J (Dr)	mfg.mech.admissions@bham.ac.uk
University of Bradford	Bradley, Jack (Dr)	ug-eng-enquiries@bradford.ac.uk
Institute of Medical Engineering and Medical Physics, University of Cardiff	Nokes, Len D M (Prof)	Nokes@cardiff.ac.uk
Imperial College London, Institute of Biomedical Engineering	Toumazou, Christofer (Prof)	c.toumazou@imperial.ac.uk
School of Mechanical Engineering, University of Leeds		ug-admissions@mech-eng.leeds.ac.uk
The university of Liverpool, Medical Engineering	Doherty, Patrick J (Dr)	patrickj@liv.ac.uk
School of Biomedical and Natural Sciences, Nottingham Trent University	Rees, Robert (Prof)	robert.rees@ntu.ac.uk
Queen Mary, University of London, Department of medical engineering	Langbridge, Marian (Prof)	m.langbridge@qmul.ac.uk
The university of Sheffield	Plant, C. S.	c.a.plant@sheffield.ac.uk
University of Strathclyde, Department of Bioengineering	Gaylor, John (Dr.)	j.d.s.gaylor@strath.ac.uk
Centre for Biomedical Engineering, University of Surrey	Ewins, David (Dr.)	d.ewins@surrey.ac.uk
University of Ulster, School of electrical and mechanical engineering	Rao, Mummadisingu (Dr)	mprv.rao@ulster.ac.uk
The Department of Bio-Medical Physics and Bio-Engineering, university of Aberdeen	Sharp, Peter (Prof)	p.sharp@biomed.abdn.ac.uk
The Department of Bio-Medical Physics and Bio-Engineering, university of Aberdeen	Lurie, David (Prof)	d.lurie@biomed.abdn.ac.uk
City university London	Milonidis, E. (Dr.)	e.milonidis@city.ac.uk
City university London	Roudsari, Abdul	sb374@soi.city.ac.uk
Trinity College, Dublin	Kelleher, Dermot P. (Prof)	dermot.kelleher@tcd.ie
University of Dundee, Biomedical Engineering Division of Mechanical Engineering and Mechatronics	Abel, E W (Dr.)	e.w.abel@dundee.ac.uk
Imperial College, London, Faculty of Engineering, Department of Bioengineering	Lever, Michael (Prof)	m.j.lever@imperial.ac.uk
King's College London, medical engineering and physics	Greenough, Anne (Prof)	anne.greenough@kcl.ac.uk

	The university of Manchester, Computational Methods and Imaging in Medicine	Rydeheard, David (Dr.)	der@cs.manchester.ac.uk
	Medical Physics and Clinical Engineering, the university of Sheffield	Lawford, P V (Dr)	p.lawford@sheffield.ac.uk
	University of Strathclyde, Glasgow	Barbenel, Joseph Cyril (Prof)	J.C.Barbenel@strath.ac.uk
		Alternative adress:	a.c.nicol@strath.ac.uk
Yugoslavia	Center for medical physics, university of Novi Sad	Stankovi , Slobodanka (Dr.)	cica@uns.ns.ac.yu
	Institute of Nuclear Sciences VINCA, University of Belgrade	Spasic Jokic, Vesna (Prof)	svesna@vin.bg.ac.yu
	Faculty for Electrical Engineering, University of Belgrade	Popovic, Dejan (Prof)	dbp@smi.anc.dk
	Faculty of Electrical Engineering, University of Belgrade	Marinkovic, Predrag (Prof)	marinkovic@kiklop.etf.bg.ac.yu
	Faculty of Mechanical Engineering, University of Kragujevac	Filipovic D. Nenad (PhD)	fican@ptt.yu fica@knez.uis.kg.ac.yu fica@infosky.net

Appendix C

Survey on European Biomedical Engineering e-curricula

As a first step towards EVICAB's objectives, a survey on the existing European distance education courses has commenced, according to the project activities outlined in work package 1, part a. The survey includes the EVICAB partner institutions, in an effort to make an organized inventory of the partners' e-curricula and their conformity to the Bologna declaration. The present questionnaire is a part of this survey and intended to be answered by personnel at your department/institution who is responsible for the e-curricula within the biomedical engineering (BME) field. The term *e-curricula* in this questionnaire refer to courses available to off-campus students by means of computer and internet technologies, including audio-visual aids. Off-campus implies that students do not need to be physically situated at the campus from where the course is initiated.

The estimated time to complete the questionnaire is around 20 minutes. If any of the questions is unclear or other problems arise while trying to answer the questionnaire, please contact evicab@imt.liu.se or gosal@imt.liu.se respectively.

Contact information of person completing the questionnaire:

Name:

Telephone:

E-mail:

Title/position:

Appendix D:

Survey on European Biomedical Engineering e-curricula

Are you interested in participating in the harmonization of European higher education? Do you want to promote your distance courses and enrol students from countries other than your own? What about gaining access to a detailed European survey of available distance courses thus being able to offer a complete Biomedical Engineering programme to your own students?

The project *European Virtual Campus for Biomedical Engineering* (EVICAB), funded by the European Commission, commenced on January 2006. The objective of EVICAB is to develop, build up and evaluate sustainable, dynamical solutions for virtual mobility and e-learning that, according to the Bologna process, (i) mutually support the harmonization of the European higher education programmes, (ii) improve the quality of and comparability between the programmes, and (iii) advance the post-graduate studies, qualification and certification. These actions concern the field of biomedical engineering and medical physics and are coordinated by the Ragnar Granit Institute at Tampere University of Technology, Tampere, Finland. More project related information and the complete list of partner institutions can be found on EVICAB's official site www.rgi.tut.fi/evicab.

As a first step towards the project objectives, a survey on the existing European distance education courses has started. The present questionnaire is a part of this survey and intended to be answered by personnel at your department/institution who is responsible for the e-curricula within the biomedical engineering (BME) field. The term *e-curricula* in this questionnaire refer to courses available to off-campus students by means of computer and internet technologies, including audio-visual aids. Off-campus implies that students do not need to be physically situated at the campus from where the course is initiated.

The estimated time to complete the questionnaire is around 20 minutes. If any of the questions is unclear or other problems arise while trying to answer the questionnaire, please contact evicab@imt.liu.se or gosal@imt.liu.se respectively.

Contact information of person completing the questionnaire:

Name:

Telephone:

E-mail:

Title/position:

Appendix E

This appendix contains explanations on the questions of the survey and is supposed to be read only by the designers of the questionnaire. This means that the persons answering the questionnaire do not have access to this explanatory text. All explanations are numbered according to the questions they intend to elucidate.

Purpose of question number:

1. To get an indication of the number of existing courses and planned courses within EVICABs lifetime.
2. To uniquely identify each course since the following questions might need to be answered for each and one of the specified courses.
3. The official language of EVICAB should be English, but it is still interesting to know to what extent the courses follow this “standard”.
4. To categorize the courses according to the Dublin descriptors (see attached material).
5. To categorize the courses according to topics as defined by BIOMEDEA.
6. To get an indication of the workload of each course and whether ECTS credits are widely used or not.
7. To get an indication whether the educational institution is in conformance with the Bologna transparency declaration.
- 8-13. To survey the internal quality assurance and if it is in agreement with the ENQA-report accepted by the Bologna process.
14. To survey the external quality assurance and if it is in agreement with the ENQA-report. The educational programme does not need to be a BME programme.
- 15-17. To make sure the courses are delivered at least once a year and to check how they are distributed over the educational periods.
18. To get an indication of the number of students attending the courses.
19. To get an indication whether student mobility is enhanced or not.
20. To get an indication whether *these benefit lifelong learning* distance courses or not.
- 21-22. To get an indication whether the course contributes to a qualification (degree) within a specific track, which can prove to be of importance in the promotion of *joint degrees* within the field of BME.
23. It would be extremely interesting in surveying the used pedagogical approaches since they are intimately connected to important issues such as educational cycles and quality assurance. This cannot, however, be done within the context of the present questionnaire.
24. Self-explanatory question: Do they want to join EVICAB?

Appendix F

Your department/institution is currently offering **BME e-courses** (as defined on the front of this questionnaire), or is planning to offer such an education from autumn 2006 to autumn 2007. Please, answer the questions only if applicable to the specified course!

1	<p>Specify if the course is an existing or a planned course. Make a separate file for every course you specify.</p> <p><input type="checkbox"/> Currently offered course</p> <p><input type="checkbox"/> Planned course</p>
2	<p>What is the identification number (if existing) or the name (if intended) of each course?</p> <p>.....</p>
3	<p>Is the course delivered in English?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (if no state the used language)</p>
4	<p>Which one of the following cycles of qualification does the course belong to? If unsure about the cycle definitions please refer to the appendix "The framework of qualifications of the European Higher Education Area" or its subset Dublin.</p> <p><input type="checkbox"/> First cycle (Bachelor) of qualification</p> <p><input type="checkbox"/> Second cycle (Master) of qualification</p> <p><input type="checkbox"/> Third cycle of qualification</p> <p><input type="checkbox"/> None of the above</p>
5	<p>Which of the following topics does the course belong to? Please tick the 3 most appropriate alternative(s).</p> <p><input type="checkbox"/> Biomedical instrumentation and technology</p> <p><input type="checkbox"/> Physiological measurements</p> <p><input type="checkbox"/> Biosignals, signal processing and interpretation</p> <p><input type="checkbox"/> Medical imaging systems and image processing</p> <p><input type="checkbox"/> Biomechanics</p> <p><input type="checkbox"/> Biomaterials and biocompatibility</p> <p><input type="checkbox"/> Clinical engineering</p> <p><input type="checkbox"/> Healthcare telematics</p> <p><input type="checkbox"/> Modelling and simulation</p> <p><input type="checkbox"/> Rehabilitation engineering</p> <p><input type="checkbox"/> Design and project management</p> <p><input type="checkbox"/> Medical informatics</p> <p><input type="checkbox"/> Cellular and tissue engineering</p> <p><input type="checkbox"/> Laboratory and analytic techniques in medicine</p> <p><input type="checkbox"/> Radiation therapy, therapy planning and dosimetry</p> <p><input type="checkbox"/> None of the above (state your own description of topic)</p> <p>.....</p>
6	<p>How many ECTS credits are awarded to a student who has completed the course?</p>

	<p>.....ECTS credits</p> <p><input type="checkbox"/> We don't use ECTS credits</p>
7	<p>Are the course outcomes (goals) publicly available? If yes, please include a copy of these outcomes in the given field. Otherwise, please tick "No".</p> <p><input type="checkbox"/> Yes</p> <p>.....</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Other description, specify</p> <p>.....</p>
8	<p>Is the course subject to an internal policy for quality assurance? If "yes", please state the policy.</p> <p><input type="checkbox"/> Yes</p> <p>.....</p> <p><input type="checkbox"/> No</p>
9	<p>Which are the procedures assuring the course quality in practice?</p> <p>.....</p> <p>.....</p> <p><input type="checkbox"/> No such procedures exist</p>
10	<p>Are students assessed using published criteria? If "yes", please include a copy of the material available to the students. Assessment criteria describe how well a student has to be able to achieve the learning outcome in order to be awarded a particular grade.</p> <p><input type="checkbox"/> Yes</p> <p>.....</p> <p><input type="checkbox"/> No</p>
11	<p>What are the continuous measures taken in order to assure that the teaching staff is qualified and competent with regard to facilitating student learning? Examples of measures: Mentorship programmes, teaching orientation sessions or seminars, self- and peer assessment etc.</p> <p>.....</p> <p>.....</p> <p><input type="checkbox"/> No such quality assurance exists</p>
12	<p>What are the 3 most important resources (from people to machines) available for the support of student learning?</p> <p>.....</p> <p>.....</p> <p>.....</p>

Appendix A

13	<p>Do you regularly publish up-to-date, impartial and objective information about the course in order to attract students to enrolling in the course? This information is not to be confused with learning outcomes but should be regarded as a reasonable marketing of the course. However, learning outcomes can be a part of this information.</p> <p><input type="checkbox"/> Yes (how often).....</p> <p><input type="checkbox"/> No</p>
14	<p>Does the course belong to a programme that is subject to external quality assurance? (Quality assurance bodies must be recognized as national or regional higher education quality assurance agencies by the lawful authority/ies in their respective country, e.g. national accreditation centres, commissions for higher education quality, accreditation councils and committees etc.).</p> <p><input type="checkbox"/> Yes (external quality assurance agency/organ).....</p> <p><input type="checkbox"/> No</p>
15	<p>Is the course delivered each academic year?</p> <p><input type="checkbox"/> Yes (if yes how many times?).....</p> <p><input type="checkbox"/> No</p>
16	<p>For how many weeks is the course scheduled?</p> <p>Number of weeks</p>
17	<p>When does the course start?</p> <p>Month:</p>
18	<p>How many students are usually enrolled in the course?</p> <p>Number of students:</p>
19	<p>How many of the students are usually enrolled from other universities?</p> <p>Number of students from your country.....</p> <p>Number of students from a foreign country.....</p>
20	<p>How many students have a working experience within the biomedical engineering field of ...</p> <p><input type="checkbox"/> 0-2 years? Number of students:</p> <p><input type="checkbox"/> 2-10 years? Number of students:</p> <p><input type="checkbox"/> more than 10 years? Number of students:</p> <p><input type="checkbox"/> No student has previously been practicing a BME profession</p>
21	<p>Is the course formally a part of a BME programme?</p> <p><input type="checkbox"/> Yes (if yes, which one?).....</p> <p><input type="checkbox"/> No</p>
22	<p>If the answer to the previous question was "yes", is the course formally a part of a</p>

	<p>track within a programme?</p> <p><input type="checkbox"/> Yes (if yes, which one?).....</p> <p><input type="checkbox"/> No</p>
23	<p>Are you interested in answering a follow-up questionnaire about the pedagogic approach used in the courses?</p> <p><input type="checkbox"/> Yes (please state your address information in order for us to contact you)</p> <p><input type="checkbox"/> No</p>

Thank you!

Appendix G

Your department/institution is currently offering **BME e-courses** (as defined on the front of this questionnaire), or is planning to offer such an education from autumn 2006 to autumn 2007. Please, answer the questions only if applicable to the specified course!

1	<p>Specify if the course is an existing or a planned course. Make a separate file for every course you specify.</p> <p><input type="checkbox"/> Currently offered course</p> <p><input type="checkbox"/> Planned course</p>
2	<p>What is the identification number (if existing) or the name (if intended) of each course?</p> <p>.....</p>
3	<p>Is the course delivered in English?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (if no state the used language)</p>
4	<p>Which one of the following cycles of qualification does the course belong to? If unsure about the cycle definitions please refer to the appendix “The framework of qualifications of the European Higher Education Area” or its subset Dublin.</p> <p><input type="checkbox"/> First cycle (Bachelor) of qualification</p> <p><input type="checkbox"/> Second cycle (Master) of qualification</p> <p><input type="checkbox"/> Third cycle of qualification</p> <p><input type="checkbox"/> None of the above</p>
5	<p>Which of the following topics does the course belong to? Please tick the 3 most appropriate alternative(s).</p> <p><input type="checkbox"/> Biomedical instrumentation and technology</p> <p><input type="checkbox"/> Physiological measurements</p> <p><input type="checkbox"/> Biosignals, signal processing and interpretation</p> <p><input type="checkbox"/> Medical imaging systems and image processing</p> <p><input type="checkbox"/> Biomechanics</p> <p><input type="checkbox"/> Biomaterials and biocompatibility</p> <p><input type="checkbox"/> Clinical engineering</p> <p><input type="checkbox"/> Healthcare telematics</p> <p><input type="checkbox"/> Modelling and simulation</p> <p><input type="checkbox"/> Rehabilitation engineering</p> <p><input type="checkbox"/> Design and project management</p> <p><input type="checkbox"/> Medical informatics</p> <p><input type="checkbox"/> Cellular and tissue engineering</p> <p><input type="checkbox"/> Laboratory and analytic techniques in medicine</p> <p><input type="checkbox"/> Radiation therapy, therapy planning and dosimetry</p> <p><input type="checkbox"/> None of the above (state your own description of topic)</p> <p>.....</p>
6	<p>How many ECTS credits are awarded to a student who has completed the course?</p>

	<p>.....ECTS credits</p> <p><input type="checkbox"/> We don't use ECTS credits</p>
7	<p>Are the course outcomes (goals) publicly available? If yes, please include a copy of these outcomes in the given field. Otherwise, please tick "No".</p> <p><input type="checkbox"/> Yes</p> <p>.....</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Other description, specify</p> <p>.....</p>
8	<p>Which are the procedures assuring the course quality in practice?</p> <p>.....</p> <p>.....</p> <p><input type="checkbox"/> No such procedures exist</p>
9	<p>Are students assessed using published criteria? If "yes", please include a copy of the material available to the students. Assessment criteria describe how well a student has to be able to achieve the learning outcome in order to be awarded a particular grade.</p> <p><input type="checkbox"/> Yes</p> <p>.....</p> <p><input type="checkbox"/> No</p>
10	<p>What are the 3 most important resources (from people to machines) available for the support of student learning?</p> <p>.....</p> <p>.....</p> <p>.....</p>
11	<p>Does the course belong to a programme that is subject to external quality assurance? (Quality assurance bodies must be recognized as national or regional higher education quality assurance agencies by the lawful authority/ies in their respective country, e.g. national accreditation centres, commissions for higher education quality, accreditation councils and committees etc.).</p> <p><input type="checkbox"/> Yes (external quality assurance agency/organ).....</p> <p><input type="checkbox"/> No</p>
12	<p>Is the course delivered each academic year?</p> <p><input type="checkbox"/> Yes (if yes how many times?).....</p> <p><input type="checkbox"/> No</p>
13	<p>How many students are usually enrolled in the course?</p> <p>Number of students:</p>
14	<p>How many of the students are usually enrolled from other universities?</p> <p>Number of students from your country.....</p> <p>Number of students from a foreign country.....</p>

15	<p>Are you interested in answering a follow-up questionnaire about the pedagogic approach used in the courses?</p> <p><input type="checkbox"/> Yes (please state your address information in order for us to contact you)</p> <p><input type="checkbox"/> No</p>
16	<p>Are you interested in promoting your distance course through a European platform based on comparable and mutually recognized qualifications?</p> <p><input type="checkbox"/> Yes (please state your address information in order for us to contact you)</p> <p><input type="checkbox"/> No</p>

Thank you!