

# CONCEPTUAL DESIGN OF A REQUIREMENT-BASED E-TUTORING COURSE AT VIENNA UNIVERSITY OF TECHNOLOGY: INCREASING STUDENTS' MOTIVATION BY USING VIDEOCONFERENCING

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## Abstract

Application of e-learning tools highly modifies tutors' requirement profiles. Once teachers deploy regular tutors as e-tutors, further competencies (e-skills) are needed to be able to coach students within academic settings. Most publications about education and training to qualified e-tutors show either unique or rather restrictive requirements or are highly extensive and therefore can't be applied to university demands. Therefore, this paper describes a procedure model enabling to consider university-specific requirements within education and training to e-tutors. The first step of our approach consists of a requirement analysis based on a preliminary questioning of teachers. Results pointed out that teachers demand specific e-skills from future e-tutors, such as e-moderation as well as communication competencies. To increase students' motivation, our e-tutoring concept was broadened by utilisation of videoconferencing. The application of videoconferencing as the major moderation tool enabled mediating new technology-related experiences to students. In conclusion, it can be stated that videoconferencing highly supported students' activities, participation as well as motivation within our e-tutoring training. Students also reported high overall contentedness, especially emphasising immediateness of moderation-related experience and gaining insight into authentic tutoring scenarios.

Keywords: E-Tutoring, videoconferencing, e-moderation, e-skills, motivation, requirement analysis.

## 1 INTRODUCTION

Nowadays, teaching more and more shifts towards virtual environments, enabling hereby new learning perspectives for e-learning. As a result, teachers and lecturers are confronted with additional work in respect to communication, development of specific content for virtual learning arrangements and supervising online learning environments. Therefore, teachers often deploy the institute's regular tutors as e-tutors to overcome this additional online work. However, e-tutoring scenarios require further competencies (e-skills) for coaching students within online academic settings. So, adaptation of existing tutoring curricula became imminent.

Our investigation shows that existing e-tutoring concepts, as described in the literature, are either too extensive or oversimplify tutoring demands. As a result, university-specific requirements are often neglected as curricula have restrictive requirements. For instance, Schröder's and Wankelmann's [1] holistic description of e-tutors' requirement profiles is a broad overview, however the qualification demands for future e-tutors are extensive. Numerous competencies, divided up into hard and soft skills, claiming disproportionately high qualification of e-tutors. As a result, e-tutoring training has considerably high workload, resulting in long-term programmes as well as high educational costs. Furthermore, insufficient acceptance by students and lecturers might be additional effects.

Other e-tutoring concepts describe e-tutors' qualification requirements by definition of roles. For example, Denis et al. [2] introduce roles, such as content facilitator, advisor/counsellor, assessor, technologist, resource provider, manager/administrator, designer, co-learner, researcher, etc. These specifications can be highly useful - however, in practice e-tutors generally fulfil several roles, so that their deployment can't be simplified to training of single roles. Furthermore, universities have diverse qualification-requirements and thus different understanding of e-tutors' deployment. Therefore, universal curricula cannot be applied easily.

Kiedrowski [3] gives a solid overview on e-tutors' competencies as well as roles, stressing hereby importance of various deployment scenarios. His approach of emphasising determination of requirements as a central part of curriculum design is similar to our approach, aiming university-specific requirement analysis as its initial step. Due to Kiedrowski's approach, the development of the e-tutoring curriculum should consist of three parts. Firstly 'analysis of tasks and requirements of teletutors' is needed, secondly 'determination of qualification requirements' has to be conducted and thirdly 'selection and conception of the future training methods' have to be carried out.

To sum up, most publications about education and training for qualified e-tutors show either unique or rather restrictive requirements or are highly extensive and therefore can't be applied to university demands without any further adaptation. Within the following sections, we describe a procedure model that enables considering university-specific requirements within education and training to e-tutors.

## 2 REQUIREMENT ANALYSIS

This section presents our model for developing a university-specific curriculum at Vienna University of Technology.

### 2.1 Methodology

Development of our e-tutoring concept consisted of two parallel tracks (see overview in Fig. 1). Within track 1, various oral interviews were carried out (see explicit description in section 2.2). Hereby, not only future tasks of e-tutors were collected (as well as prioritised) but also teachers' understanding of e-tutors' roles were evaluated.

Parallel to track 1 a second track was carried out evaluating related work in the area of e-tutoring curricula. Existing academic papers about e-tutoring concepts were investigated. To be able to compare as well as analyse literature the following main criteria were used:

- What competences are described and used within education of future e-tutors?
- What workload, modules and didactic methods are considered?
- Relation between online and offline work (with respect to exercises and classroom units)

Consequently, questioning results (track 1) were analysed in combination with findings of literature review (track 2). In doing so, the goal was to develop a summarised university-specific 'catalogue of requirements' that prioritise demands. These main demands will be discussed in section 2.3, describing specific tasks and functions of future e-tutors at Vienna University of Technology.

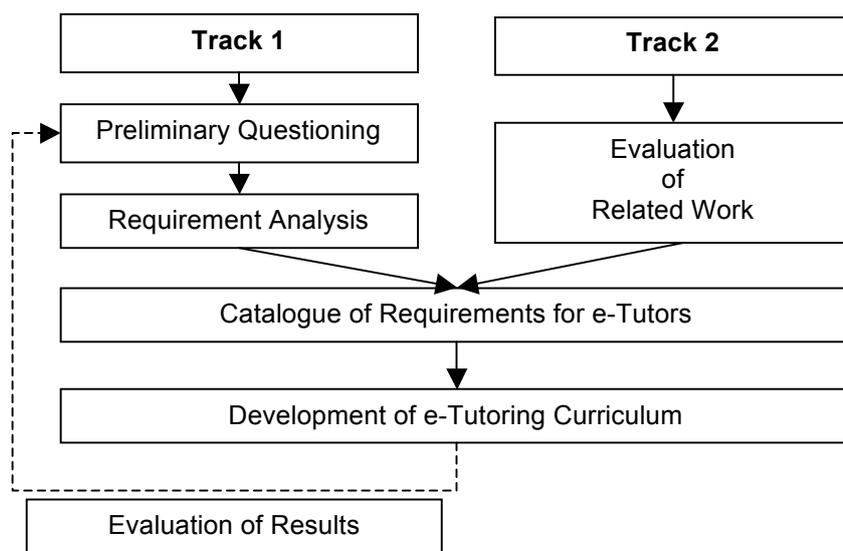


Fig.1 Development of requirement-based e-tutoring curriculum at Vienna University of Technology

## 2.2 Preliminary Questioning

To determine university-specific demands on e-tutors, a preliminary questioning was conducted consisting of two parts. Within the first part, single interviews with academic deans of all faculties were carried out, whereas the second step considered questioning of targeted lecturers at our university. Hereby, both groups of lecturers were interviewed, those who already use e-learning within their courses as well as those who do not yet apply e-learning. Furthermore, it is important to stress that every faculty at our university has their specific organisational structures and different characteristics of students. As already investigated by Euler [4] and Schulmeister [5], application of tutors highly vary due to institutions' structures. For example, at Vienna University of Technology there are different requirements to tutors at the graduate programmes of Informatics, where they have to supervise up to 800 students, whereas Chemistry's tutors mostly supervise smaller mandatory exercise courses at laboratories.

The preliminary questioning of deans and lecturers was carried out as an open discussion - however, specific questions were used to guide the interviews: (extract of guidelines)

1. How is e-learning integrated within the organisational structures? How does the willingness of faculty members look like in terms of utilisation of e-learning?
2. Do you already apply e-tutors at your institute? What tasks and responsibilities do you pass to your future e-tutors? Within what kind of lectures do you deploy your e-tutors? Hereby, what characteristics do these lectures have in regard of didactic concepts, students' support or assessment strategies?
3. To what extent do you think that e-tutors' work can influence the quality of teaching or even the institute's or faculties' academic research?
4. Are there any institute or faculty-specific requirements for potential e-tutors?

## 2.3 'Catalogue of Requirements'

Interview results have pointed out that lecturers demand specific e-skills from future e-tutors. These findings are summarised as a short 'catalogue of requirements' consisting of three main objectives.

### *Development and management of e-content:*

As lecturers have limited budget for conversion of scripts, presentation slides and/or tutorials to high-quality multimedia learning objects, it is expected that future e-tutors have to be capable of converting different media into various forms of teaching material. Furthermore, e-tutors should be responsible for designing layout related issues and have to be skilled in basic data management to handle learning environments, such as CMS, LCMS. This demand is especially relevant for courses having high numbers of students.

### *Enhancement of communication skills:*

One of the university's important aims is to provide high teaching quality. For example, students should always be able to ask questions directly to their lecturers to get useful and learning-supportive feedback between the classroom units. However, this demand is highly challenging since teachers face additional work described before. Therefore, future e-tutors should be trained towards online communications skills to meet this demand. They should have not only enough expert knowledge but also sufficient moderation competencies to be able to supervise forums, discussions and even synchronous learning sessions, such as chats or audio/video conferences.

### *Supporting collaborative work:*

As virtual environments are used more often in university teaching, future e-tutors should be capable of supervising peer work contributing hereby to development of courses' community sense. Furthermore, e-tutors should serve as role models in communication ensuring optimal peer climate.

Taking these facts into consideration, our e-tutoring concept has to place major emphasis on e-moderation as well as on usage of communication tools. The majority of the lecturers stressed the fact that future e-tutors have to be able to set up certain communication tools and apply them in terms of constructive learning support.

### 3 DEVELOPMENT OF E-TUTORING CONCEPT

As the requirement analysis has pointed out, communication and moderation skills have to form the central part of our curriculum. Due to years of experience in teaching, these competencies have to be educated not only by theoretical lessons but rather by practical tutorials [1] [6]. Within classroom lectures, theoretical background of moderation as well as communication is given, whereas within four online exercises practical skills are trained (see Tab. 1). These exercises were mainly based upon the *experiential learning* approach by Kolb [7] enabling to emphasise students' self-awareness and particularly focusing on enhancing their skills.

Tab.1 Online exercises of the e-tutoring concept

Exercise number	Objective and Description	Didactic Method	Learning Outcomes	CMC Tool
1.	evaluation of real e-tutoring situations	field analysis followed by online teamwork	module essay, enhancing e-grouping and e-moderating	discussion forums
	change of role: moderating and tutoring of discussion forums (+feedback round)			
2.	development of a self-contained e-tutoring concept	online project work	project report, enhancing e-grouping and e-moderating	discussion forums, mailing lists, chat
	change of role: moderating and tutoring of discussion forums (+feedback round)			
3.	practical online tutoring experience of self-contained e-tutoring concept (exercise 2)	experimental learning (within a university setting)	gaining practical experience of e-moderation, utilisation of didactic techniques	video-conferencing (emphasising audio), chat, whiteboard
	change of role: moderating and tutoring of chat, audio conference, whiteboard (+feedback round)			
4.	practical online presentation and experience of tutoring scenarios	experimental learning (within individual settings, i.e. work, at home etc.)	gaining practical experience in e-moderation, utilisation of didactic techniques	video-conferencing (emphasising video), survey tools
	change of role: moderating and tutoring of video conference and poll tools (+feedback round)			

As indicated, classroom lessons represent education of theoretical aspects that were organised in modules (see Tab. 2). These lectures also reflect the requirement analysis' main demands. As an example, communication and moderation modules make up 60% of lecture. Tab. 2 illustrates exemplary topics as well as a list of competencies covered within these lectures.

As e-tutors' future tasks and exercises will take place in online environments primarily, our curriculum emphasises working online. Therefore, all discussions as well as collaborative working and tutoring exercises were carried out online, hereby creating an 'unusual' learning scenario. Due to the fact that our course concept was realised at a brick and mortar university, working (merely) online is not commonly emphasised. To keep the students' interests alive, various didactic methods were applied. First, each online exercise trained a different communication tool (Tab. 1). Furthermore, the design of our e-tutoring concept aimed to increase interaction progressively. At the beginning of the course (exercise 1 and 2), asynchronous communication tools were used, whereas at the end of the course synchronous systems were utilised. This strategy of incremental enhancement of interactivity made it possible to teach students having different competence-levels.

As the requirement analysis indicated, preparation of e-content for the specific target audience is one of the main demands. Hereby, the curriculum especially emphasises didactic aspects of content development. However, certain elementary technical skills in terms of software competency were required. So, any intensive training for specific software was intended, only rapid overview of technical basics was given. However, during first lectures, students' skills were surveyed and if lack of skills was identified, additional lessons were supplemented to serve certain needs.

Another crucial factor of our conceptual design was *change of perspective* as described by Merkt [8]. Hereby, each course participant had to gain experience not only as a trainer but also as a student to understand characteristics of both perspectives. Therefore, each of the four online exercises considered different moderators as well as communication scenarios (see Tab.1). As an example, moderators had to encourage discussions and raise debates by enhancing critical thinking as well as look after ideal pacing (continuous monitoring of motivation and activity). To be able to share these experiences a feedback round to discuss experiences and deepening gained knowledge was carried out after each online exercise.

Tab.2 Theoretical modules of the e-tutoring concept

<b>Module (weighting)</b>	<b>Exemplary topics ...</b>	<b>Mediated competences</b>
1. e-learning basics (15%)	<ul style="list-style-type: none"> <li>▫ didactic methods, learning styles</li> <li>▫ e-learning settings and environments</li> <li>▫ target group analysis</li> <li>▫ development of course concepts</li> <li>▫ fields of activity (business, academia)</li> <li>▫ e-tutoring basics</li> </ul>	<ul style="list-style-type: none"> <li>▫ analysing e-learning models and implications for e-tutoring roles</li> <li>▫ making decisions in terms of didactic designs</li> <li>▫ evaluation of technology in respect to didactical as well as organisational conditions</li> </ul>
2. competencies and role models (15%)	<ul style="list-style-type: none"> <li>▫ categories of skills</li> <li>▫ boundaries of e-tutoring</li> <li>▫ task-specification and role models</li> </ul>	<ul style="list-style-type: none"> <li>▫ create understanding of role models</li> <li>▫ collaboration techniques</li> <li>▫ methods for enhancing critical thinking</li> </ul>
3. online communication in e-learning (30%)	<ul style="list-style-type: none"> <li>▫ theoretical education of CMC tools ... didactical scenarios, types of communication, examples, obstacles of communication etc.</li> </ul>	<ul style="list-style-type: none"> <li>▫ media competence</li> <li>▫ planning interactive use</li> <li>▫ designing feedbacks</li> <li>▫ online communication literacy</li> </ul>
4. e-moderation (30%)	<ul style="list-style-type: none"> <li>▫ empathic aspects of e-tutoring (motivation of target group)</li> <li>▫ diversity management</li> <li>▫ building gender awareness</li> <li>▫ accessibility in e-learning</li> </ul>	<ul style="list-style-type: none"> <li>▫ (a)synchronous moderation</li> <li>▫ online tutoring of groups</li> <li>▫ didactic design within CMC</li> <li>▫ building tutoring empathy</li> </ul>
5. quality criteria of e-learning (10%)	<ul style="list-style-type: none"> <li>▫ e-learning standards, legal aspects</li> <li>▫ analysing the market</li> <li>▫ evaluation of e-courses</li> </ul>	<ul style="list-style-type: none"> <li>▫ skills to evaluate</li> <li>▫ thinking commercially</li> <li>▫ legal security</li> </ul>

#### 4 UTILISATION OF VIDEOCONFERENCING

One of the most important issues for the e-tutoring curriculum was to develop a concept that enables future e-tutors gain experience with moderation as well as communication tasks as lively and actively as possible. Hereby, we choose videoconferencing as the central method since this computer-mediated communication tool (CMC) is closest to face-to-face communication and also is capable of demonstrating limits of online co-operation. Due to its synchronous, immersive as well as collaborative character this tool is ideal for stressing immediacy of self-awareness and online character of tutoring.

Compared to other tools, videoconferencing enables new insights since this tool is not commonly used for training of moderation and communication skills at brick and mortar universities.

To increase students' motivation, within the videoconferencing sessions (see online exercises three and four in Tab. 1) different tutoring scenarios were trained. Hereby, students were facing new technology-related experiences of e-tutoring. For example, supervising of online collaborative work and managing group members' requests (within videoconferencing-discussions) were educated in order to experience didactic approaches in practice. Within these videoconferencing sessions, students were also able to face immediate coaching scenarios, hereby developing competencies related to emotional and didactic awareness.

As described in section 3, our e-tutoring curriculum emphasises *changing of roles*. To train videoconferencing was highly structured. After each slot, change of the moderation role occurred. The scheduling presented in Tab. 3 also enables time- as well as cost-effective utilisation of the videoconferencing system.

Tab.3 scheduling of videoconferencing sessions

Videoconferencing (First Session)						
Group 1			Group 2			
Slot 1	5 min. Break	Slot 2	10 min. Break	Slot 3	5 min. Break	Slot 4
moderation member A of group 1		moderation member B of group 1		moderation member A of group 2		moderation member B of group 2
15 min		15 min		15 min		15 min
active participants → group 2		active participants → group 2		active participants → group 1		active participants → group 1

As the tool for videoconferencing, Adobe Connect Pro was used. This web-based system integrates various communication forms (audio and video transmission, chat, whiteboard, presentation of files, survey tool, etc.), enabling not only to practice different tutoring scenarios but also apply creative didactic techniques. Decision criteria for its utilisation were good quality of audio-, video- as well as data-transmission and role management that enabled changing of roles as described above. Due to students' technical skills as well as Adobe Connect Pro's intuitive usability, hardly any software training was required, enabling teachers to start education of related skills right from the beginning.

## 5 EVALUATION OF CONCEPT

The e-tutoring concept described above was realised within a practical course at Vienna University of Technology in Austria. To ensure applicability, this course was embedded within the curriculum of 'Informatics-Didactics' as well as the general elective course catalogue of 'soft skills'. Time period for initial realisation of the course was in winter term 2009 (October 2009 to February 2010). The course has a duration of one semester with a workload of two hours per week.

To evaluate effectiveness, relevance and practicability of the conceptual design, various evaluations were carried out.

First, the university's official course report investigated overall student's contentedness hereby verifying curriculum's appropriateness. This quantitative examination reviewed various aspects listed in Tab. 4. General outcome of this assessment rated the course on a scale between 1 and 5 (where 1 is best value) with a result of 1.57. So, evaluation's findings show that students' expectations were met, as content, exercises, design and realisation of the curriculum were satisfying.

The second evaluation was carried out qualitatively as lecturers conducted a survey among the students at the end of the semester. This investigation was realised as an online questionnaire where

students could reflect their experiences as well as were asked to rate and evaluate the conceptual design of the e-tutoring curriculum. To sum up, similar results were recorded as within the university's official course report – however, some students reported unfamiliarity with heavy load of working online suggesting hereby increased number of offline meetings. We believe that future e-tutors have to be online literate, so therefore the conceptual design will not be changed.

As described in Tab.1, feedback rounds were considered to evaluate students' experiences with online exercises as well as (especially) videoconferencing sessions. Hereby, students especially emphasised immediateness of moderation-related experience and the possibility to try out a large number of CMC tools. Furthermore, they appreciated gaining insight into authentic tutoring scenarios. The diversity of e-tutoring settings considered within the conceptual framework was rated positively, in particular. Moreover, due to videoconferencing's novelty in brick and mortar institutions, students' motivation increased as former inactive students participated in discussions. Especially when videoconferencing was applied, collaborative working as well as inter-student communication increased.

Tab.4 official verification of the curriculum's appropriateness

<b>Vienna University of Technology - Official course report</b>	<b>Result*</b>
Providing course information	1,29
Curriculum's content is interesting	1,14
Usefulness of curriculum's content	1,57
Provided materials cover content	1,43
Teaching materials are useful for learning	1,29
Quality and design of teaching materials	1,43
Establishing relationship between theory and practice	1,29
Peer collaboration	1,00
Curriculum's structure	1,29
Lecturers ability to awake interest for topic	1,71
Meeting curriculum's learning outcomes	1,17
Level of requirement is justified	1,43
<i>Overall - workload</i>	<i>2,57</i>
<i>Overall – level of difficulty</i>	<i>2,57</i>
<i>Overall – acquiring new insights</i>	<i>2,14</i>
<i>Overall – peer atmosphere</i>	<i>1,00</i>
<b>Students' Overall contentedness</b>	<b>1,57</b>

\* ... scale between 1 and 5 (where 1 is best value), n=7

## 6 CONCLUSIONS

This paper describes a requirement-based e-tutoring concept that enables consideration of university-specific requirements within training of e-tutors. Most publications show either a unique or a rather restrictive curriculum that can't be applied. Therefore, we have developed a procedure model to integrate university demands into the conceptual design of e-tutoring education. The first step of our approach consists of a requirement analysis based on a preliminary questioning of teachers. Results pointed out that teachers demand specific e-skills from future e-tutors. Seeing this fact, our e-tutoring concept places major emphasis on e-moderation as well as on the usage of communication tools.

Within various online exercises, students were educated, emphasising hereby working online and experiencing authentic tutoring scenarios both from a teachers' as well as a tutors' perspectives. Due

to videoconferencing's synchronous, immersive as well as collaborative character, this tool is ideal for stressing immediacy of self-awareness and online character of tutoring. This approach was highly effective since university's evaluation as well as students' feedbacks were overwhelmingly positive. Furthermore, it should be mentioned that a fundamental aspect for the success of videoconferencing was its novelty, as this communication tool is not yet commonly used within teaching at a brick and mortar university.

The current concept has been tested with a small group of students. As a further step, we plan to investigate whether our didactical concept works with 50 up to 100 students in one course. Hereby, we also want to find out how scheduling can be optimised to provide all students with a high amount of direct e-tutoring experience. As a possible solution, clustering into further sub-groups might be adopted to maximise capacity utilisation of videoconferencing.

As a further result, we have summarised our experiences with videoconferencing, introducing 'Nine recommendations'. These recommendations, described by Rakoczi et al. [9] give explicit advice to utilisation of videoconferencing within training of future e-tutors.

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