



# Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction

Manuela Paechter\*, Brigitte Maier, Daniel Macher

Department of Psychology, University of Graz, Universitaetsplatz 2/III, 8010 Graz, Austria

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## ABSTRACT

Within only a few years, the use of e-learning has increased rapidly in Austria. In certain subjects, up to 60% of university students report using e-learning platforms at least 'sometimes' or 'frequently' (Unger & Wroblewski, 2006). Yet, which aspects of e-learning do students consider important for their learning achievements and course satisfaction? This question was addressed by surveying 2196 students from 29 universities in Austria about their expectations of, and experiences in e-learning. Multiple regression analyses using Mplus 4.21 were carried out to investigate how different facets of students' expectations and experiences are related to perceived learning achievements and course satisfaction.

With regard to their expectations, i.e., aspects of a course they consider important, students' achievement goals were the best predictors for success and ranked higher than other course characteristics. With regard to their experiences, students' assessments of the instructor's expertise in e-learning, and her/his counseling and support were the best predictors for learning achievement and course satisfaction. Furthermore, self-regulated and collaborative learning were related to learning achievements. The results of the study suggest to influence students' motivation and goals by adapting instruction accordingly and emphasize the importance of continuing education and training for the instructors.

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## 1. Introduction

Over the past few years, digital media have enriched the teaching and learning experiences and have become commonplace with university students and lecturers (Engelbrecht, 2005; Liaw, Huang, & Chen, 2007). Joint endeavors have been made in the last 10 years by universities in Austria to introduce e-learning, i.e., the application of digital media for teaching and learning. With financial support by the government, universities have been encouraged to develop e-learning strategies. These initiatives resulted in a variety of best-practice examples for e-learning and course development (Pflichter, 2006). The advancement of e-learning at universities is also influenced by the development of technical support, e.g., by the widespread introduction of learning management systems (such as Blackboard, WebCT, Moodle, etc.) (Alexander & Golja, 2007; Coates, James, & Baldwin, 2005). In a survey carried out in 2006, more than 3000 students from various Austrian universities were asked how often they use learning management systems in their courses. In the social and business sciences, 60% of students reported using such systems 'sometimes' or 'frequently'. In other subjects, at least 30–40% of students reported using such systems 'sometimes' or 'frequently' (Unger & Wroblewski, 2006).

Even though the application of e-learning at universities has increased rapidly, little is known about students' expectations and experiences. Until recently, research focused on students' experiences with specific aspects of e-learning courses, e.g., the interaction with an instructor, learning with a specific learning management system, or certain characteristics of a course (Alexander & Golja, 2007; Coates et al., 2005; Engelbrecht, 2005).

The aim of our research was to obtain a general view of students' expectations of, and experiences in e-learning. By means of regression analyses, we investigated those expectations and experiences contributing to perceived learning achievements and course satisfaction. Our objective was not to examine specific courses or best-practice examples but to survey a large sample of students in order to obtain a broad picture of e-learning as it is offered in Austrian universities.

\* Corresponding author. Tel.: +43 (0)316 380 8542; fax: +43 (0)316 380 9805.  
E-mail address: [manuela.paechter@uni-graz.at](mailto:manuela.paechter@uni-graz.at) (M. Paechter).

## 2. Theoretical background

When designing an e-learning course, instructors are faced with many considerations and decisions that consequently affect how students experience instruction, construct and process knowledge. These decisions related to the didactic design of a course may refer to one of five fields of instruction (Brophy, 1999; Ehlers, 2004):

- (1) Course design, learning material, and electronic course environment: Brophy (1999) assumes that the structure and coherence of the curriculum and the learning material are a major factor for facilitating meaningful learning. The quality of the learning environment and the ease of using a learning management system also contribute to the success and course satisfaction of an e-learning course (Chang & Tung, 2008; Shee & Wang, 2008) and performance (Lee & Lee, 2008).
- (2) Interaction between students and an instructor: instructors must perform a variety of tasks in the process of teaching, e.g., provide a structure of the course contents, give feedback of accomplishments, stimulate students' motivation to process and reflect on the content, and assist them to engage in learning activities (Brophy, 1999). Interaction between student and instructor supports knowledge construction, motivation, and the establishment of a social relationship. The exchange of information regarding educational content as well as socio-emotional information is important for learning (Johnson, Hornik, & Salas, 2008; Paechter & Schweizer, 2006; Richardson & Swan, 2003).
- (3) Interaction with peer students: this aspect consists of communication processes, where students exchange information of the course contents and socio-emotional information. Students benefit in the following ways: working in small groups to construct understanding, socio-emotional support, and learning within a cohesive and positive environment (Brophy, 1999; Jucks, Paechter, & Tatar, 2003). Mutual support and the feeling of group cohesion are related to students' engagement in team work, motivation to participate in a learning environment, and course satisfaction (Concannon, Flynn, & Campbell, 2005).
- (4) Individual learning processes: e-learning students may receive ample opportunities to practice and apply what they are learning. In general, students have choices regarding the time, place, and the regulation of learning processes (Narciss, Proske, & Körndle, 2007). Such self-regulation of learning is an important characteristic that contributes to students' motivation (Pintrich, 2000).
- (5) Course outcomes: course outcomes may refer to cognitive and emotional variables. On the side of cognitive variables, learning achievements are considered most important. They can be described as different facets of competences such as theoretical and methodical knowledge as well as skills required for problem solving, personal/social competences (e.g., in self-regulated or collaborative learning), and/or media competence (Paechter, Maier, & Macher, *in press*; Weinert, 2001). On the side of emotional variables, satisfaction with a course is an important outcome that influences the decision to continue or drop-out of a course (Chiu, Hsu, Sun, Lin, & Sun, 2005; Levy, 2007).

Using these five fields of instruction, a framework was introduced describing structures, processes (interaction and individual learning), and outcomes of a course. Similar frameworks can be found in quality assurance systems describing desirable characteristics of e-learning (Ehlers, 2004).

## 3. A study on students' expectations of, and experiences in e-learning

Our study investigated how students' expectations of e-learning courses, i.e., important and desirable characteristics of a course, and their experiences in an e-learning course relate to learning achievements and course satisfaction.

### 3.1. Method and sample

As a first step in our research, a pilot study with qualitative online interviews was carried out. In the interviews, 446 students described aspects of learning and teaching they consider important and desirable from the five fields of instructions. Furthermore, they described their experiences in an e-learning course (Paechter, Fritz, Maier, & Manhal, 2007). In a content analysis (Vaughn, Schumm, & Singagub, 1996), students' answers were categorized and the frequency of answers in all categories was determined.

Answers in the pilot study were used for the development of a quantitative questionnaire. Thereby, those experiences or expectations that students considered important in the interviews are included in the questionnaire.

The quantitative questionnaire contains (a) an evaluation of students' expectations of e-learning, (b) their evaluations of learning experiences, (c) assessments of course outcomes (learning achievements, course satisfaction), and (d) demographic questions. In part a, students evaluated the importance of course characteristics on a six-point scale (ranging from 1 "not important at all" to 6 "very important"). In part b, they evaluated statements describing positive or negative learning experiences on a six-point scale (ranging from 1 "I disagree completely" to 6 "I agree completely"). In part c, they assessed their learning outcomes and course satisfaction on a six-point scale (ranging from 1 "very low achievements/satisfaction" to 6 "very high achievements/satisfaction") (cf. similar measures in Chemers, Hu, & Garcia, 2001; Lee & Lee, 2008). Self-assessments of learning achievements were chosen for various reasons. The participants were recruited from a variety of universities and from courses with heterogeneous grading systems which cannot be compared to one other. In contrast to grades, students' self-assessments take the difference between a student's knowledge before and after a course into account and render valuable information about individual increases in knowledge and competences. In a pilot study, we found rather substantial correlations (up to  $r = .63$ ) between students' self-assessments of achievements in media competence (similar to the measures used in this study) and scores measured by an achievement test (Pinter, 2006).

In Austria, education at a university level is mainly provided by universities and universities of applied sciences with a stronger focus on practice. Both types of institutions offer studies on a bachelor and master level but universities also offer studies on a Ph.D. level. All universities in Austria offering e-learning courses at the time of the study participated (sixteen out of twenty-two universities). In addition, at least one university of applied sciences from each federal state was recruited (thirteen out of twenty universities of applied sciences).

Lecturers and organizational units offering support for e-learning were informed about the survey and were asked to inform students about it. Participation was voluntary.

Altogether, 2196 students took part. There were 1361 (62%) female and 821 (37.4%) male participants (0.6% missing values,  $n = 14$ ). Most participants, 80.19%, were between 18 and 25 years old; 11.70% were between 25 and 30 years old, and 7.88% were 31 and older. The students were enrolled in a variety of majors. Of the university students ( $n = 1531$ , 69.7%): 51.86% studied social sciences ( $n = 793$ ); 15.63% arts ( $n = 239$ ); 11.64% natural sciences ( $n = 178$ ); 9.61% medicine ( $n = 147$ ); 7.72% education ( $n = 118$ ); 2.22% technical subjects ( $n = 34$ ), and 0.98% agriculture and forestry ( $n = 15$ ) (missing values of five students). For the group of students at universities of applied sciences ( $n = 665$ , 30.3%), a different categorization had to be used as these universities offer studies with a combination of subjects: 38.50% of the participants studied a subject combining technological aspects and business education ( $n = 256$ ); 30.08% studied a subject focusing on business education and languages ( $n = 200$ ); 17.44% studied a subject in the field of social work and business education ( $n = 116$ ); 6.92% studied a subject focusing on science and business education ( $n = 46$ ), and 5.86% studied a subject focusing on technology and sciences ( $n = 39$ ) (eight students without answer). Most of the participants in the study had already attended more than one e-learning course: 20.1% ( $n = 442$ ) had taken more than four e-learning courses; 20.4% ( $n = 447$ ) three or four and 36.7% ( $n = 807$ ) one or two courses. Only 11.9% ( $n = 261$ ) were enrolled in their first e-learning course (missing values of 239 students). Attending a pure e-learning course were 12.0%, and attending a blended-learning course were 85.2% (missing values of 61 students).

### 3.2. Students' expectations and their contribution to course outcomes

Students' expectations contributing to course outcomes (achievements and satisfaction) were investigated. A multiple regression analysis was carried out with the items of students' expectations as independent variables and three achievement variables plus satisfaction as dependent variables (cf. descriptive statistics for expectations in Table 1, for achievement and satisfaction in Table 3, summary of multiple regression analysis in Table 2). We assumed a linear relation between independent (predictor) and dependent (criterion) variables meaning we would expect that increases in one variable would be related to increases or decreases in another one. Mplus 4.21 was used for the multiple regression analyses because it supports the investigation of the relationship between a set of independent and dependent variables in one single regression analysis (Muthén & Muthén, 2006). As the sample size was rather large ( $N_1 = 1943$ ,  $N_2 = 1862$ ), and in order to reduce the overall risk of committing a Type I error (cf. Cohen, 1992), only regression coefficients ( $\beta$ -weights) with a significance of  $p < .01$  were considered.  $\beta$ -weights describe the relation between a predictor and a criterion variable after the effects of other predictor variables have been removed. They range from  $-1$  to  $1$  (0 means no relation at all;  $1$  or  $-1$  mean that variations in one variable can be explained completely by variations in another). When interpreting results, one has to keep in mind that multiple regression does not explain causes and effects but instead describes relations between variables or sets of variables.

It was further investigated whether the students' gender, age, or number of e-learning courses taken are related to their evaluations (Paechter et al., 2007). As no differences were found for these groups, the results for the whole sample are reported.

On the side of students' expectations, only few variables contribute to perceived learning achievements in a course, specifically expectations of learning achievements, flexibility of learning, and the exchange of knowledge with peer students (cf. Fig. 1). The acquisition of knowledge and skills is mainly (positively) related to students' expectations to acquire knowledge in the subject matter ( $\beta = .18$ ,  $p < .01$ ),

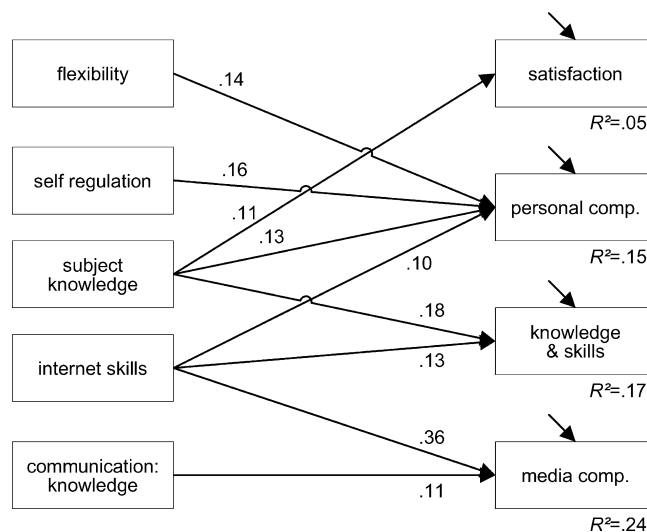
**Table 1**  
Descriptive statistics of students' expectations.

Items	<i>M</i>	<i>SD</i>	<i>N</i>
<i>Importance of variables concerning course design</i>			
1. A clear and organized structure of the course and learning material	5.53	0.79	2145
2. Usability of the platform	5.50	0.85	2146
3. Favorable cost-benefit ratio of effort and learning outcomes	5.29	0.98	2143
<i>Importance of variables concerning the interaction with the instructor</i>			
4. Fast feedback from the instructor	5.40	0.88	2149
5. Counseling and support of learning by the instructor	5.23	0.89	2149
6. Possibility to establish personal contact with the instructor	5.05	1.08	2144
7. Easy and fast accessibility of the instructor	5.42	0.86	2148
8. Expertise of the instructor in the implementation of e-learning courses	5.17	0.98	2137
<i>Importance of variables concerning the interaction with peer students</i>			
9. Easy and fast exchange of information and knowledge with peer students	5.26	1.01	2151
10. Variety of communication tools for exchanging information with peer students (e.g., e-mail, chat, newsgroups)	4.71	1.21	2149
11. Support of cooperative learning and group work with other course participants	4.35	1.33	2150
12. Personal contact with peer students	4.77	1.33	2144
<i>Importance of variables concerning individual learning processes</i>			
13. Flexibility of learning with regard to time and place	5.17	1.12	2150
14. Flexibility in choice of learning strategies and pace of learning	5.02	1.13	2144
15. Opportunities for self-paced chapter exercises and the application of one's knowledge	5.22	0.98	2148
16. Opportunities for controlling one's learning outcomes (e.g. by self-tests)	4.92	1.25	2149
17. Support for maintaining learning motivation	4.87	1.20	2148
<i>Importance of variables concerning learning achievements</i>			
18. Acquiring knowledge and skills in the subject matter	5.16	0.98	2151
19. Acquiring skills on how to apply the knowledge	5.30	0.96	2146
20. Acquiring skills in communication and cooperation	4.96	1.17	2147
21. Acquiring skills in self-regulated learning	5.05	1.07	2142
22. Acquiring skills in using the internet for scientific practice	4.74	1.25	2151

**Table 2**Summary of multiple regression analysis for learning achievements and course satisfaction regressed on students' expectations ( $N = 1943$ ).

Importance of:	Acquiring of:									Satisfaction with the course		
	knowledge and skills in the subject matter			personal competence			media competence			B	SE B	$\beta$
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$			
acquiring knowledge and skills in the subject matter (subject knowledge)	0.19	0.03	.18	0.18	0.04	.13				0.14	0.04	.11
acquiring skills using the internet for scientific practice (internet skills)	0.11	0.02	.13	0.11	0.03	.10	0.37	0.02	.36			
acquiring personal competence (self-regulated learning) (self regulation)				0.21	0.03	.16						
flexibility in choice of learning strategies and pace of learning (flexibility)				0.17	0.03	.14						
easy and fast exchange of information and knowledge with peer students (communication: knowledge)							0.14	0.03	.11			
$R^2$	.17			.15			.24			.05		

Note. All reported regression coefficients are significantly different from zero ( $p < .01$ ).



**Fig. 1.** Learning achievements and course satisfaction regressed on students' expectations ( $N = 1943$ ). All reported standardized regression weights are significantly different from zero ( $p < .01$ ).

i.e., students who consider this competence as important also report higher achievements. The acquisition of personal competence is positively related to four variables: the expectation to acquire knowledge in the subject matter ( $\beta = .13$ ,  $p < .01$ ), to acquire media competence ( $\beta = .10$ ,  $p < .01$ ) and personal competence ( $\beta = .16$ ,  $p < .01$ ), plus expectations on the flexibility in the choice of learning strategies ( $\beta = .14$ ,  $p < .01$ ). Two items are related to the acquisition of media competence: the expectation to acquire skills using the internet for scientific practice ( $\beta = .36$ ,  $p < .01$ ), and the importance of knowledge exchange with peer students ( $\beta = .11$ ,  $p < .01$ ). For all three variables on learning achievements, a satisfactory amount of variance can be explained by the independent variables ( $R^2 = .24$  to  $R^2 = .15$ ), whereas only a small amount of variance can be explained for course satisfaction ( $R^2 = .05$ , cf. Table 2).

### 3.3. Contribution of e-Learning Experiences to Course Outcomes

Furthermore, it was investigated which of the students' experiences in an e-learning course contribute to achievement and satisfaction. A multiple regression analysis was carried out with the 20 items (items 1–20 in Table 3) on students' experiences as independent variables and three achievement variables plus satisfaction as dependent variables (items 21–24 in Table 3; cf. descriptive statistics in Table 3, multiple regression analysis in Table 4). It was investigated whether the students' gender, age, or number of e-learning courses taken are related to their evaluations. As no differences were found for these groups, the results for the whole sample are reported.

On the side of experience variables, seven variables contribute to course outcomes. The instructor's expertise in e-learning ( $\beta = .17$ ,  $p < .01$ ) and his/her support in learning ( $\beta = .13$ ,  $p < .01$ ) are positively related to the acquisition of knowledge and skills in the subject matter, whereas difficulties in maintaining motivation contribute negatively to knowledge acquisition. The instructor's expertise ( $\beta = .12$ ,  $p < .01$ ), the exchange of knowledge with peer students ( $\beta = .14$ ,  $p < .01$ ), and establishing online communication with students ( $\beta = .14$ ,  $p < .01$ ) contribute to the acquisition of media competence. The flexibility in the choice of learning strategies is positively related to the acquisition of personal competence (e.g., self-regulated learning) ( $\beta = .30$ ,  $p < .01$ ).

Three variables are positively related to course satisfaction: the instructor's expertise in implementing e-learning courses ( $\beta = .16$ ,  $p < .01$ ), the instructor's support ( $\beta = .13$ ,  $p < .01$ ), and the clarity and structure of the course and the learning material ( $\beta = .23$ ,  $p < .01$ ). Dif-

**Table 3**

Descriptive statistics of students' experiences, learning achievements, and satisfaction in e-learning.

Items	M	SD	N
<i>Experiences concerning course design</i>			
1. The learning environment offers e-mail, chat, newsgroups and/or other communication facilities for the interaction with other course participants	5.38	1.11	2180
2. The course itself and the learning material are clear and well structured	4.68	1.24	2178
3. The learning environment is user friendly	4.66	1.35	2151
4. I often have to deal with technical problems (e.g., errors of the software, slow access to the internet)	2.71	1.56	2179
5. The course is demanding with regard to the organization of learning and time needed for learning	3.79	1.37	2175
<i>Experiences concerning the interaction with the instructor</i>			
6. When I need advice from my instructor, I can easily get in contact with her/him via e-mail, chat, forum, etc.	5.37	0.99	2172
7. My instructor has a high level of expertise in the implementation of e-learning courses	4.94	1.12	2170
8. My instructor gives fast feedback via e-mail, chat, newsgroups and/or other communication facilities	4.99	1.25	2150
9. My instructor supports and counsels me with regard to my learning processes	4.74	1.26	2160
10. I miss the personal contact with my instructor	2.42	1.47	2179
11. Due to the online communication in the course, personal relations are neglected	3.13	1.62	2164
<i>Experiences concerning the interaction with peer students</i>			
12. I can exchange knowledge easily and quickly with other course participants via e-mail, chat, newsgroups, etc.	4.69	1.31	2181
13. There are ample opportunities in the course to establish personal contact with other participants	4.42	1.40	2179
14. The online communication tools facilitate establishing new contact with other students	2.91	1.53	2168
15. Learning in groups and cooperation with other learners are fostered in the course (e.g., by group activities, discussions etc.)	3.96	1.56	2171
16. Using the computer-mediated communication facilities complicates group work	3.18	1.56	2174
<i>Experiences concerning individual learning processes</i>			
17. I can decide on my own at what times and where I am learning (e.g., at the university, at home)	4.51	1.61	2174
18. I can decide on my own about the pace of learning and the use of learning strategies	4.38	1.43	2174
19. The learning environment offers opportunities to increase my knowledge and to control my success (e.g., via tests)	3.15	1.78	2152
20. I find it difficult to motivate myself and to maintain my learning motivation in the course	3.05	1.53	2170
<i>Experiences concerning course outcomes</i>			
21. Knowledge and skills in the subject matter	4.47	1.06	2173
22. Personal competence (e.g., self-regulated learning)	4.27	1.37	2161
23. Media competence (e.g., using the internet for scientific practice)	4.22	1.28	2184
24. Satisfaction with the course	4.41	1.25	2072

**Table 4**Summary of multiple regression analysis for learning achievements and course satisfaction regressed on students' experiences ( $N = 1862$ ).

Experiences	Acquiring of:									Satisfaction with the course		
	knowledge and skills in the subject matter			media competence			personal competence			B	SE B	$\beta$
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$			
I can decide on my own about the pace of learning and the use of learning strategies (flexibility)							0.28	0.02	.30			
My instructor has a high level of expertise in the implementation of e-learning courses (tutor expertise)	0.16	0.02	.17	0.13	0.03	.12				0.18	0.03	.16
My instructor supports and counsels me with regard to my learning processes (tutor support)	0.11	0.02	.13							0.13	0.03	.13
I can exchange knowledge easily and quickly with other course participants via e-mail, chat, newsgroups etc. (communication: knowledge)				0.14	0.03	.14						
The online communication tools facilitate establishing new relationships with other students (communication: relation)				0.12	0.02	.14						
The course itself and the learning material are clear and well structured (structure)										0.23	0.02	.23
I find it difficult to motivate myself and to maintain learning motivation in the course (motivation)	−0.10	0.02	−.15							−0.12	0.02	−.15
$R^2$	.27			.18			.23			.30		

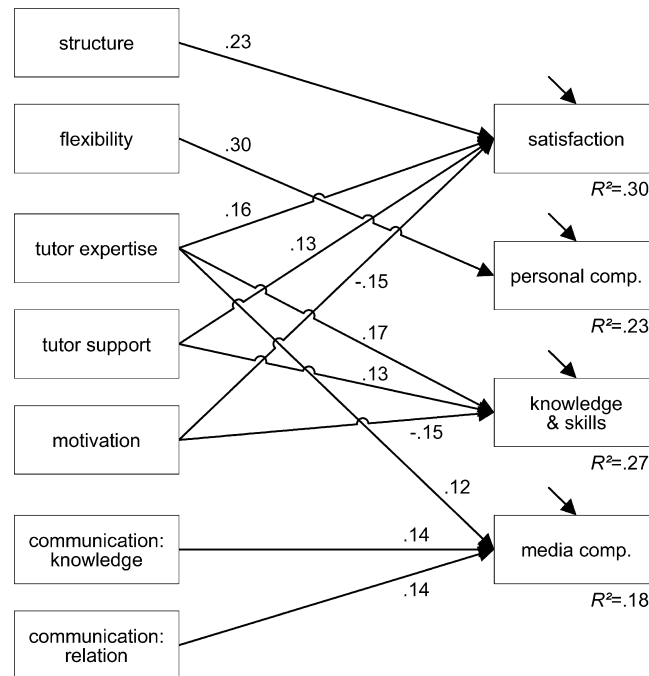
Note. All reported regression coefficients are significantly different from zero ( $p < .01$ ).

difficulties in maintaining learning motivation are negatively related to satisfaction ( $\beta = -.15$ ,  $p < .01$ ). For all four course outcome variables, a satisfactory amount of variance can be explained by the independent variables (cf. Table 4, Fig. 2).

In addition, the relation between the four outcome variables was determined. As Table 5 shows, all achievement variables are related to each other. Satisfaction with the course is only related to the acquisition of knowledge and skills in the subject matter and to none of the other achievement variables.

#### 4. Discussion

The results of the research contribute to an understanding of which characteristics of an e-learning course and learning behaviors are important for learning achievements and satisfaction. They can be seen as a description of students' experiences and offer recommendations of how to design e-learning courses under the general conditions at universities (e.g., the availability of only specific learning management systems, the necessity to offer courses to a large number of participants, etc.).



**Fig. 2.** Learning Achievements and Course Satisfaction Regressed on Students' Experiences ( $N = 1862$ ). All reported standardized regression weights are significantly different from zero ( $p < .01$ ).

**Table 5**

Relations between learning achievements and course satisfaction ( $N = 1862$ ).

Acquiring of:	Acquiring of:									Satisfaction with the course		
	knowledge and skills in the subject matter						media competence			personal competence		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
knowledge and skills in the subject matter				0.42	0.03	.32	0.31	0.03	.22	0.13	0.02	.10
media competence							0.45	0.03	.26			
personal competence												
Satisfaction with the course												

Note. Table 5 describes relations between variables from multiple regression analysis for learning achievements and course satisfaction regressed on students' experiences. All reported regression coefficients are significantly different from zero ( $p < .01$ ).

#### 4.1. Students' expectations on e-learning courses and their contribution to learning achievements

Mainly one set of variables, students' achievement goals, contributes to perceived learning achievements. In terms of expectancy-value theory of motivation, these results can be explained by the value students attach to gains in competences (Bruinsma, 2004; Eccles & Wigfield, 2002). Students' assessments of the importance of specific achievements reflect their mastery goals and their wishes to become proficient in an area. Consequently, students who attach a high value to specific achievements are also likely to invest more effort in learning, to apply more elaborated information processing strategies, or to devote more time to learning (Bruinsma, 2004; Nurmi & Aunola, 2005). In addition, the flexibility in the choice of learning strategies and the exchange of knowledge with peer students are positively related to learning achievements. Students who use opportunities in self-regulated and collaborative learning also experience higher learning achievements.

These results encompass important considerations for the design of e-learning courses. Achievement goals proved to be more important than other course characteristics, e.g., the design of the learning material or the user friendliness of the learning platform. Instructors should therefore influence motivation and goals by adapting instruction accordingly, e.g., by making learning objectives transparent and by providing opportunities for self-regulated learning and self-tests to measure progress throughout the whole course.

#### 4.2. Relation between students' experiences and course outcomes

Students' evaluations of learning experiences in four fields of instruction (course structure, interaction between instructor and students, interaction with peer students, individual learning) and their relation to course outcomes were investigated. Our study emphasizes the role of the instructor, an aspect which is often neglected in research on e-learning. In comparison to all other variables, the instructor's support in learning (and therefore the interaction between instructor and students) strongly contributes to learning achievements and course satisfaction. In students' perception, the instructor's counseling and support are especially important for their construction of knowledge, the acquisition of media competence, and for satisfaction with a course.



Furthermore, students emphasize the instructor's expertise in the implementation of e-learning courses. Compared to classroom instruction, e-learning instructors are faced with additional tasks. They have to develop coherent and structured learning material that is also technically well designed (e.g., learning material with multimedia elements or hypertext structures), provide opportunities for on-line practice or self-tests for students and for online collaboration with peer students. In the case of blended learning, instructors have to optimally combine online and face-to-face learning sessions. In a factor analysis of a questionnaire on quality in e-learning, Selim (2007) found that items on the instructor's task list in setting up online instruction formed a distinct and important factor.

Besides the instructor's expertise and support, only a few variables proved to be important for students' perceptions of learning achievements and course satisfaction. These variables describe three fields in which instructors need professional expertise: the structure and coherence of the learning material and the course, the stimulation of learning motivation, and the facilitation of collaborative learning. Instructors may provide structure and coherence by means such as advance organizers, clear presentations of learning objectives, or a structure of the learning contents. Prior knowledge of the subject matter has to be factored in thus allowing to successively build on what has already been learned by the students (McCown, Driscoll, & Roop, 1996). Instructors also need knowledge in how to stimulate students' intrinsic or extrinsic motivation, e.g., by means such as providing opportunities for students to seek challenge, arousing their curiosity, or allowing them choices in activities (Pintrich & Schunk, 1996). Motivation is also linked to opportunities for self-regulated learning, a characteristic of e-learning courses related to perceived learning achievements. Lastly, the results stress that instructors need expertise in implementing and supporting collaborative learning.

## 5. Conclusion

In our study, two aspects contribute strongly to learning achievements and course satisfaction: students' achievement goals and the instructor. Students who considered gains in competencies as especially important, experienced higher achievements. Furthermore, the results of our study emphasize the instructor's expertise and role as a counselor and facilitator in learning. The instructor does not become less important in e-learning. On the contrary, students experience the instructor's support and expertise as especially important for the acquisition of knowledge, skills, and competences and for course satisfaction. Other than these variables, only a few others contribute to learning achievements or satisfaction: students' motivation, opportunities for self-regulated and collaborative learning, and the clarity of the course structure.

Instructors need a high degree of didactic expertise in the implementation of an online course. Yet, not all instructors are sufficiently skilled in the implementation of e-learning as indicated by students' assessments. Until recently, however, only a few universities in Austria offer continuing education and training for e-learning instructors (Pflichter, 2006). The results of our study stress the importance of such further training.

## References

- Alexander, S., & Golja, T. (2007). Using students' experiences to derive quality in an e-Learning system: An institution's perspective. *Educational Technology & Society*, 10(2), 17–33.
- Brophy, J. E. (1999). *Teaching. Educational practices series (Vol. 1)*. International Academy of Education & International Bureau of Education. <[www.ibe.unesco.org](http://www.ibe.unesco.org)> Retrieved 19.02.09.
- Bruinsma, M. (2004). Motivation, cognitive processing and achievement in higher education. *Learning and Instruction*, 14, 549–568.
- Chang, S. C., & Tung, F. C. (2008). An empirical investigation of students' behavioural intentions to use the online learning course websites. *British Journal of Educational Technology*, 39, 71–83.
- Chemers, M. M., Hu, L. T., & Garcia, B. F. (2001). Academic self-efficacy and first-year college student performance and adjustment. *Journal of Educational Psychology*, 93(1), 55–64.
- Chiu, C. M., Hsu, M. H., Sun, S. Y., Lin, T. C., & Sun, P. C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers & Education*, 45, 399–416.
- Coates, H., James, R., & Baldwin, G. (2005). A critical examination of the effects of learning management systems on university teaching and learning. *Tertiary Education and Management*, 11, 19–36.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159.
- Concannon, F., Flynn, A., & Campbell, M. (2005). What campus-based students think about the quality and benefits of e-learning. *British Journal of Educational Technology*, 36, 501–512.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53, 109–132.
- Ehlers, U. (2004). Quality in e-learning. The learner as a key quality assurance category. *European Journal of Vocational Training*, 29, 3–15.
- Engelbrecht, M. (2005). Adapting to changing expectations: Postgraduate students' experience of an e-learning tax program. *Computers & Education*, 45, 217–229.
- Johnson, R. D., Hornik, S., & Salas, E. (2008). An empirical examination of factors contributing to the creation of successful e-learning environments. *International Journal of Human-Computer Studies*, 66, 356–369.
- Jucks, R., Paechter, M., & Tatar, D. (2003). Learning and collaboration in online discourses. *International Journal of Educational Policy, Research & Practice*, 4, 117–146.
- Lee, J. K., & Lee, W. K. (2008). The relationship of e-learner's self-regulatory efficacy and perception of e-Learning environmental quality. *Computers in Human Behavior*, 24, 32–47.
- Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers & Education*, 48, 185–204.
- Liaw, S. S., Huang, H. M., & Chen, G. D. (2007). Surveying instructor and learner attitudes toward e-learning. *Computers & Education*, 49, 1066–1080.
- McCown, R., Driscoll, M., & Roop, P. (1996). *Educational psychology. A learning-centered approach to class-room practice* (2nd ed.). Boston: Allyn and Bacon.
- Muthén, L. K., & Muthén, B. O. (2006). *Mplus user's guide* (4th ed.). Los Angeles, CA: Muthén & Muthén.
- Narciss, S., Proske, A., & Kördle, H. (2007). Promoting self-regulated learning in web-based learning environments. *Computers in Human Behavior*, 23, 1126–1144.
- Nurmi, J.-E., & Aunola, K. (2005). Task-motivation during the first school years: A person-oriented approach to longitudinal data. *Learning and Instruction*, 15, 103–122.
- Paechter, M., Maier, B., & Macher, D. (in press). Evaluation von Lehre mittels Einschätzungen des subjektiven Kompetenzerwerbs. *Psychologie in Erziehung und Unterricht*.
- Paechter, M., Fritz, B., Maier, B., & Manhal, S. (2007). *eSTUDY – eLearning im Studium: Wie beurteilen und nutzen Studierende eLearning?* Austrian Federal Ministry of Science and Research. <[http://www.e-science.at/dokumente/eSTUDY\\_Endbericht.pdf](http://www.e-science.at/dokumente/eSTUDY_Endbericht.pdf)> Retrieved 19.02.09.
- Paechter, M., & Schweizer, K. (2006). Learning and motivation with virtual tutors. Does it matter if the tutor is visible on the net? In M. Pivec (Ed.), *Affective and emotional aspects of human-computer-interaction: Emphasis on game-based and innovative learning approaches* (pp. 155–164). Amsterdam: IOS Press.
- Pflichter, F. (2006). Weiterentwicklung im blended learning-Bereich aus Sicht des bm:bwk. In ForumNeueMedien Austria (Ed.), *Usability im eLearning & eLearning Strategien* (pp. 112–115). St. Poelten: Verlag Forum Neue Medien.
- Pintrich, K. (2006). *Validierung eines Erhebungsinstruments zur Medienkompetenz*. Unpublished master's thesis, University of Graz, Graz, Austria.
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts & P. R. Pintrich (Eds.), *Handbook of self-regulation* (pp. 13–39). San Diego, CA: Academic Press.
- Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education*. London: Prentice Hall.
- Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68–88.
- Selim, H. M. (2007). Critical success factors for e-learning acceptance. Confirmatory factor models. *Computers & Education*, 49, 396–413.

- Shee, D. Y., & Wang, Y. S. (2008). Multi-criteria evaluation of the web-based e-learning system: A methodology based on learner satisfaction and its applications. *Computers & Education*, 50, 894–905.
- Unger, M. & Wroblewski, A. (2006). *Neue Medien im Studium. Ergebnisse der Studierenden-Sozialerhebung 2006*. Austrian Federal Ministry of Science and Research. <[http://www.e-science.at/dokumente/ergebnis\\_studierenden-sozialerhebung.pdf](http://www.e-science.at/dokumente/ergebnis_studierenden-sozialerhebung.pdf)> Retrieved 19.02.09.
- Vaughn, S., Schumm, J. S., & Singagub, J. (1996). *Focus group interviews in education and psychology*. Thousand Oaks, CA: Sage.
- Weinert, F. (2001). Concept of competence. A conceptual clarification. In D. Rychen & L. Salganik (Eds.), *Defining and selecting key competencies* (pp. 45–66). Seattle: Hogrefe and Huber.