

E-LEARNING IN RURAL AREAS - GERMAN PERSPECTIVE

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ABSTRACT

Globalisation, the accelerating development of new information and communication technologies and the increasing dynamics of markets place new demands on knowledge transfer. Of particular significance in education is the use of e-learning, learning based on new information and communication technologies. Due to its independence of time and location, e-learning is viewed as an opportunity to overcome spatial disparities in knowledge management, in particular between urban and rural areas. In the context of a European network project nationwide surveys were undertaken, in order to study the use of e-learning in the field of further education and to analyse the e-learning market in Germany, in terms of both supply and demand. The surveys addressed e-learning providers, e-learners and a control group in order to describe the e-learning market in Germany and to identify problems which impede the access to e-learning especially in rural areas and particularly do not allow rural inhabitants to benefit from the advantages of e-learning. Different aspects of e-learning provision are shown, especially in terms of specialisation and innovation, as well as obtained benefits and identified learning needs from (potential) e-learning participants.

Keywords: continuing vocational education, e-learning, rural development, e-learning market

1. INTRODUCTION

Lifelong learning and the promotion of qualifications and competences are decisive framework conditions for the economic development and sustained competitive strength of enterprises. Technological and economic restructuring makes new demands on the imparting of knowledge. In particular, further vocational training is of increasing importance not only in the course of technological and economic structural change, but also in view of demographic change. In the context of education and Knowledge Management the use of new information and communications technologies (ICTs) plays a central role in promoting sustainable development. To meet the demand for further training and education from various occupational groups and sections of the population, mainly in rural areas, an efficient educational offer must be ensured. Consequently, special importance is attached to e-learning, a new type of learning in the educational sector based on new ICTs. Because it individualises the learning process and is independent of time and place of learning, e-learning offers the opportunity to bridge the digital divide and surmount spatial disparities, not only between countries, but also between urban

and rural regions within each country. “e-ruralnet – network promoting e-learning for rural development”, a project co-financed by the European Commission (including ten other EU countries, with project coordination in Greece), is dealing, within the scope of the “Programme for Lifelong Learning”, Transversal Projects-ICT, with e-learning as a perspective for rural areas, and at the same time focusing on the needs of small and medium enterprises (SMEs), micro-enterprises and self-employed persons, but also of job seekers. One aspect of the project was analysis of the e-learning market, in terms of both supply and demand. In this connection, a nationwide survey was undertaken in order to establish the supply of and demand for e-learning in the field of further education, especially in rural areas.

2. METHODOLOGY

Within the period January 2010 to February 2011 surveys of e-learning providers, e-learners and a control group were conducted throughout Germany in order to investigate the supply and demand of e-learning in the further training and education sector. The focus was directed to non-formal and informal learning conceptions. Within the scope of a quantitative research method, three online-based questionnaires for each target group were provided through an internet platform. The advantages of this kind of questioning are, in particular, those of time and cost [1]. In the course of the online-based survey, little readiness to cooperate was shown by those questioned, which led to a low rate of return and high rate of breaking-off. As a consequence, paper-based questionnaires were used in the scope of the survey of e-learners and the control group. 183 e-learning providers constitute the data basis of this study, of which 153 (78.7%) were already active in the e-learning market (ex-post analysis) and 39 (21.3%) planned to start in the near future (ex-ante analysis). The survey of e-learners, i.e. persons who had participated in a further training course based on e-learning, was done through the organisations offering e-learning that had participated in the provider survey. The control group consists of persons with no previous experience of e-learning. For the e-learners survey a total number of 102 responses have been included in the analysis and for the control group 107 responses.

The data are analysed within the framework of a descriptive analysis. Usually a significance level is called a significant result when the significance level $\alpha \leq 5\%$, or is called a highly significant result with $\alpha \leq 1\%$. The significance level $\alpha \leq 5\%$ is labelled with (*) and $\alpha \leq 1\%$ with (**).

A χ^2 - statistical test was carried out for nominal scaled data in combination with methods of testing for the correlation measures. Cramers V and ϕ -coefficient (in case of a 2*2-matrix) are used to measure the association in contingency tables. The correlation coefficient has been calculated for ordinal scaled data by using Spearman rank correlation and for interval scaled data by using the Pearson product moment correlation. In case of binary variables the ϕ -coefficient is identical with the Pearson product moment correlation. All correlations are labelled with "r". The correlation coefficient is a usual applied effect size, which can be interpreted as follows: $r=0,5$ as a strong effect, $r=0,3$ as a medium effect and $r=0,1$ as a small effect [2]. Additionally a one way analysis of variance (ANOVA) has been calculated to test significant differences of group means, which is labelled with F.

3. RESULTS

3.1. E-LEARNING PROVIDERS

The further education sector in Germany is characterized by a comparatively little regulation by the government, competitive character of the free continuing training market, plurality of training providers and multifunctionality [3]. The majority of e-learning providers (72.1%) represented in this survey are privately operated, 15.6% are public organisations and 12.3% NGOs. On the basis of present findings, it can be concluded that the German e-learning market is a growing market. About 42.1% of the e-learning providers had been providing e-learning courses less than five years and 21.3% of continuing education providers were planning to start providing e-learning courses in the near future. Only 36.6% of providers had long term experiences offering e-learning for more than 5 years.

The size of providers and e-learning activity was measured by the number of teachers and trainers employed, students participating in e-learning courses and the number of e-learning packages currently offered. Half of the e-learning providers employed 25 or less teachers (median=25). Almost a quarter of the providers (22.4%) employed more than 100 teachers. The mean value of employed teachers is 106.05 and the standard deviation is 230.60. Obviously, a low number of large e-learning providers has upward biased the mean and employed a lot more teachers than other providers. A reason for this result could be caused by the decreasing number of permanent employment contracts and the increase of temporary contracts. Particularly affected are full-time teachers who are replaced by freelance staff [4]. Additionally, providers preferred to employ teachers part-time. About 70.9% of all providers employed ten or less e-learning teachers who are actually involved in e-learning and 83.5% employed 20 or less.

The number of e-learning students which had been instructed through e-learning courses during the last 12 months range from 0 to 20,000 with a mean value of 1073.96, a standard deviation of 2801.11 and median of 102.50. 50 % of the providers had 103 or less students. Here again, a small number of large providers has upward biased the mean. The percentage of female students has a mean of 48.05% and a standard error of 2.201. The gender differences seem to be marginal in this survey, although other studies in Germany have shown that women are significantly under-represented in the context of on-the-job training [5].

The number of e-learning packages currently offered range from 0 to 1000. The mean value of e-learning packages is 33.08 and the standard deviation is 106.91. Half of the providers provided

6 or less e-learning packages (median=6). And again a low number of large providers influence the mean.

The number of e-learning teachers are strongly correlated with the number of teachers employed ($r=0.778^{**}$), the number of e-learning packages currently offered ($r=0.279^{**}$) and the number of e-learning students ($r=0.197^{*}$).

The specialisation of the further training and education provider in e-learning can be expressed by the number of e-learning courses offered within the total training output. About a quarter (22.7%) of the providers that provided e-learning courses during the last 12 months had a proportion of e-learning courses more than 80% of the total output. These organisations can be regarded as specialised e-learning providers. The majority of e-learning providers (50.8%) were non-specialised e-learning providers that supplement their traditional learning and delivery mode with e-learning. About a quarter (26.5%) ranges between these two ends of the scale (Fig.1).

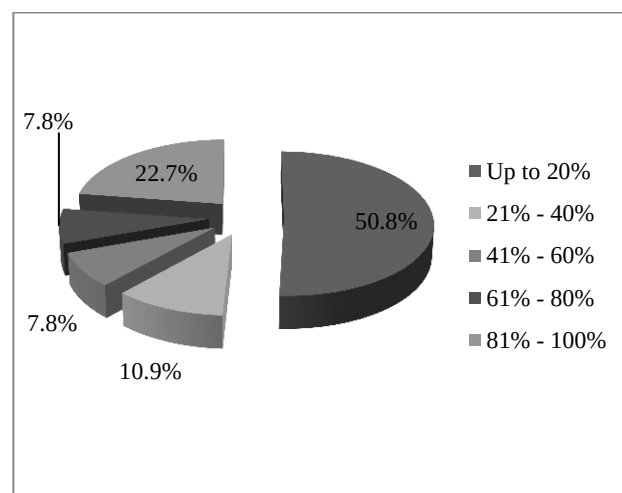


Figure 1: E-learning courses as % of total training output

It is not surprising, that the specialised e-learning providers have a significantly higher proportion of e-teachers in their organisations $F(4,99)=10.584^{**}$, $f=0.65$.

The rural orientation of e-learning providers was measured by the provision of special e-learning packages for rural areas. The majority of e-learning providers (84%) do not target rural areas specifically, because they do not provide special e-learning packages for rural areas. They do not differentiate between urban and rural areas and offer their standard e-learning courses to various occupational and population groups irrespective of their place of work and residence. About 16% of the providers target at rural areas. But they do not significantly differ in their organisational structure from other providers.

Rurally orientated providers tend to offer more specific learning content from the area of the primary sector ($r=0.308^{**}$), highlighting the importance of this sector in rural areas. Taken as a whole, business management subjects and ICT-related subjects clearly dominate the content of e-learning courses (Fig.2).

After successful completion of an e-learning course, certificates of the provider are acquired by students in 81.4% of cases. In addition, 21.6% of providers offer nationally recognised certificates, and 16.5% internationally recognised certificates; only 18% of providers offer formal qualifications. Providers targeting rural areas significantly more frequently offer national recognized certificates ($r=0.168^{*}$).

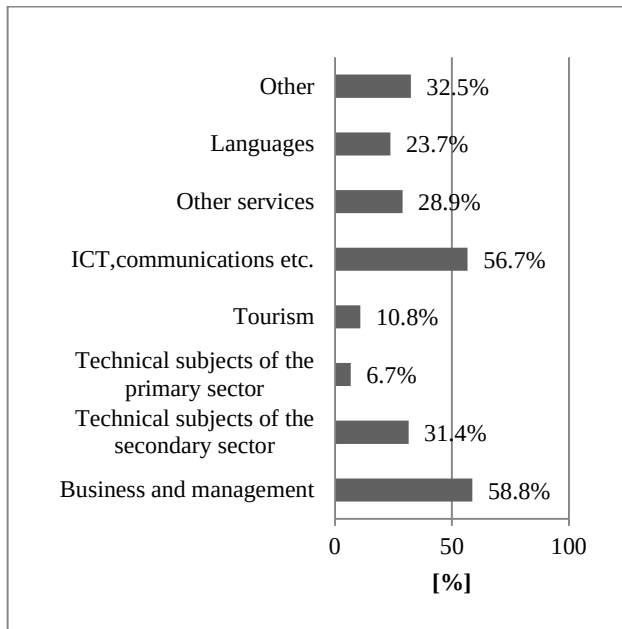


Figure 2: Subjects included in e-learning courses

Different modes of e-learning delivery are used, such as e-learning self-administered by the student, e-learning tutor-assisted or blended learning, a mixture of e-learning and face-to-face learning. Blended learning is the most preferred option by e-learning providers (79.2%). E-Learning self-administered by the student can be found significantly more frequently as a delivery mode in organisations targeting rural areas ($r=0.193^*$). Almost 80% of the rurally oriented providers use a delivery mode supporting self-administered studies of the student, representing nearly 50% of the sample. Correspondingly, pedagogical methods, such as GBL or interactive content and animations ($r=0.175^*$), are preferred. These methods offer the possibility of a non-personal interaction and support a self-administered study.

In terms of pedagogical methods used, the providers selected on average between 4 and 5 of the given 11 alternatives (incl. open question "Other"). The preference of "traditional" pedagogical methods like text reading (79.2%), powerpoint presentations (57.6%), e-mail attachments (40.3%) or link to websites (52.1%) is evident. This is confirmed by the fact that the majority of the providers (84.7%) use more conventional tools supporting asynchronous communication forms such as e-mail and discussion groups (63.9%). Tools to support collaboration, such as e-learning communities, register only 33.3% and synchronous communication forms like chatrooms and videoconferences via webcam 54.9% and 30.6% respectively. The e-learning providers choose on average between 3 and 4 items of the given 8 alternatives (incl. open question "Other") in this category.

Organisations with a higher degree of specialisation are more likely to assess their e-learning courses as innovative. In part this can be confirmed using the data by type of technologies and tools used. Conventional e-learning delivery pedagogies such as Power Point presentations are used more in less specialised organisations, while more "innovative" tools like blogs, wikis and e-learning communities are used more in specialised organisations.

E-learning plays a particularly important role in the context of vocational training and can help to improve the competences

and qualifications of different target groups. Providers were asked to indicate the priority of different subgroups within these two categories on a five-level evaluation scale (1=No Priority, 5=Top priority). Irrespective of location and branch of industry, the workforce, especially employees in enterprises (mean value=4.34) and self-employed persons (mean value=3.46), are very important target groups for e-learning providers. Among companies, large-scale enterprises (mean value=3.58) and small (mean value=3.42) and medium sized enterprises (mean value=3.69) are the most important target groups. SME's and micro companies located in rural areas or small towns are expected to play an important role as target groups for rurally orientated providers. The results of this study do not verify this hypothesis.

Providers were asked about their opinion on problems of access to e-learning, particularly in rural areas. The providers have selected on average two items of the given alternatives. From the view of the e-learning providers primarily an insufficient technical infrastructure (57.6%) and IT illiteracy (35.4%) are stated as main problems for access to e-learning in rural areas. Other problems such as lack of support staff in rural areas for rural entrepreneurs and employees, the limited financial capacity of rural residents and entrepreneurs, as well as no available public funding and no suitable training course materials, play a secondary role. There is a highly significant correlation between the items „No suitable infrastructure „ and „IT-illiteracy“ ($r=0.253^{**}$). Additionally the open question "Other" is negatively correlated to the items "No suitable infrastructure" ($r=-0.319^{**}$) and "Limited financial capacity for rural residents and entrepreneurs" ($r=-0.187^*$), which could be an indication for missing or opposing alternatives. Analysis of the qualitative data of this item points to a lesser extent to structural problems, but rather to subjective reasons. In most of the cases the providers mentioned lack of experience concerning the problems in rural areas, lack of acceptance and a missing additional benefit of e-learning compared to conventional learning courses (Fig.3).

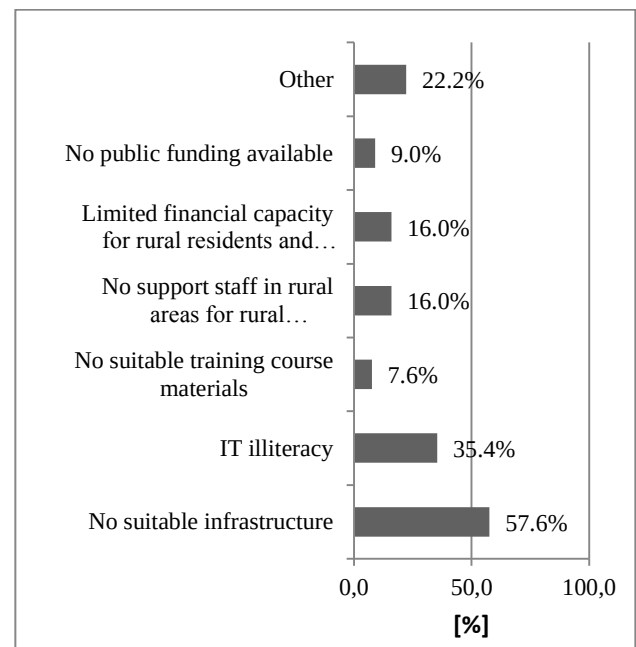


Figure 3: Main Problems associated with e-learning in rural areas

With regard to the quality of further education, it is necessary to ensure that (further) learning opportunities are equal for all people irrespective of place and level of education. Easy-to-use e-learning courses can increase levels of access, motivation and acceptance among users. Providers should judge different individual qualities of the e-students for a successful completion of their e-learning courses on a five-level evaluation scale (1=No Priority, 5=Top Priority). From the viewpoint of the providers, e-learning can particularly benefit persons with a high potential for self-discipline and willingness to learn (Fig.4).

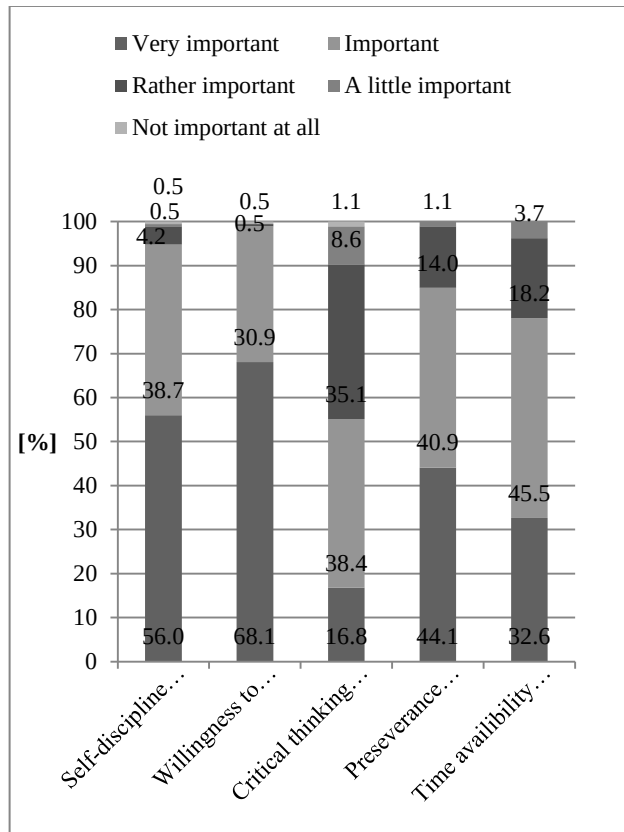


Figure 4: Providers expectations from students

Therefore the participants should have or acquire specific competences for self-directed and self-organised learning. Mean values of the item "Time availability" differ significantly when data is grouped according to rural orientation ($F(1,137)=4.636^*$, $f=0.185$). Providers targeting rural areas rate the item "Time availability" lower (mean value=3.71) than other providers (mean value=4.10).

Analysis of the e-learning market in which the demand side is taken into account will follow in the next chapter. In this, the needs, difficulties and problems of learners will be identified.

3.2. E-LEARNERS AND CONTROL GROUP

The main reasons for e-learners and control group for the participating in a further training course are primarily connected with vocational education and training, and relate to learning important for their occupational perspectives in the company or

the labour market. 60.8% of the e-learners stated that they participate in an e-learning course in order to do a better job and to improve their career prospects and 34.3% wanted to increase their chances of getting a job or changing their job; the same in the control group with 52.3% and 39.3% respectively. For e-learners, particularly for the survey participants more than 35 years old, the acquisition of knowledge for everyday use also plays an important role, which is significantly higher in the e-learners group (45.1%) than in the control group (19.6%). Besides their professional ambitions, personal reasons are also a focus of interest for e-learners. This can be interpreted as an indicator of the particular interest in further education (Fig.5).

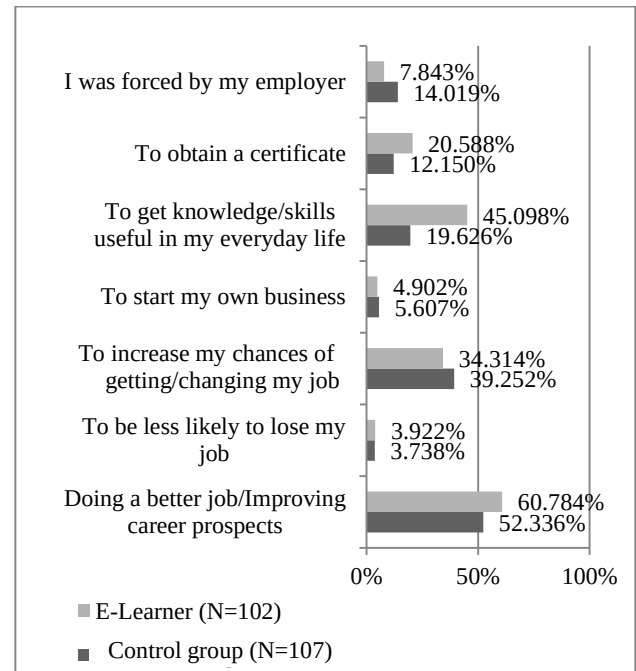


Figure 5: Reasons for selecting the recent training course

In terms of the skills needs of the participants, the improvement of business and ICT skills, as well as technical skills in connection with the secondary economic sector was most frequently stated by both, e-learners and control group. E-learners confirm the results of the providers survey concerning delivery methods, tools and pedagogies used. About half of the e-learners (52%) regarded the methods and tools used on the most recent e-learning course as innovative, the other half (48%) did not.

A higher benefit from participation in a continuing education course is more likely to be found in the control group, although in both groups the actual benefit focuses on the area of fostering personal interests. Measurable benefits like a salary increase or promotion at present job are infrequent. The relatively high number of respondents in both groups who have gained no benefit from their further training course so far, and do not expect any benefits, is rather surprising. The share of e-learners in these response categories is slightly higher (24.51% for e-learners compared to 19.63% for the control group) (Fig.6).

It seems that the e-learning courses have a lower orientation to the (vocational) needs of the participants. E-learners and control group were asked whether they actually use what they have learnt. The majority of the respondents use the knowledge acquired frequently or occasionally. About half of the control

group (49.04%) use the newly acquired knowledge a lot, while for e-learners the share is lower (35.64%).

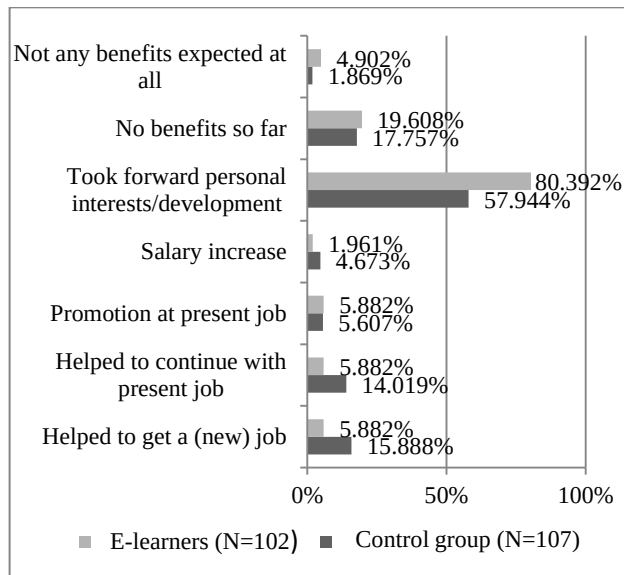


Figure 6: Benefits from the recent training course attended

However, e-learning does not meet the expectations of all participants. Although the majority of e-learners felt that their learning needs have been fulfilled by the e-learning course (67.7%), a relatively high proportion believe otherwise (32.3%). The results of our study show that learners have a strong desire for social interaction, such as with tutors or other learners. Improvements suggested by the e-learners were mainly to do with interaction and communication such as group-work with other students (34.3%) or more intensive support from the tutor (32.4%). Additionally a more demand-matching course content offer, more oriented to the needs of the learners, (30.4%) was mentioned. Each e-learning concept must be adapted to the specific target group. Interestingly the items „More support by tutor“ and „Better content, more relevant to my needs“ are negatively correlated to the items „More modern/innovative learning tools“ and „Other“. The open question „Other“ contains additional views and information of the respondents, such as more face-to-face learning, better professional support, more practical relevance and the wish for deep-going contents (Fig.7).

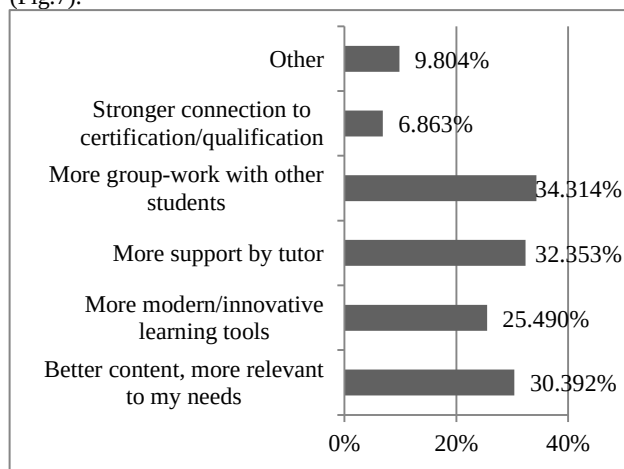


Figure 7: Suggestions for improvement of e-learning courses

Furthermore, e-learning seems to be less motivating than conventional courses for a relatively high proportion both of the e-learners (42%) and of the control group (63%). In this context, blended learning appears to be the most promising e-learning delivery mode.

Most of the participants (61.8%) had no problems in attending the e-learning course, especially with regard to their IT skills and usage of the courses. About 94% of e-learners found the applied methods and tools on their most recent e-learning course easy to use. The main perceived problems in connection with participation in the e-learning course were lack of time (30.4%) and lack of self-discipline (11.8%). Within the framework of the control group survey, lack of time (28.1%) and the high cost (28.1%) were given as the main reasons for previous non-participation in a further training course.

In both groups, further training is mainly financed by the participant or by the employer. E-learners more often paid their courses, while the control group more often received public subsidies (Fig.8).

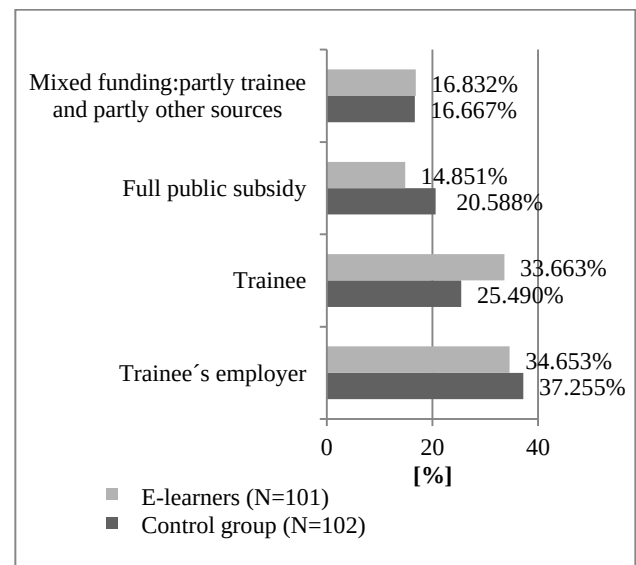


Figure 8: Funding of e-learning courses

For both groups the internet and the employer seem to be by far the most important information sources for finding a suitable further training course. In most cases a broadband connection seems to be an absolute precondition for participating in an e-learning course (affirmation by 67% of the respondents). Although only a small percentage of the survey participants stated an insufficient internet connection as a problem when using the e-learning course, it must be pointed out that particularly in villages and small towns an insufficient technical infrastructure seems prevalent. Those people living and working in rural areas more often stated that they do not have an appropriate technical infrastructure ($r=0.336^{**}$). From this it can be assumed that broadband internet access in these areas is not as strongly developed as in cities. A further problem mentioned by the control group, is the IT illiteracy of the participants and their lack of the skills to use these latest technologies.

But finally it has to be stated that the majority of e-learners (98%) have a positive opinion of e-learning and would be well prepared to participate again in an e-learning course. The control group, however, have a more pessimistic attitude to e-

learning due to their lack of experience of it. Only 66% would be prepared to participate in an e-learning course.

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8. CONCLUSIONS

E-learning is an established form of both core and supplementary learning in many contexts in the area of further education in Germany focusing on vocational education and training. It covers a wide range of technological developments in the field of new ICTs and different organisational forms of learning. The results of the survey show that the German e-learning market is a growing and fast developing market, in which private and smaller organisations offering e-learning dominate. An indication for this growth is the high number of providers who planned to enter this market in the near future and the high number of specialised e-learning providers in this area.

Another aspect is the rural orientation of e-learning providers measured by the offer of special e-learning packages for rural areas. Providers targeting rural areas are characterized by the subjects provided and the e-learning delivery mode.

The existence of an adequate technical infrastructure is a prerequisite for the use of e-learning. This also applies to the so-called offline learning opportunities known as computer-based training (CBT). These e-learning applications offer spatial and temporal flexibility of learning, but usually allow no personal interaction, for example, with tutors or other e-learners, as in network- or web-based training (WBT). But an insufficient technical infrastructure is still stated as the main problem and constraint for the use of e-learning in rural areas. E-learning providers and control group described as a further problem the IT illiteracy of participants and their lack of skills to use these latest technologies. Therefore the digital divide still seems to be an issue in Germany.

However, e-learning does not meet the expectations of all participants, although the respondents have a (more or less) positive attitude towards e-learning. It seems that the e-learners are not able to take full advantage of e-learning. E-learning does not always sufficiently fulfill the existing learning needs and the benefits of e-learning are not clearly visible for the (potential) participants.

E-learning makes an important contribution to the promotion of lifelong learning and can help to improve rural development. The requirements necessary for this appear auspicious, but further improvements are still needed.

9. REFERENCES

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