Journal of Contemporary

Medical Education

available at www.scopemed.org

Educational Strategies

Description and evaluation of a didactical concept for online seminars

Klaus D. Stiller, Ludwig Kreuzpointner, Helmut Lukesch

Department of Experimental Psychology, University of Regensburg, GERMANY

ABSTRACT

We first describe the didactics of eight online courses. Each seminar mostly consists of 14 modules, which are essentially worked through in linear sequence, each module normally within a week. Didactics combine imparting of knowledge by direct instruction according to the nine instructional steps by Gagné, Briggs and Wager (1988) and an avoidance of 'sluggish' knowledge via stimulation of learner activities mainly by transfer tasks. We then discuss and summarize some evaluative results. Generally, evaluations showed a high acceptance of the structure and the implementation of the courses and a high level of achievement of educational objectives, but they also point to improvements such as allowing learners to become more self-determined, especially in the second half of a course. We then report some measures to help foster the sustainability of courses. Thereby, keeping contents up-to-date is crucial. Finally, the course designs are discussed in the frame and scope of e-learning. Technically, only a narrow range and very basic elements of the e-learning possibilities are used for the courses. Didactically, the courses are based on a working design using direct instruction and constructivist problem-based tasks.

INTRODUCTION

In this paper, we describe the didactics of eight online seminars on various topics developed for university students enrolled in various subjects (e.g., psychology, pedagogy, applied computer science) and teachers of all German primary and secondary education by the Chair of Psychology VI of Regensburg University, Germany (see www-elearning.ur.de and Table 1). We summarize and discuss some evaluative results, report our measures to help foster the sustainability of courses and then the course designs are discussed in the frame and scope of e-learning. The first online course 'media worlds of children and adolescents' was launched in 2004. The last course 'abnormalities in mental processing and behaviour of children and adolescents' was completed in 2011. All of the seminars are based on the same didactical concept of which some were evaluated.

Didactics

Didactics combine imparting of knowledge by (a) direct instruction and an avoidance of 'sluggish' knowledge by stimulation of (b) knowledge construction. Nowadays, the combination of direct instruction and methods of knowledge construction has been fairly widely accepted and known to be most suited to improve learning [1]. Hence, the advantages of both approaches can be used fruitfully as: (a) an efficient mediation of knowledge by direct instruction and (b) an avoidance of 'sluggish' knowledge by the learners' self-activity when applying the information learned.

The cognitive perspective: Direct instruction

The starting point of each online course is a WWW portal. Each course mostly consists of 14 modules

(lessons). The instructional aspect of the online courses is reflected by the three phases of the course modules, which are designed according to the following nine steps of instruction by Gagné et al. [2]: (1) gain attention, (2) inform about objectives, (3) stimulate recall of prior knowledge, (4) present the material to be learned, (5) provide guidance for learning, (6) elicit performance, (7) provide informative feedback, (8) assess performance and (9) enhance retention and transfer. We call this type of instruction and related instructional designs *direct instruction*. The central aspect of the design of Gagné et al. [2] is to assure the

knowledge requirements needed for the proceeding instructional phases. The emphasis and specific implementation of each instructional step depends on the learning objectives set by the instructors. Bloom, Krathwohl and Masia [3], for instance, differentiate between learning objectives in the cognitive, affective and psychomotor domains at the highest level of their highly elaborated learning taxonomy. The online courses mainly set cognitive educational objectives but no psychomotor and only moderate affective objectives.

Table 1. Topics and titles of the online courses.

Topics	Seminar titles
Media psychology	Media worlds of children and adolescents
	Media education and its psychological, communicational and legal basics
Developmental Psychopathology	Introduction to Developmental Psychopathology and selected disorders
	Specific disorders
Behavioural problems	Abnormalities in mental processing and behaviour of children and adolescents
Counselling for teachers	The basics of counselling in schools: Fields of work – basics of pedagogy and legal – educational careers – aspects of the German school system
	The basics of pedagogical-psychological counselling and individual aid: Diagnostics – test theory / statistics – personality
	Cooperating with external counselling services – counselling of schools and teachers – working with parents

Table 2. Classifying the instructional phases of the online course 'Introduction to Developmental Psychopathology and selected disorders' according to the instructional steps by Gagné et al. [2]. The design is only oriented towards these instructional steps, because no clear assignment exists between course phases and instructional steps, but phases may serve more than one instructional step.

Course phases	Course subphases	Instructional steps	
Initiation	Introduction	(1)	gain attention
	Prior knowledge test	(3)	stimulate recall of prior knowledge
Acquisition	Module script	(2)	inform about objectives
		(4)	present the material to be learned
		(5)	provide guidance for learning
	Tasks	(6)	elicit performance
		(7)	provide informative feedback
		(8)	assess performance
		(9)	enhance retention and transfer
Consolidation	Crossword		
	Cloze	(8)	assess performance
	Summary	(9)	enhance retention and transfer
	Final module test		
Further consolidation	Link supplements	(9)	enhance retention and transfer
	Extended knowledge test		

To optimize the instructional steps, the instruction was implemented in a linear way. The modules and their contents must work according to a linear sequence. The modules are structured in three phases: (1) initiation, (2) acquisition and (3) consolidation. In the following paragraphs, these phases are briefly described and classified according to the nine steps of instruction by Gagné et al. [2] (see Table 2).

(1) The initiation phase comprises a short introduction to the topic (by using examples, audios, videos and pictures), a test of prior knowledge (multiple-choice questions on the lessons content) and a presentation of objectives (in later developed courses, 'informing about objectives' was relegated to the formal section acquisition phase, although it is still seen as an essential part of the didactical introduction phase). The test allows the learners to activate and validate their prior knowledge.

(2) The acquisition phase focuses on the learning material in the form of scripts in PDF format and partly online script pages. The script comprises the learning objectives, the table of contents, the structured content itself, references for further studies, tasks for knowledge transfer and application.

(3) The consolidation phase serves to strengthen the acquired knowledge. In some courses, learners could use exercises (e.g., closes, crosswords, matching tasks) to test what had been learned and what module parts should possibly be relearned. A summary provides a review of the most important concepts of the module. A final knowledge test using the same multiple choice questions from the prior knowledge test allows the learners to control their knowledge acquisition in respect of the module content. Feedback for these tests includes the correct answers as well as the learners' answers in both knowledge tests. An optional, extended consolidation is offered by providing additional resources such as links to external web pages, text-files, or audio-files. The extended consolidation is visually and significantly placed with an extra headline under the obligatory consolidation phase. Resources supplement and expand the module topic and can be studied autonomously. Moreover, in some courses, learners can evaluate their acquired knowledge by passing an extended knowledge test, which draws its items by chance from an item pool of the modules already studied. Finally, learners should evaluate the module.

Most of the learners are adult students with minimal prior knowledge about or experience in the domains. Thus, the instructional aspect of the online courses is strengthened to a greater extent than the constructivist aspect in facilitating the introduction of the learners into a fundamentally new topic. In sum, problems that arise from a lack of knowledge in problem-oriented learning arrangements are avoided, and the basic knowledge needed to solve more challenging problems is built.

The constructivist perspective: Knowledge construction

At the other end of a continuum along the dimension 'teacher activity / learner passivity' we find the constructivists' instructional theories. Against this background, teachers are expected to create authentic learning situations (e.g., to present problems as well as tools and material to solve them) in which learners are able to construct applicable knowledge in a self-active and self-determined way, in guided cooperation as well as in situated and contextualized settings. Thus, the teacher is a part of the whole process and only intervenes on demand as a coach or consultant. The most famous theories characterized as constructivist are 'Anchored Instruction' [4], 'Cognitive Apprenticeship' [5] and 'Cognitive Flexibility' [6].

In the online courses, the constructivist aspect is mainly represented by the transfer tasks, which are key parts of the consolidation phase. The transfer tasks should enable learners to apply and transfer their acquired knowledge. In aspects of learning taxonomy, transfer tasks serve educational objectives beyond knowledge and comprehension by focusing on application, analysis, synthesis and evaluation [3]. All tasks provide authentic real world problems and are thus suited to foster motivation. They provide the means to apply newly acquired knowledge and skills, which in turn trains the learner. Learners are forced to make an active and self-determined construction of applied knowledge, mostly alone and partly in guided cooperation, as well as in discussions of task solutions. Solving the problems require self-determined investigation (often using the internet) and formulation of the results, analyses and evaluations. Beyond cognitive aspects, additional importance is attached to learners' reflection of their perceptions, cognitions, emotions, motivations and behaviours. Apart from the intrinsic aspect, the transfer tasks also motivate extrinsically, because the quality of solving them is the basis of evaluating the learners´ success in the course. Each learner is required to accomplish a given number of tasks that are subsequently evaluated by the course tutor. Tutors give precise, individual feedback. Learners can compare their work with a detailed solution which also serves as the reference for the tutor´s feedback. Only when a sufficient amount of tasks are marked with at least 'D' (acceptable, needs improvement but not failing), the learner has successfully passed the seminar. The quality of an online seminar greatly depends on both the qualities of the transfer tasks and the individual feedback. In addition, the possibility to proceed with

self-active and self-determined knowledge construction is given by the supplementary links to literature and other information sources of the internet.

EVALUATIVE RESULTS

Online Seminar 'Media worlds of children and adolescents'

The starting point of the online course is the WWW portal. It contains three sections: (1) course issues, (2) modules and (3) tasks. The course issues contain introductions to technique, navigation and course organization, an overview on topics, a guide to learning and working and information about tutors and course participants. The course consists of 14 modules and accompanying methodical excursions as well as a glossary [7]. The modules are structured in three phases: (1) initiation (test of prior knowledge, introduction to the topic and presentation of objectives), (2) acquisition (working on the learning material) and (3) consolidation (summary, final knowledge test, transfer tasks and providing resources). Online content is presented concisely and illustratively, and offline scripts (available after the presentation of objectives) are intended to allow deeper and more detailed processing. In the section tasks, learners can submit their task solutions and are supported by an overview of existing and completed modules, an overview of completed tasks and their success at solving them (with individual feedback), as well as model solutions for all tasks. The modules and its contents must be studied in linear sequence, each module within a week. Learners are expected to spend an average of three hours working on one module. Tutoring is administered via email and newsgroups.

The evaluation should show whether the course is manageable, useful and reasonable for learners. Therefore, we measured (a) the acceptance of the online course as a measure of future 'appetence behaviour towards online courses,' (b) the emotions of anger, boredom and enjoyment during learning as important mediators of learning processes, (c) the experienced self-efficacy as a measure of manageability when using the computer and as a measure of competence of actions while participating in the online course [8], (d) the time input for selected work phases as a basis to estimate the overall time input and (e) the performance as an indicator for achievement of educational objectives.

Media acceptance is often seen as an indicator for future appetence behaviour, and it is assessed as measures of media attraction and functionality [9]. Hence, the measure should reliably indicate if a medial educational offer takes root and catches on. In respect of this online course, acceptance should indicate the

extent that a sufficient amount of students have a long-term interest in participating in this type of online course. While already participating in an online course, media acceptance should specifically influence the decision to continue or to drop a course.

Experienced self-efficacy plays a key role in behavioural regulation and thus it is a precondition for competently addressing the affordances in learning and achievement situations [10,11]. Independent of the actual existing skills, experienced self-efficacy often affects performance outcomes by its impact on learning behaviour (e.g., learning strategies, effort; e.g., [12]).

The relationship between emotions and learning has already been established. Pekrun [13] showed that a variety of emotions are present while learning and Titz [14] suggested that learners especially create new and unexpected experiences when processing new media for learning, which triggers both positive and negative emotions. Moreover, emotions are assumed to affect strategies of problem solving and memory processes as well as motivation and action processes in a straightforward way [15]. Hence, emotions are an important source of performance variance [14].

Detailed results of an online course evaluation were reported by Bichler [16] and Knipfer [17]. Of the 62 students who enrolled in the online course, 20 studied psychology, 18 studied pedagogy, 16 studied education, 8 studied in other disciplines, 13 students dropped the course before the end of Module 3 and six students in the proceeding modules. The drop-outs are attributed to (a) normal drop-out rates during the orientation phase of students at the beginning of a semester, (b) features of the studied subject, given that the least amount of dropouts studied psychology (9.1%), whereas most dropouts studied pedagogy (31.8 %), education (36.4 %) and other subjects (22.7 %), (c) individual problems, which could be assumed by analysing the individual working behaviour (e.g., working continuously and successfully in the online course, before suddenly stopping work), (d) the extensive evaluation questionnaires, which might especially have discouraged students in disciplines other than psychology, (e) the continuous, linear presentation of the modules, whereby Module X could only be studied after Module X-1 had been finished (skipping modules was not allowed). Three students were excluded from data analyses, because they had not solved the allotted amount of task solutions. Hence, the sample comprised only the students who had successfully passed the online course. The students were 33 female (82.5 %) and 7 male (17.5 %) students with a mean age of 24.7 years (SD = 4.9).

In the following paragraph, the dependent variables and their measurements are described (see Table 3). The assessment was focused on (a) the acceptance of the

Table 3. Characteristics of scales.

Scales	Items	M	SD	M/item	SD/item	α	Score Range
Acceptance Online Portal	6	25.90	2.36	4.32	0.39	.66	6-30
Acceptance Modules	13	54.93	4.76	4.23	0.37	.80	13-65
Acceptance Tasks	6	22.35	2.91	3.73	0.49	.75	6-30
Emotion Enjoyment	6	23.45	2.56	3.91	0.43	.72	6-30
Emotion Anger	5	10.03	2.15	2.01	0.43	.74	5-25
Emotion Boredom	6	11.07	2.39	1.85	0.40	.74	6-30
Self-Efficacy	10	42.35	5.40	4.24	0.54	.83	10-50
Transfer Tasks	8	102.75	6.55	12.84	0.82	.55	0-120

online portal in general (structure, functions, topics), the modules (structure, contents, additional resources) and the tasks, (b) the emotions of anger, boredom and enjoyment during learning [14] and (c) the experienced self-efficacy when using the computer while participating in the online course [8]. The above variables were assessed with an online questionnaire that was administered after completing the 10th module. Learners rated their agreement with various statements on a five-point Likert-scale (for acceptance and self-efficacy items: I agree, neutral, I disagree; for emotion items: absolutely correct, slightly correct, not correct at all). All statements referred directly to the online seminar.

In addition, the time input for selected work phases was rated by the learners. The rating of time input on tasks was given while posting the task solutions. The rating of time input on modules was specified before the final knowledge test had begun (consolidation phase). Finally, transfer performance was assessed by eight obligatory tasks (15-point system), which were solved and posted at different times while participating in the course. The low reliability score of the performance measure should be evaluated in light of the fact that the low variance in points despite the diversity of tasks.

The mean of course acceptance for structure and functions of the WWW portal as well as the scope and relevance of topics could be seen as satisfyingly high (M = 4.32, SD = 0.39). Learners also rated the structure of the modules (e.g., well-structured), their contents (e.g., interesting, demonstrative, comprehensible) and their additional resources (e.g., helpful, demonstrative, appealing) positively (M = 4.23, SD = 0.37). The acceptance of tasks was also positive (M = 3.73, SD = 0.49). Tasks were rated as reasonable, clearly formulated, well-prepared and good to work on. The mean score of task acceptance was decreased by tasks that were rated as slightly challenging (M = 3.53) and balanced in terms of the amount of work (M = 3.03). But on these items, medium ratings are preferable because they show the manageability of tasks related to

effort and difficulty. In general, acceptance ratings show that the course was well accepted, but single aspects should be improved.

Learners mainly enjoyed the course (M = 3.91, SD = 0.43), whereas emotions of anger (M = 2.01, SD = 0.43) and boredom (M = 1.85, SD = 0.40) appeared infrequently during learning. These ratings are welcomed, given the importance of emotions for learning and their relationships to performance [14]. The factors that affect emotions while learning online might come from multiple sources (e.g., technology, navigation, communication). Hence, the sources of anger and boredom should be investigated in more detail.

The participants reported a fairly high self-efficacy of course usage (M = 4.24, SD = 0.54). This reflects that the course creators successfully realized low technical demands, minimal error sources and transparency of interactivity.

Mean task performance of 12.84 (SD = 0.82) out of 15 points reflects a high achievement of cognitive educational objectives. The occurrences of three students who did not pass the course successfully do not contradict this statement. They failed because of their lack of work quantity (they did not solve enough tasks) not because of a lack of work quality (their task solutions were at least satisfying). The course is successful in helping learners to reach the intended objectives.

The learners needed 620.62 minutes (SD = 235.81) to solve the eight obligatory tasks and 511.88 minutes (SD = 183.04) for studying the eleven modules. Thus, average time input for solving a task and studying a module was roughly 78 and 47 minutes, respectively. If we assume that the average time to solve the eight obligatory tasks is a reliable estimate for the average time to solve eight selectable tasks (these tasks are assumed to be equal to the obligatory tasks in terms of extent and demand and therefore work load), an average time of roughly 1241 minutes to solve the 16

tasks can be assumed. Correspondingly, the estimated average study time of the 14 modules would roughly equate to 651 minutes. These data indicate an estimated average of 2.25 hours to complete a module. Given that time input on other activities (e.g., using the scripts and solution outlines for learning, reading the feedback, visiting supplementary sources, posting the task solutions, gaining orientation over the Web portal at the beginning) was not included in the assessment, an average minimal time input of three hours per week should be assumed.

Online Seminar 'Introduction to Developmental Psychopathology and selected disorders'

Developmental Psychopathology is described as the field of research and intervention on the deviating and dysfunctional progress within regular child development. It can be seen as an interface of developmental and clinical psychology containing contributions of embryology, sociology and neurosciences as well as many other research fields. Participants of the online seminars are primarily graduate students of psychology. Its extended and intended use is for the qualification of nurses and especially for the qualification of psychotherapist for children and youth. After two introduction modules containing an over view, the theoretical basics, research methods and basic concepts, as well as an introduction to the classification of mental disorders, the origin, epidemiology, diagnostic, prevention and therapy of the following 11 mental disorders most relevant for

children's development are presented: depression, conduct disorders, anxiety disorders, obsessive-compulsive disorder, eating disorders, disorders of personality, mental retardation, autism, hyperkinetic disorders, posttraumatic stress disorder and Tourette's syndrome. The topics of course II (see Figure 1) are risk and protection factors, social phobia, drugs and alcohol, impulse control disorder, abuse of internet and computers, schizophrenia, self-destructive behaviour, suicide, adiposity, enuresis and encopresis, dissociative disorder, child abuse, sexual abuse and children of parents with psychiatric disorders.

As an external quality feature, we can state that course I was the first winner of the Springer E-learning Award Psychology in 2008 for its usability, provoking curiosity and the didactical concept. The didactical concept is equivalent to the previously discussed courses.

With course I, we investigated the influence of learner sequenced and system sequenced conditions on the success of learning and the evaluation by the participants [18]. The study sample, which consisted of 49 students (42 female, 7 male, 32 students of psychology, 17 students of pedagogy and future teachers) at the universities of Bamberg (n = 19), Munich (n = 7) and Regensburg (n = 22), were divided into two groups. One group began with system sequenced learning, i.e. they were required to progress through the first seven modules and their contents one after another step-by-step.


Figure 1. Screenshot of course II, first module: Risk and protection factors. Left menu: listing of the course topics. Right menu: content of the first module. The contents become accessible one after another as studying proceeds. The picture shows the status after all contents have been studied.

Then this same group worked learner sequenced, i.e. learners were free to choose the order of contents in the second half of the course. The second group learned in the reverse order of sequencing conditions. The evaluation of the course was accomplished with the ISO-Norm 9241/10, a questionnaire for the evaluation of the usability of software [19] and a questionnaire evaluating the structural variation was administered, one measuring the motivation and one defining the subjective learning success.

When the participants were asked before starting the course, 18 students preferred a system sequenced modus and 31 students a learner sequenced one. After the first seven modules, only six participants (three in each group) still preferred the system sequenced modus, whereas the learner sequenced modus was preferred by 33 students (note the drop-out of 10 students). At the end of the course, only in the group starting with learner sequencing, three students

preferred the system sequenced modus.

The overall evaluation with the ISO-Norm 9241/10 questionnaire shows a positive estimation of the usability in both conditions with small advantages in the group that started system sequenced (see Figure 2). The self-reported motivation remained at a high level over the 14 weeks. A statistically significant interaction difference was found in the subjective ratings of learning success between the sequence groups, system-learner at T1 and learner-system at T2. After first working freely in the course, the feeling of having learned something relevant increased with system-sequenced learning to the extent that it was higher than the reported success of the group that started with system-sequenced learning. But the between group effect could be relevant at this point. When starting system-sequenced, the pleasure with the course at the end was statistically greater than when starting learner-sequenced.
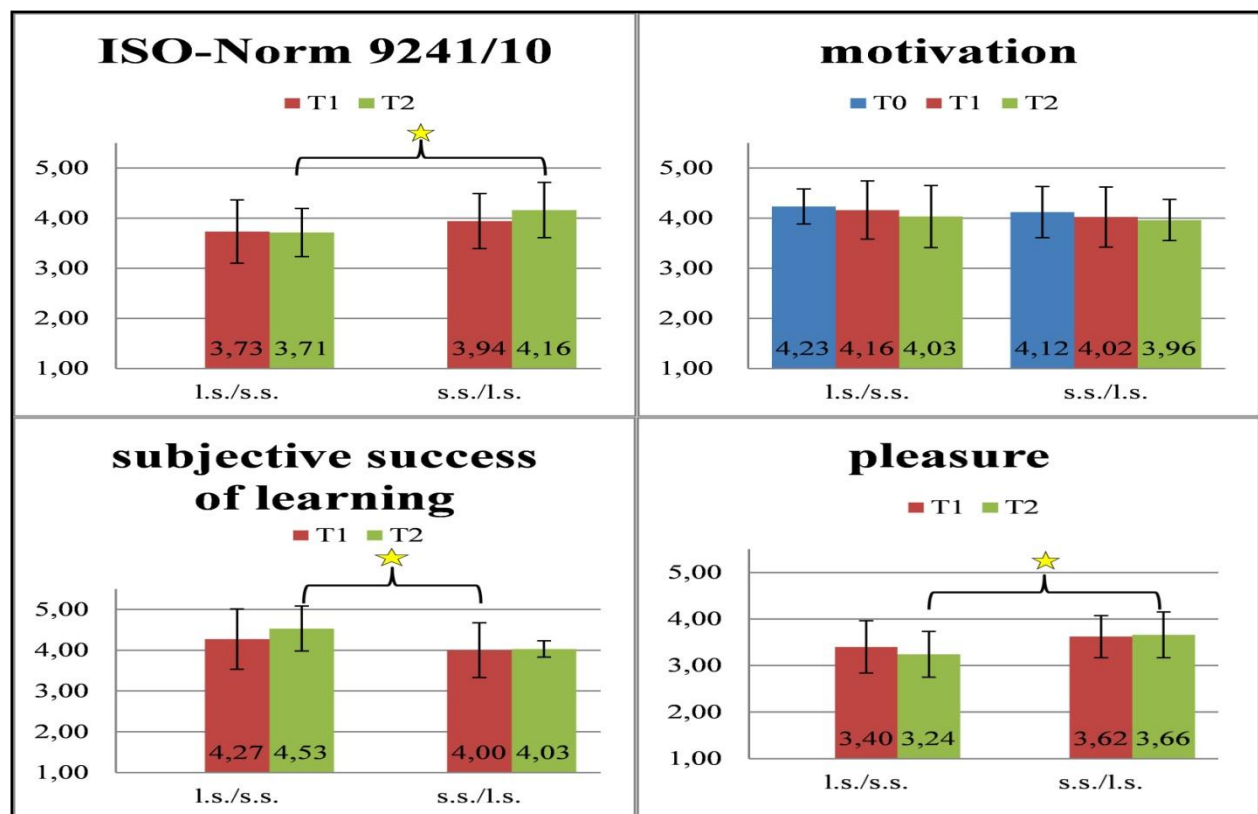
Figure 2. Four results of the evaluation of allowing learners to sequence the module contents (learner sequenced, l.s.) vs. restricting learners to study a linear order one after another (system sequenced, s.s.). T0: at the beginning, T1: after module seven, T2: at the end of the course. At T1, the participants changed the pace mode (for details see Heydolph-Breindl [18]; marked differences are statistical significant with $\alpha = .05$).

We conclude that learners will profit more from learning when they know what to do and how to do it. Sequencing by system shows learners how to learn with an online course. When an e-learning course starts in a

system sequenced modus, most of the learners followed the best path. After an initial system-sequenced learning phase, which is an essential part of the process, working on an e-learning course could be

given to the students' choice. Hence, the feeling of self-regulation increases, and concurrently the usability remains high. The structure of the working process in the group that started learner sequenced lead to an increase in subjective learning success after changing to the system-sequenced modus. This result supports the idea to start in a system-paced modus.

Sustainability of courses

Sustainability in the context of a project promotion means the ability to ensure and maintain the project results beyond the funding period, and in a restricted view, the continuation of the project after omission of the initial support [20]. Measures to guarantee sustainability should at a minimum pan out in maintenance of the project results and updating them after the support omission (in aspects of finance, human resources, administration, politics and spirit). Degel [20] discusses seven prerequisites for a sustainable usage of an online course: (1) Content quality, (2) didactical quality, (3) system quality, (4) process quality, (5) business model, (6) embedding of system and service and (7) marketing and promotion.

(1) The content quality is a key aspect of sustainability. A correct and largely complete presentation of a topic is a good starting point for a sustainable usage of an online course. Most important is to keep the content up-to-date and to have the necessary tools and system in place to ensure easy updating [21]. We therefore used a content management system, a learning management system, and its usage was evaluated by the tutors.

(2) The didactical concept, based on direct instruction and problem-based tasks, has been demonstrated to effectively work and to lead to verifiable knowledge gains in various empirical studies (e.g. [22]). Moreover, the designs of all online courses were continuously improved because of these empirical results.

(3) The quality of the system also contributes to the quality of an e-learning system. The aspects of interface design (e.g. placing of navigational units and content presentation on the screen), system's self-adaptation and teacher's system adjustments to the learners' needs, scalability (i.e. system independence from number of users) and usability (navigation and functionality) especially contribute to sustainability. Accordingly, the design was aimed at implementing a clear and intuitive arrangement of the course interface as well as a simple and intuitively usable navigation in aspect of usability guided by the various results of the evaluations. A basic level dedicated server can adequately handle the estimated maximum number of users (250 participants) with ease. There are also some standard possibilities to adapt the system to special learner needs according to the content management system used.

(4) Process quality includes the aspects of content, didactics and technical system, which should be explicitly considered for quality management. For all online courses, the content and its presentation were checked by independent expert group, working didactics were chosen for the courses and were demonstrated to be also working in an e-learning environment, and all systems were extensively tested in functionality and usability, as well as permanently improving the course according to the evaluation results.

(5) Documenting how sustainability can be achieved for a business model is indispensable. For our e-learning courses, a business model was not deemed necessary, because each online course was implemented in an existing curriculum and sometimes participation was compulsory.

(6) The online courses and accompanying services are embedded in social structures and processes. Courses are periodically revised and conducted by the university chair staff or they take a coordinated position within a curriculum that also comprises face-to-face seminars.

(7) An explicit marketing and promotion concept that introduces these online courses to the target audience or helps to establish the courses. The target audiences of the online courses only needed to be informed about their existence and the possibility to participate in them. Some forms of promotion nevertheless occurred, such as publications, posters and oral presentations at congresses and conferences.

Course designs and the scope of e-learning

E-learning methods constitute a wide scope in which a special learning content can be delivered and associated learning objectives can be reached. The sheer offering of learning material via old-fashioned ordered link lists should only be a practical solution and not confused with online courses for basic and advanced education. All eight online courses introduced in this paper demonstrate comprehensively how a specific topic can be prepared. However, only a small part of the possibilities provided nowadays by e-learning is used. This implies that technical possibilities (e.g., the ways of interacting with other people and information presentations) should be chosen with regard to their pedagogical impact and not because of the attractive features of the technology. The manner in which technology is exploited is crucial in fostering pedagogical processes. Not everything that is technologically possible is also pedagogically useful. The primacy of didactics should rule [23-25]; dictated by didactics, pedagogically beneficial and technologically realisable options must be delivered in one coherent package.

For the online courses in this paper, we fall back essentially on a reliable didactic, which is implemented in a 'new' media in a rather classic technical way: (1) a working didactic, i.e. the nine steps of instruction of Gagné et al. [2] belonging to the paradigm of direct instruction, (2) tasks for knowledge transfer and application embedded in constructivist ideas and (3) detailed feedback that refers to the learners task solutions as well as detailed worked-out solution outlines on a general level. Technical innovative applications are pedagogically interesting, but most possibilities still need to be investigated for their pedagogical impact. Some exemplary technically innovative possibilities are listed among selected topics of the World Congress 'Global Learn Asia Pacific 2011', such as collaborative technologies, mobile teaching and learning technologies, shared online video, videoconferencing, Web 2.0 technologies (podcasting, wikis, blogs, etc.), game-based learning, learning communities and personalized learning environments. Even if educators do not know the meaning of these terms and how they are linked to innovation, they can somehow get an idea of the pedagogical difficulties that might appear. One thing might be clear for the domain of learning and teaching: Innovations will mostly not replace but supplement working methods that are empirically demonstrated.

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