

eLearning as an integrated element of everyday life in school: an empirical study

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Abstract: This paper deals with the implementation process of diverse eLearning applications in secondary modern schools in Austria. It will establish different criteria which should be taken into account so that every school benefits from these results.

An empirical study, which took place in a selected Austrian secondary modern school, takes centre stage in this work. This school is one of the first schools in Austria experimenting in this domain.

Attention should be paid to the adoption process of eLearning in schools, because not every situation yields the same benefits as expected. One of the greatest problems of applying this modern teaching method is the acceptance lacking on the part of the headmasters, the teachers and the pupils. In particular, the lack of readiness/acceptance and enthusiasm by all involved is one of the main causes of this problem.

Based on the results of the empirical study, these serious problems should be reduced. One part of this study is descriptive, which will illustrate the problem of the lack of acceptance in one selected school in Austria. In consideration of acceptance models, new eLearning adaptation factors should be acquired.

The surveys were held on two dates. The first one was at the beginning of the schoolyear, in September. The second one took place at the end of this project year, in July. The goal of the latter survey is to determine factors which increase the acceptance by the users. Furthermore, these findings should support other schools in the process of adopting eLearning.

The goals of this study can be defined as:

- The adoption of eLearning in schools should systematically be analysed in order to document the basic conditions for using eLearning in education.
- The continuous changing of educational processes and their methods should be documented in this pilot project.
- How and to what extent eLearning is used in the educational process in schools.

- What the causes for the lack of acceptance by teachers and pupils are and how can they can be decreased.
- Based on a case study the acceptance of adjustment and the acceptance of attitude should be checked. Interaction factors should be worked out.
- What the positive effects are and how they could be made accessible to sceptics.
- What the critical disadvantages are and how they could break down.
- These acquired factors could be the guideline for a smooth adoption of eLearning in schools.

This paper addresses all the factors eLearning, starting with the adoption of eLearning. It deals with educational methodes and the changing situation of the acceptance process. Based on investigations dealing with the acceptance of eLearning, a change in educational processes should be demonstrated.

Keywords: eLearning, blended learning, acceptance, education, school

1 Introduction

Essentially school systems often consist of four layers which can be visualized through a pyramid (see figure 1). The two topmost layers represent a federal ministry for education and the headmasters of schools. Both parties mainly deal with strategic issues. The next two layers are made up of teachers and pupils, which can be seen as the operational part of the system.

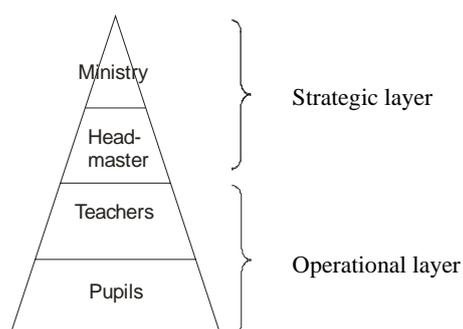


figure1: school system

eLearning can only be effective in education if all parties in these four layers commit to it and contribute their part to form a strong chain.

Federal ministries can bring forward eLearning by launching projects and by supporting research activities in this domain.

Headmasters are able to facilitate the use of eLearning by taking several actions. One essential issue is to provide the technical infrastructure in schools. Furthermore, eLearning training courses have to be provided for the teachers. Headmasters may also offer incentives for adopting eLearning. Such incentives could take shape as simple compliments to teachers which enhance their prestige and may extend to financial benefits like in the eBuddy program which will be discussed in section “eBuddy”.

All strategic guidelines and efforts take no effect if they are not executed on the operational layers.

An interesting interrelation between teachers and pupils can be identified and is shown in figure 2.

This relation can be seen as a circle having positive or negative back coupling.

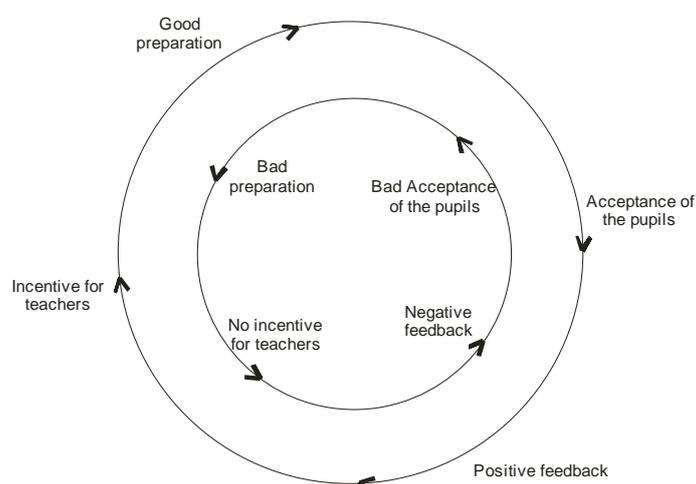


figure 2: positive and negative back coupling

One entry point into this circle can be identified at the pupils. The feedback they provide regarding the eLearning sequences is very important. According to the attitude towards eLearning and the quality of the sequences, this feedback may be motivating or demotivating for teachers. Positive feedback will only be given by pupils with a positive attitude attending good eLearning sequences. Teachers become proud of the positive results of their work and become motivated to intensify the use of eLearning sequences.

Negative feedback leads to a contrary result. Preparing an eLearning sequence implicates extra work for teachers. If this time-consuming process goes unappreciated, teachers fall back into their conventional teaching methods and eLearning hardly gets a second chance to be introduced.

2 ELearning elements in school

2.1 eBuddy

Of course teaching is also possible without information and communication technology (ICT), but why shouldn't the conventional educational process be supported by this new teaching method? Teaching with computers and the internet is such an enrichment in everyday life in school. Nevertheless there are still some teachers who shrink away from this way of teaching, because they feel less competent to handle the technical part. Exactly these teachers look forward to asking persons who are very confident with these methods to enhance their learning process in this sector. On the other hand, some teachers are using information and communication technology constantly in their lessons. Isn't it possible that one of the colleagues, who is very accomplished in this sector, can support some of the unsure teachers? This is the strategy of the eBuddy project. One teacher acts for a few weeks as a coach (eBuddy) to support his or her colleagues at the following areas:

- Watching live some sequences in the lessons of the coach
- Getting support from the eBuddies for preparing eLearning lessons
- Using support from the eBuddies for wrapping-up the lessons

On one hand, every teacher who is accomplished in the sector of information and communication technology is able to become an eBuddy. On the other hand, all teachers who want to use eLearning in their lessons but need some experience, can rent an eBuddy. The persons who act as an eBuddy can also be rented from another school. The eBuddies receive a small sum of money for their work.

2.2 Associate partner school

Next to the eBuddy project, assistance can also be executed at a higher level. It is possible that teachers from one school can look over the shoulders of accomplished teachers in another school. One school acts as a school where some teachers present samples of their lessons. Some teachers of the school where the presentation takes place provide an opportunity for the teachers of the quest school. Because of the good preparation of materials, for example a list of the presented subjects, the questteachers are able to decide which lessons they will attend.

Both schools agree on one date when this project day will take place. The aim of this project is a good transfer of knowledge from teachers in exchange for a small sum of money from the Federal Ministry of Education and Research.

2.3 ePortfolio

Teaching and learning methods in schools have changed a lot in the last few years. One focal point in education is an increased support of the constructivism. Pupils should be able to design some new knowledge on their own. Self-directed learning is one keyword in this changing process. The concept of the ePortfolio is based on this method.

An ePortfolio is identified as a folder for collecting achievements and documents.¹ Different documents which reflect individual learning processes and the learning biography are collected in an ePortfolio. These documents could consist of different certificates, awards, or educational materials.²

An ePortfolio provides the opportunity to observe the whole process of learning by the pupils and offers to reach the greatest milestones of one's individual career.

Basically the content of an ePortfolio can be divided into three parts, which can also contain sub-categories. As previously mentioned, an ePortfolio could be a collection of different data and facts. On one hand, there could be collected text files or HTML files. On the other hand, it is possible to collect all types of multimedia files, like audio and video files. The third category provides the opportunity to save graphic files, which are very important for pupils with a "pictoral" talent. One further category is references, such as awards or certificates. But they do not refer to a school sector. These references could also be located in the private sector of the pupils. The third category could contain a list of learning links, like links to dictionaries or educational communities. In this category links to one's personal web page or information could also be posted.

The following figure 3 shows some possible categories of an ePortfolio:

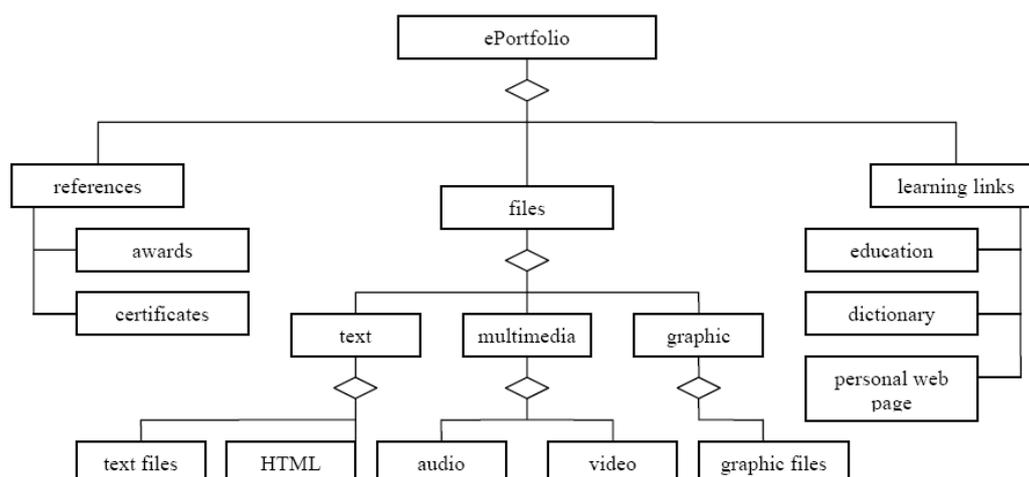


Figure 3: Possible contents of an ePortfolio

¹ Gläser-Zikuda, M.; Hascher, T.: (Hrsg.) Lernprozesse dokumentieren, reflektieren und beurteilen. Lerntagebuch und Portfolio in Bildungsforschung und Bildungspraxis; Bad Heilbrunn; Klinkhardt; 2007

² vgl.: Stangl W.: Portfolio; <http://arbeitsblaetter.stangl-taller.at/PRAESENTATION/portfolio.shtml>; 2006

Beside these categories, an ePortfolio could be divided into different sectors. ePortfolio types and categories could consist of different elements because these elements could overlap with elements of other categories. Because of the different types of schools in Austria, the choice of the ePortfolio elements could be made individually by each school. According to these categories, some examples of ePortfolio types are listed below:

- **Presentation portfolio**
 - Application portfolio
 - Curriculum vitae
 - Personal references
 - Exhibition portfolio
 - Exhibition of own collected work (music, images....)
 - visualisation and reflection of pictures (other artists)
 - Language portfolio
- **Learning portfolio**
 - Reading portfolio
 - Examples of successful work
 - Collection of common mistakes
- **Reflection portfolio**
 - Reflections of conflict situations
 - Impressions of events
 - Learning diary
- **Teaching portfolio**
 - Learning links
 - Learning files
- **Process portfolio**
 - Documentation of one's career
- **Culture portfolio**
 - Documentaton of emotions about culture
- **Assessment portfolio**
- **Language portfolio**
- **Project portfolio**
 - projects (e.g. Exercise company)
 - documentation of learning contents

2.4 Podcasts

Podcasting describes the process of using audio files to deliver syndicated website content to a digital audience.³ The term podcasting specifies the production and the distribution of media files such as audio and video files on the internet. In school it is possible to provide different subject areas for the pupils so that they are able to reapply their new knowledge anywhere and anytime. Alternatively, pupils could also prepare some material for their colleagues. For example, in school it is common that pupils presenting presentations in different subjects. These presentations are often augmented with PowerPoint or overhead transparencies. But the audible presentation is just for one time only. In some cases, the documents from the presentation get lost or misplaced. To find a remedy, the presentation (images, videos, etc.) combined with the voice of the pupils could be converted to a digital lecture which could be stored at the ePortfolio portal.

One big ambition using podcasts is that pupils and teachers are able to observe the learning process of each person. This opportunity is especially fundamental for language study because, in this case, the continual progress could not be noticed. Even in other subjects the presentations could be saved in different languages.

3 Empirical Research

The secondary modern school BORG Birkfeld, which can be seen as a pioneer school in the eLearning sector in Austria, conducted a project in the school year 2006/2007 where teachers, regardless their subjects, had to apply eLearning in their lessons. Consequently, all pupils of this school made contact with eLearning.

This project provided the opportunity to investigate the adoption process of eLearning and related issues. After the project two surveys directed at teachers and pupils were conducted. The first survey took place at the beginning of the school year, whereas the second was held at the end of this project year.

The aim of the investigation was to identify key aspects which determine the acceptance of eLearning.

3.1 Questionnaire and Measures

Web-based questionnaires were used to conduct the survey. Compared to traditional paper- and pencil based surveys the web-based surveying may require sophisticated programming expertise, but the analysis of the questionnaires can be done more efficient by the use of computer aided tools. Twenty-four teachers (100%) and 245 pupils (100%) were participants of this survey. The headmaster

³ [Susan Ward](http://sbinfocanada.about.com/od/onlinebusiness/g/podcasting.htm): Podcasting & Podcasts: <http://sbinfocanada.about.com/od/onlinebusiness/g/podcasting.htm>

was also treated as a teacher. The survey focuses on the operational layer, so the Federal Ministry of Education. and the headmistress did not participate.

The survey was conducted using two different web-based questionnaires which were made available for all teachers and pupils of this school. This school is a member of the eLearning-Cluster, which consists of interconnected secondary schools, organisations and institutions in the fields of education and science. This consolidation was an initiative by the Federal Ministry for Education, Science and Culture in Austria. The aim of this cooperation was to build model schools which act as partners of an eLearning Cluster and for exchanging eLearning know-how among each other. This school offers three different concentration areas, which the pupils can choose before starting their careers. There is a branch in music, a branch in art and one branch in computer science.

Furthermore, the branch of computer science is divided into a regular class and a laptop class.

Information about the questionnaires for the two different survey groups (teachers and pupils) was distributed by me. The questions for teachers were mainly aimed at finding out more about the acceptance of this new learning method and to provide an insight into the educational structure of preparing an eLearning sequence. To find out the acceptance and the rejection of using eLearning was a main goal of the pupils' questionnaire.

3.2 Evaluation of the questionnaires for teachers:

Twenty-three teachers with different subject combinations took this survey including eleven teachers in the subjects of natural science, in mathematics, computer science, physics, chemistry or geography. In contrast to that, fourteen language teachers, for example English, German, French, Italian, or Latin, were surveyed. The remaining fourteen teachers teach the humanities. The number of the participants did not change from the first part to the second part of the survey.

Table 1: Constitution of teachers concerning their subjects.

	quantity
natural science	11
languages	14
humanities	14

The good development of the teachers' positive approach to the computer work is especially important in this evaluation. At the date of the first survey, more than 37 percent of the teachers specified that they like to work with the computer. In the space of this project year the percentage rate increased to 42 percent. In the category "gladly", a huge increase in the percentage rate was also achieved. In a more detailed analysis, the result shows that mainly teachers in the natural science sector like to work with the computer to aid their preparation and their lessons.

Table 2: work with the computer

questionnaire item		Definitely	Probably	Possibly	Probably Not	Definitely Not	Total
<i>Work with the computer</i>							
Date of survey I (N=24)		37,50%	20,83%	25,00%	16,67%	0,00%	100%
Date of survey II (N=24)		41,67%	37,50%	16,67%	4,17%	0,00%	100%
Date of survey I (N=24)	natural science	45,45%	18,18%	18,18%	18,18%	0,00%	100%
Date of survey II (N=24)	natural science	50,00%	30,00%	20,00%	0,00%	0,00%	100%
Date of survey I (N=24)	languages	28,57%	28,57%	21,43%	21,43%	0,00%	100%
Date of survey II (N=24)	languages	23,08%	46,15%	23,08%	7,69%	0,00%	100%
Date of survey I (N=24)	humanities	28,57%	28,57%	21,43%	21,43%	0,00%	100%
Date of survey II (N=24)	humanities	57,14%	42,86%	0,00%	0,00%	0,00%	100%

3.2.1 Experienced work with the computer

The pupils as well as the teachers were asked to rate their experiences working with the computer on a scale. The changing situation from the beginning of the project year until the end is presented in Table 3, below. In this instance, the analysis was specific to the particular subjects of the teachers.

Table 3: experiences working with the computer

questionnaire item		Definitely	Probably	Possibly	Probably Not	Definitely Not	Total
<i>experiences working with the computer</i>							
Date of survey I (N=24)		20,83%	25,00%	25,00%	29,17%	0,00%	100,00%
Date of survey II (N=24)		33,33%	37,50%	25,00%	4,17%	0,00%	100,00%
Date of survey I (N=24)	natural science	36,36%	9,09%	27,27%	27,27%	0,00%	100,00%
Date of survey II (N=24)	natural science	50,00%	10,00%	40,00%	0,00%	0,00%	100,00%
Date of survey I (N=24)	languages	7,14%	28,57%	28,57%	35,71%	0,00%	100,00%
Date of survey II (N=24)	languages	15,38%	46,15%	30,77%	7,69%	0,00%	100,00%
Date of survey I (N=24)	humanities	7,14%	28,57%	28,57%	35,71%	0,00%	100,00%
Date of survey II (N=24)	humanities	28,57%	57,14%	14,29%	0,00%	0,00%	100,00%

At the first date of the survey, 21 percent of the teachers asked mentioned that they feel very experienced and confident working with the computer. This percentage rate increases until the end of the school year to more than 33 percent. Also the second category “probably” documents a rapid growth. In addition to the common results Table 3 gives a subject-specific overview. Teachers in the sector of natural science feel especially experienced in their work with the computer. A big growth could be documented in the first category “definitely.” In contrast to these results, a low growth of the percentage rate could be listed from the teachers in the language sector.

When these results are compared with the results of the question concerning “teachers in notebook classes,” interesting results are achieved. At the first date of the survey, one-third of the teachers instructing in notebook classes felt very experienced in the work with the computers. In contrast to this, no teacher instructing in a traditional subject votes for this category. Much more diversified are the results at the end of this project year. More than half of the teachers in notebook classes voted for the first category “definitely,” whereas no teacher in traditional subjects voted for this category.

3.2.2 Excessive demands with more learning skills

Table 4: excessive demands with more learning skills

questionnaire item	Definitely	Probably	Possibly	Probably Not	Definitely Not	Total
<i>excessive demands with more learnig skills</i>						
Date of survey I (N=24)	8,33%	25,00%	16,67%	25,00%	25,00%	100%
Date of srvey II (N=24)	0,00%	8,33%	25,00%	25,00%	41,67%	100%

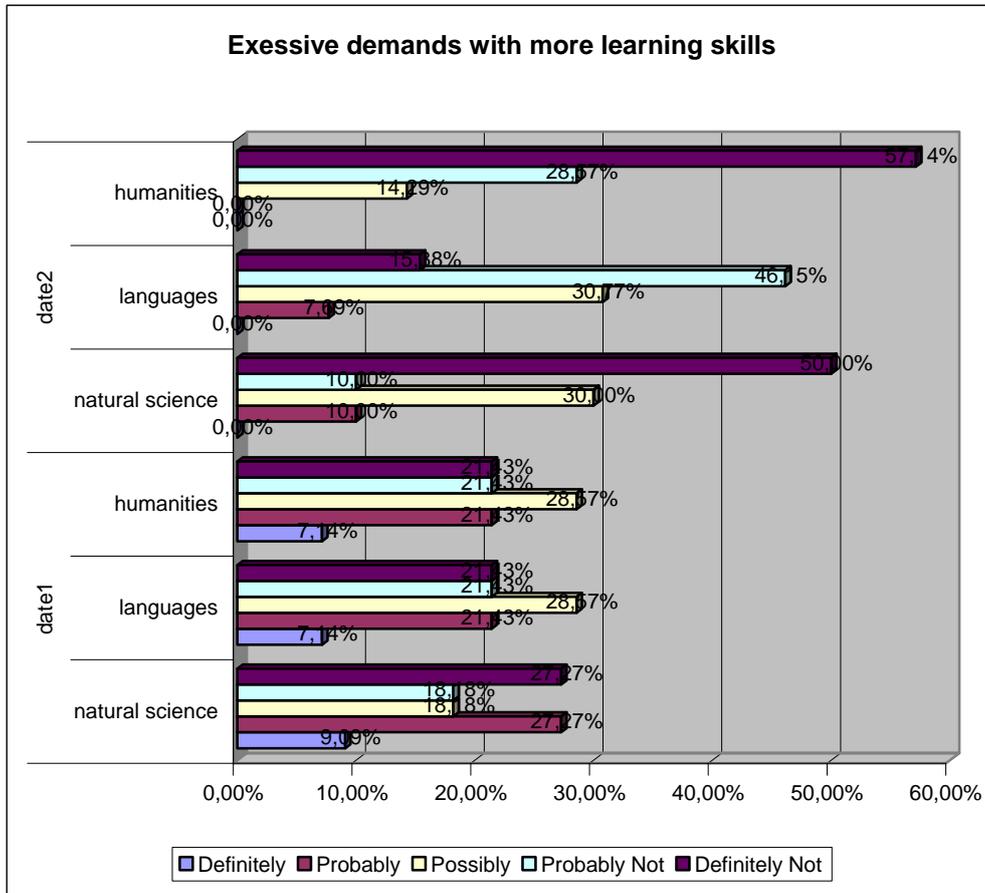


Figure 4: excessive demands with more learning skills

According to some teachers, it is a huge hinderance to teach with eLearning elements because it is an excessive demand to work with different and varied learning skills, such as a learnplattform in combination with the traditional books. At the first date of the survey, 25 percent of the teachers asked voted for the category “probably.” By the second point of the survey, the percentage rate decreased to 8 percent. At the beginning of the project year, 25 percent of the teachers voted for the category “definitely Not.” At the end of this year, the percentage rate grew to 42 percent. When these results were compared with the different subjects of the teachers, the following results were achieved. 27 percent of the teachers in the natural science sector said at the first point of the survey that they felt no excessive demand working with different learning skills. Also in the sector of languages (21%) and in the sector of humanities (21%) there were lower percentages. But a remarkable growth of the percentage rate could be listed until the end of the project year. 50 percent of the teachers in the natural science sector and 57 percent of the teachers in the humaniyies sector voted for this category. In the second point of the survey, no teachers voted for the category “definitively not.” These results are due to the regular routine of working with the computer.

3.3 Evaluation of the questionnaires for pupils:

On the whole, 245 pupils completed the survey. The number of the pupils and the makeup of the classes are not different form the first survey to the second one. The number of female pupils is 162, whereas the number of male pupils is only 83. The distribution of the pupils by concentration area is very homogeneous. 96 pupils are attend the music concentration, 76 attend the computer science concentration and 73 are attend the artistic concentration.

Table 5: Distribution of pupils in reference to different concentration areas

Music emphasis		96
Computer science emphasis	Pupils without notebooks	45
	Pupils with notebooks	31
artistic emphasis		73
		245

3.3.1 Personal attitude towards the computer work

An important aspect concerning the acceptance of eLearning is the positive attitude towards schoolwork with the computer. Before the survey, all pupils were informed that the questions are only related to school and not to personal use. The results of this question show that the positive responses have increased considerably and the responses to the categories “probably not” and “definitely not” have decreased very much. The category “definitely” supports this trend. On the first

date of the survey 33.5 percent of the pupils claimed that they definitely like working with the computer, whereas for the second survey this percentage rate rose to 46 percent.

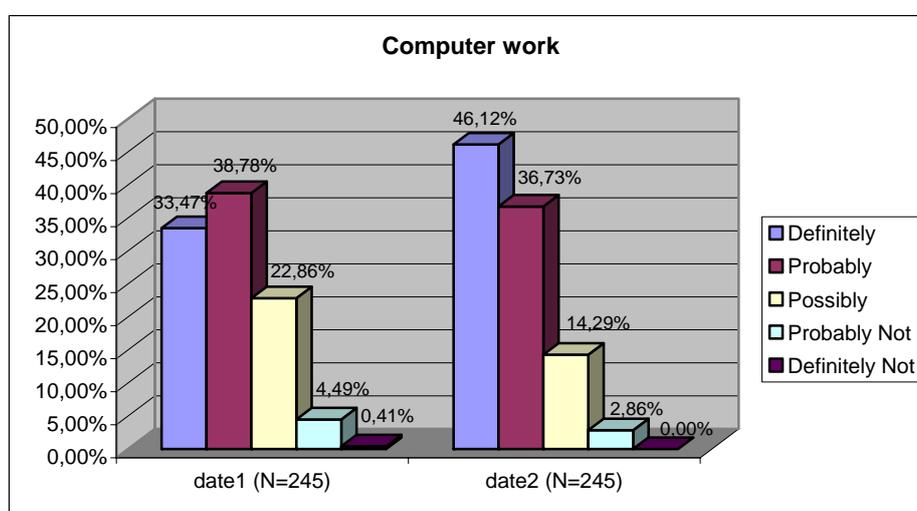


figure 5: Computer work

The following table 6 shows the personal attitude given in the survey according to gender. Pupils are divided into different groups (age sectors). In the first group are pupils between the ages of 14 and 15, in the second group are pupils in the ages between 15 and 16 and so on. Female pupils especially show increasing acceptance in the first group. On the first part of the survey 43 percent voted for the first category, whereas on the second part of the survey almost 80 percent of the female pupils voted for this category. This trend could be seen as far as the third group.

Table 6: computer work

questionnaire item			Definitel y	Probabl y	Possibly	Probabl y Not	Definitely Not	Total
<i>Computer work</i>								
Date of survey I (N=24)			33,47%	38,78%	22,86%	4,49%	0,41%	100,00%
Date of survey II (N=24)			46,12%	36,73%	14,29%	2,86%	0,00%	100,00%
Date of survey I (N=73)	groupI	female	42,86%	38,78%	14,29%	4,08%	0,00%	100,00%
		male	70,83%	16,67%	12,50%	0,00%	0,00%	100,00%
Date of survey II (N=73)	groupI	female	79,59%	18,37%	2,04%	0,00%	0,00%	100,00%
		male	66,67%	25,00%	8,33%	0,00%	0,00%	100,00%
Date of survey I (N=48)	groupII	female	12,50%	43,75%	34,38%	9,38%	0,00%	100,00%
		male	12,50%	31,25%	50,00%	6,25%	0,00%	100,00%
Date of survey II (N=48)	groupII	female	37,50%	37,50%	18,75%	6,25%	0,00%	100,00%
		male	31,25%	43,75%	25,00%	0,00%	0,00%	100,00%
Date of survey I (N=56)	groupIII	female	29,41%	41,18%	23,53%	5,88%	0,00%	100,00%
		male	22,73%	40,91%	27,27%	9,09%	0,00%	100,00%
Date of survey II I (N=56)	groupIII	female	23,53%	61,76%	8,82%	5,88%	0,00%	100,00%
		male	18,18%	59,09%	18,18%	4,55%	0,00%	100,00%

Date of survey I (N=68)	groupV	female	27,66%	44,68%	25,53%	2,13%	0,00%	100,00%
		male	47,62%	42,86%	4,76%	0,00%	4,76%	100,00%
female		34,04%	36,17%	25,53%	4,26%	0,00%	100,00%	
male		61,90%	23,81%	14,29%	0,00%	0,00%	100,00%	
Date of survey II (N=68)	Total (N=245)							

Excessive demands with more learning skills

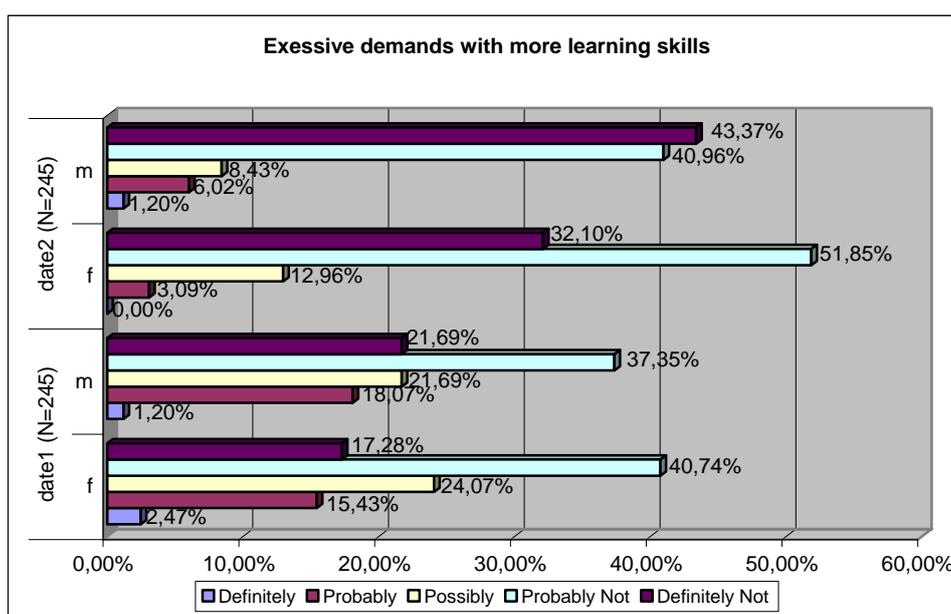


Figure 6: Excessive demands with more learning skills

Figure 6 above specifies the results of the possibly excessive demands for those with more than one learning skill. When pupils work with different learning skills the attention span decreases, and furthermore, the effectiveness of learning is lowered.

These results show particularly gender-specific components. On the first date of the survey, 17 percent of female and 20 percent of male pupils felt no excessive demands. On the second date of the survey, one-third of female and more than 40 percent of male pupils voted for this category. A correlation with the question “experienced work with the computer” shows that mainly pupils who feel very experienced feel no excessive demands.

3.3.2 Improvements of learning results

The following Figure 7 shows the results of the evaluation in relation to the increased success of working with eLearning in the school lessons. On the first date of the survey only 2 percent of the pupils asked voted for the first category “definitely.”

On the second date of the survey 29 percent specified that their learning results have “definitely” improved with the support of eLearning.

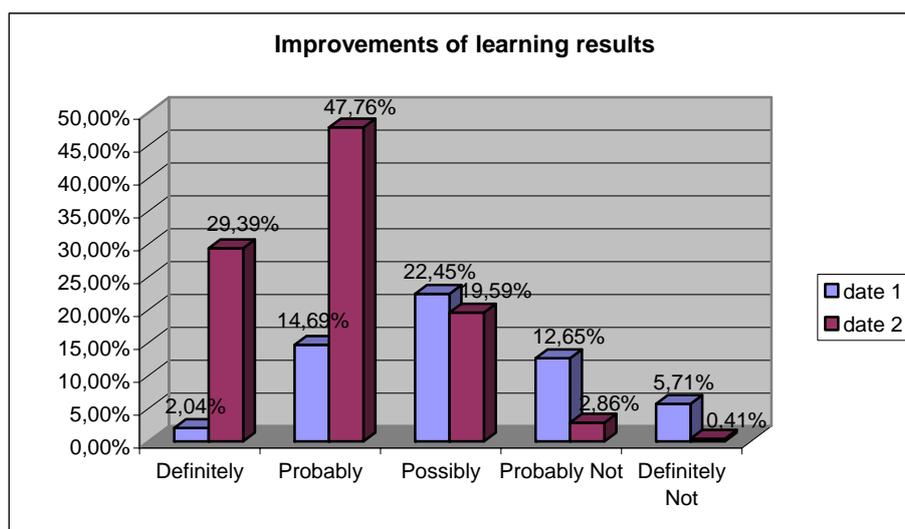


Figure 7: Improvements of learning results

It is important that teachers and students feel confident with new methods so that the efficiency of the learning-process can be increased and the obstacles of acceptance can be eliminated. Based on the results this survey it can be concluded that eLearning in schools faces a positive future. The teachers as well as the pupils want to broaden eLearning sequences in education. Based on this survey, the use of eLearning in education will not decrease in value, even in the future.

However, the conventional method will not be displaced completely. eLearning will take an important supplementary position. It can serve as an good enrichment to traditional education.

3.4 Results

A first evaluation has identified the following 11 key aspects which are determining the acceptance of eLearning:

- Technical affinity
- Readiness for further education
- Advantages

- Disadvantages
- Preparedness to Implement
- Success
- Experience
- Quality
- Cooperation
- Future
- Learning types

3.5 Future work

It is planned to order these key aspects according to their significance. Furthermore, the impact of these key factors on the school lessons will be evaluated. Based on these two investigations, practical suggestions for increasing the acceptance of eLearning will be formulated for each key factor.