Examination of Computer Literacy Competence in the Workplace: The Case for the American and German Manufacturing Industry

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Abstract

Accelerated advances in information and communication technologies are widening the offering for new ways to producing and distributing knowledge. Technological progress has fundamentally altered how we live and work, as well as, how we learn and have transformed the world into a global community. The manufacturing industry in developed economies has struggled to train and to turn their workforce into a computer literate group that keeps abreast of changes in computing and information technologies, since most of the work in manufacturing sectors does not rely on this type of literacy to perform well. This paper presents an examination on current computer literacy competence in the manufacturing industry between groups of workers (Managerial and Labor) in USA and Germany. Special emphasis is granted to the discussion of the similarities and differences found in computer literacy between these groups of workers, and the implications associated with having literate and illiterate groups in the workplace.

Keywords: Computer Literacy, Literacy in Manufacturing, Computer Literacy Differences.

1. Introduction

Computer and information technologies continue to dominate all levels of the business organizations in the world. In recent years computer information systems have experienced substantial growth and consequently, attaining acceptable literacy levels has become a necessity (Kim & Keith, 1994). An organization's literacy ultimately affects what actions its members are capable of (Mikulecky & Kirkley, 1998), as well as, how they coordinate and integrate their efforts. Organization's knowledge as represented through its literacy levels is always changing. Knowledge can be created, refined, altered and discarded (Madsen & Desai, 2010). Furthermore, as organizations members are part of the new reality, they look for ways to cope with it and to share their understanding of the surrounding environment (Cyert & March, 1963; Huber, 1991).

It is difficult for researchers to identify specific factors that cause people to accept and use new information technologies in their daily activities (King & He, 2006). In years preceding the rising of the new technological era, Lucas (1976) suggested that individual and group behavioral factors have a strong influence in the IT (Information Technology) adoption. Individuals learn from their behaviors and values, and from their social interactions (Demiray, 2010). Consequently, differences and similarities may be found in learning and literacy levels in different environments, and such differences may become costly for businesses (Coffey, M., & Gibbs, G. (2001).

Lankshear (1997) found that computer literacy skills in light manufacturing cooperatives are oriented towards modern business practices, and that basic computer literacy skills become irrelevant when the local market is open to global competition and the workforce is displaced.

Furthermore, Bolter (1991) stated that population will polarize according to literacy levels, and the elite group will work and recreate itself with the computer, while the computer illiterate will at best be passive user/reader of the machine. Jury (1999) asserted that literacy education is a need that resulted from the economic, social, and political pressures that continuously increase. Consequently, it is in the best interest of companies to maintain a computer literate workforce, as they will become more productive, and they will assume new roles (Winter, Chudoba & Gutek, 1997)

During the 1980s workers who gained access to personal computer became the largest group of end-users throughout organizations (Winter, Chudoba & Gutek, 1997). Consequently, they became more productive by assuming new responsibilities in their workplaces (Gerrity & Rockart, 1986). However, Davis (1991) stated that actual productivity improvements in white collar workers were not the result of the introduction of new technologies in the workplace. Productivity improvements reflected the increasing awareness of the new technologies and its potential application in the workplace.

Workers with higher computer literacy levels are able to use their computers in more sophisticated manners (McGrath, 1990). Conversely, the lack of computer literacy severely underutilizes equipment and diminishes desired results. Andersen (1990) suggested that computer literate workers posses both, concrete and abstract knowledge of computers, and are able to apply their knowledge to new situations without experiencing hardship. In addition, Brancheau & Wetherbe (1987) concluded that workers will have different IT adoption levels in organizations where decentralized forms of computerized work predominate.

2. Purpose of the Study

The level of computer literacy is an important variable in a number of settings. Self-reported computer literacy provides some insights on the different attitude towards adopting new changes in the work place, as they relate to technological progress and advance. This paper presents an appraisal on computer literacy in the workplace between managerial and floor workers. Further, it explores similarities and differences found in computer literacy levels between the American and the German manufacturing industry.

3. Literature Review

Arguments about the definition of computer literacy have had a long tradition in education and nursing research (Kim & Keith, 1994; Childers, 2003; Kay, 1990). Definitions vary from being very inclusive, computer literacy is the ability to self-teach and learn arbitrary new programs or tasks as they are encountered (Oni, 2000), to highly focused, computer literacy is the computer knowledge and skills of individuals in different professions (Kay, 1990; Norales, 1987). Childers (2003) viewed computer literacy as basic computer skills that individuals have. Norman (1984) stated that four levels compose computer literacy: basic understanding, usage of computer, program a computer, and computer science understanding. In addition, Bolter (1991) suggested that the term "computer literacy" has been taken to mean either the ability to operate a computer (how to insert the disks, how to call up a program, and perhaps how to type into a word processor) or a technical knowledge of programming and concepts of computer science.

The US National Research Council (1999) stated that: 'computer literacy has acquired a skills connotation, implying competency with a few of today's computer applications, such as word processing and email. Literacy is too modest a goal in the presence of rapid change, because it lacks the necessary staying power. As the technology changes by leaps and bounds, existing skills become antiquated and there is no migration path to new skills,… To adapt to changes in the technology… involves learning sufficient foundational material to enable one to acquire new skills independently after one's formal education is complete. (p.2)

Recent studies suggest that companies have an increasing need for a computer literate workforce at all levels in the organization (Zhao & Alexander, 2002). Schenk (2007) stated that higher levels of computer literacy are now required in 9 out of 10 places in the European Union. Further, in The United States, fortune 500 companies, such as Ford Motor Company, GMC, etc. are setting training programs and grants to transform their workforce into a computer literate group (McManus, 2000 & Brown, 2000). This is in part due to the modernization of manufacturing processes, the shift to a service economy, and the emergence of the internet as a viable e-commerce technology (Zhao & Alexander, 2002). Schleife (2008) stated that the use of information and communication technologies has impacted the economic conditions of firms and the private life of individuals.

Consequently, large disparities are now present between different population groups and their computer literacy levels in the workplace. In addition, Kanter (1996) stressed the need for reducing the gap in computer literacy levels as a way to achieve success in the marketplace. Knowledge gaps in organizations will directly contribute to failure and ultimately to organizational knowledge depreciation (March, 1981). The use of information technologies has exponentially increased over the last decade. These new technologies (computer based technologies) have had a profound impact on industrialized economies, as well as, on the economic conditions of firms and on the private life of individuals (McManus, 2000). Moreover, large disparities continue to unfold between different populations groups with regard to the use of new technologies. Individual characteristics such as education, age, and income can generate prolonged access barriers and literacy gaps in individuals (Schleife, 2008).

Norman (1984) suggested that there are several levels of computer literacy and that individuals should attempt to reach them. The first level is the basic understanding of general concepts. The second level is the understanding of how to use a computer to accomplish something useful. The third level is the ability to program a computer, and the fourth level is the understanding of the science of computation. Moreover, Wolfe (1992) stated that due to the increasing accessibility to computers all individuals should posses some level of computer literacy in their lifetime.

Most studies in computer literacy have used questionnaires to infer the computer literacy levels of the subjects (Pierce &Lloyd & Solak, 2001), in addition to standardized tests of computer literacy (Hignite & Echternacht, 1992) and structured interviews (Kay, 1993). Brown (2000) advised of several methods available to conduct computer literacy assessment. Furthermore, while no single method offers the best approach towards assessing computer literacy levels, many researchers agree that multiple approaches should be encouraged to assessng computer literacy in different contexts (Brown, 2000; Karsten & Roth's, 1998).

4. Methodology

The study is conducted in two cities with strong manufacturing presence, Chicago, IL in the United States and Memmingen in Germany. These cities were chosen due to availability of manufacturing companies and the immediate access to Managerial and Floor workers for this study. Furthermore, according to the Chicago Manufacturing Renaissance Council (CMRC, 2011), manufacturing jobs in the city account for 10% of the workforce in Illinois, sustaining over half a million positions in this sector and contributing directly with 1.6 trillion to the GDP of the country. In addition, the manufacturing industry has historically clustered in the northeastern region of the United States, and the city of Chicago has become a regional hub and a entrepreneurial booster for the manufacturing sector.

Equally important is the city of Memmingen, in the Bavarian region of Germany. Historically, Germany has been the manufacturing center for Europe and the entrepreneurial light of the region. The city of Memmingen has experienced steady growth in its manufacturing sector during the last decade. Furthermore, according to the Ifo Institute for Economic Research at the University of Munich (2011 investment survey report), investment in the manufacturing sector has increased by 2% consecutively in the past few years, and from the 38 billion Euros invested in industrial companies in Germany during 2010 and 2011, 88% was committed to manufacturing equipment and the rest to other assets (i.e. buildings, additional improvements, repairs). This investment commitment is clearly noticeable in cities like Memmingen, with increasing manufacturing presence and international headquartered companies in the region.

4.1. Sample for the Study

For the purpose of this study, a sample of convenience was used to conduct the computer literacy assessment. Samples were also matched (equal number of respondents randomly matched from each group of participants) for more accurate comparisons while avoiding the variance error that results from uneven sample size. The sample was composed of two groups of employees in the manufacturing sector, Managerial and Floor workers, from manufacturing companies in Chicago and Memmingen. The scope of this study limited the assessment of computer literacy only to these two groups of employees due to their direct interaction with computers and computer based systems of production. Other members of the organization such as senior directors and top executives were not considered for this study.

To comply with general normal distribution requirements it was expected that at least a minimum of 30 participants from each group, Managerial and Floor workers, from Chicago and Memmingen participated in this study. However, confidentiality clauses precluded guaranteeing that these expectations were fully met. Participation in this study was strictly voluntary and no incentives and/or other measures were permitted to assure and/or increase response rate.

4.2. Distribution of the Survey

Lead figures designated by the manufacturing companies (in the United States and Germany) forwarded a copy of the survey to selected employees (Managerial and Floor workers) that could participate in the study. The process started when the researchers made an electronic copy of the survey available via email to the lead persons in the companies. Thereafter, lead persons collected and forwarded to the researchers all responses from participants, eliminating any identifying information from the participants. The researchers had no access to the immediate distribution of the survey, neither to the immediate collection of responses, nor to direct contact with the participants.

An adapted version of the survey on computer literacy from Florida State College was used for this study. The survey has been extensively tested for reliability and validity. Internal consistency was typically assessed by calculating alpha coefficients which could range from 0.00 to 1.00. Measures of 0.70 on new measures were deemed respectable (Nunnally, 1978). For this survey the majority of subscales had yielded alpha coefficients of 0.74 or higher. Moreover, Vogt (1993) stated that content validity was addressed when the items in a scale accurately represented the phenomenon measured, suggesting that it was not a statistical property as much as it was a qualitative judgment.

The survey assessed computer literacy for Managerial and Floor workers through four subscales which were named dependent variables (DVs) in this study: DV1= General Computer Skills; DV2= File Management- word processing and printing skills; DV3= Online Communication skills; and DV4 = Information literacy skills. Furthermore, the independent variables (IVs) were the computer literacy outcomes for the different groups in the study: IV1 = DEWK (Floor workers in Germany); IV2 = USAWK (Floor workers in USA); IV3 = DEADM (Managerial workers in Germany); IV4 = USADM (Managerial workers in USA).

Because the study examined possible differences and/or similarities, a MANOVA (Multivariate analyses of variance) design was used to determine if the means of these four groups were the same. If so, the study could conclude that the populations were the same and that no significant differences existed in computer literacy between groups (NCSS, 2005). The number crunching statistical software (NCSS) was used to conduct MANOVA. Furthermore, the null hypotheses in this study addressed the following aspects of computer literacy:

1) There is no difference in computer literacy between the USA manufacturing workers and the German manufacturing workers. Therefore:
2) There is no difference in computer literacy between Managerial and Floor workers in the manufacturing industry in each country, USA and Germany.

To examine these claims the following research questions were addressed:

1) What are the computer literacy differences and/or similarities between the USA and Germany manufacturing workers?
2) What are the computer literacy differences and/or similarities between Managerial and Floor workers of the manufacturing companies in the United States and in Germany?
3) How can computer literacy differences and/or similarities be explained, if any, between groups of employees (Managerial and Floor workers) in the USA and Germany?

5. Discussion of Findings

The test statistics showed that statistically significant mean differences existed between the groups of respondents. Consequently, the Null Hypothesis 1 was rejected. This fact suggested that computer literacy differences existed between the United States and German manufacturing workers. Table 3 and Table 5 in the appendix section summarize the test statistics and the results for the study.

Research question one asked: *What are the computer literacy differences and/or similarities between the USA and Germany manufacturing workers?*

When comparing groups of workers in the manufacturing sector for both countries, the results from the study suggest that there were significant differences in some areas of computer literacy that those workers posses. A closer look to the DVs revealed that Individuals from both countries were well familiarized (no significant differences for DV1) with basic functions of computers (DV1); this could be attributed to the extensive spread out of computers during the last decades and to the continued effort to computerized tasks, while reducing human effort and increasing total output (Cuban, 1986). Industrialized nations are more committed to the latest technological innovations and their exposure to technology is stronger when compared to other countries with lesser economic sophistication (Albirini, 2008). In addition, there were significant differences in file management activities and office document drafting (DV2); this could be attributed to the nature of work (job scope) and to how business practices in the United States displace the workforce pressured by competition, relying less in basic computer skills and more into other sets of practical skills (Lankshear, 1997; Schenk, 2007).

Internet has been widely available since late 1990s. The vast majority of the population in industrialized nations knows about this technology as evidenced by high technology penetration and technology adoption indexes in these nations (Davenport, 1993). The results of the study also suggest that there were no significant differences in knowledge of the internet technology (DV3), and the issues derived from online communication (i.e. copyrights, plagiarism, privacy and security). Moreover, in more specialized tasks, there were significant differences in the way individuals manage information (DV4), and in the way they apply them to complete office tasks.

Research question two asked: *What are the computer literacy differences and/or similarities between Managerial and Floor workers of the manufacturing companies in the United States, and in Germany?*

More specific comparisons for each group of workers (in the United States and in Germany) revealed significant differences between the Managerial and Floor workers in the United States and no significant differences in computer literacy between Managerial and Floor workers in Germany. Moreover, demographic information also showed differences in some categories of the sample for this study.

The results from the study suggest that workers (Managerial and Floor workers) in Germany are well familiarized (no significant differences) with computer equipment (DV1) and tasks related to document drafting for office work (DV2). In addition, workers were also literate (no significant differences) on online communication (DV3) and issues to manage information (DV4). These results could be attributed to the training that German workers received upon arrival to the company. German education tracks, vocational or professional, include industry internships/apprenticeships. This allows workers to update their knowledge and skills, and it also reduces computer literacy gaps that may exist (Schenk, 2007).

Contrary to these findings, workers (Managerial and Floor workers) in the United States showed significant differences in all areas; general computer skills (DV1), File management and tasks related to document drafting (DV2), online communication skills (DV3), and information competency (DV4). From the demographics information, the study suggests that there were differences between the groups of Managers and Floor workers; most of the differences are shown in age, education, and length of employment. These differences could contribute to the current literacy levels found in the participants of this study. In addition, lower employee retention rates and high mobility are contributing factors to untrained workforce and the underdevelopment of new skills of employees (Rees, 1989). Lastly, the education system in the United States provides less vocational training (Mehic & Al-Soufi, 1999), leading to a shortage of new workers in the field, and the mismatch between individual skills and new job demands from the manufacturing sector (Mitchel, Carnes, & Mendosa, 1994).

Research question three asked: *How can computer literacy differences and/or similarities be explained, if any, between groups of employees (Managerial and Floor workers) in the USA and Germany?*

According to Phillips (2001), the expectation of computer literacy is both a burden and an opportunity.
The specific technology installed in any workplace constantly changes in sophistication and function. Therefore, computer literacy levels and expertise will vary as a result of changes in technology sophistication (Simon & Werner, 1996). Dickerson (2004) suggested that employees need computer skills, and that it is outside the realm of Information Technology (IT) departments to provide training on basic computing skills, leaving organization with knowledge gaps and literacy deficiencies. In addition, Self-reported computer literacy only provides some insights on the different attitudes towards adopting new changes in the workplace, as they relate to technological progress and advance (Banta & Howard, 2004).

Differences in technology adoption levels will directly contribute to computer literacy levels and to the development of new expertise for individuals (Lin, 1998).

Schleife (2008) stated that the use of information and communication technologies has impacted differently the economic conditions of firms and the private life of individuals. Consequently, large disparities are now present between different population groups and their computer literacy levels in the workplace. Andersen (1990) suggested that computer literate workers are able to apply their knowledge to new situations without experiencing hardship. However, Branchean & Wetherbe (1987) noted that computer literacy levels vary according to the nature of the computerized work in organizations. Furthermore, the demographic information from the study revealed differences between the group of workers in the United States and Germany; Education, length of employment and years of professional experience were different for both groups. The data suggested that workers in Germany stayed longer with their companies and that most individuals were formally educated and had at least 6 years work of experience.

A change in demographic composition of the workforce leads to shortages of well qualified individuals (Inman & Inman, 2004). The lack of training in basic computer skills only exacerbates the problem and also prevents workers from performing well at the workplace. Workers with higher computer literacy levels are able to use their computers in more sophisticated manners (McGrath, 1990). Conversely, the lack of computer literacy will continue to undermine desired performance.

6. Conclusion

The concept of computer literacy has changed over the past three decades along with the availability of new technologies to everyone. The evolution of computer systems and other technology devices have now redirected the attention of researchers towards a more comprehensive framework of research (Banta & Howard, 2004; O'Connor, 2007). However, not everyone is exposed to the same level of technology sophistication in business organizations, but we can assert that everyone is in direct contact with a computer in today's business environment. In addition, the study of computer literacy has been instrumental in determining the impact of technology on increasing productivity and efficiency levels (Sharkey, 2006). Therefore, it is of great importance to continue assessing computer literacy levels of different groups to better understand how individuals develop new knowledge to keep abreast and current, to the benefit of business organizations.

Business organizations need employees with updated knowledge and skills. Today's dynamic environments rely on the workforce to keep up with technological changes and to self-teach about such changes (Hill, 2006). The age of information technology has transformed all economies of the world, and it has redefined the role of individuals in business organizations. Moreover, the diverse generational composite has embraced new information technologies in different ways. While some individuals continue to resist changes in the workplace, others embrace it as the new way to achieve higher efficiencies and innovations.

Today's workforce is inclusive of three generations. This kind of diversity will change in the next decades and the need to assess computer literacy will demand additional studies in this field. Labor practices (training, updates of skills, education programs, etc.), retention rates, and the nature of the work itself will influence future levels of literacy. Workers are continuously exposed to technological changes and future studies to assess literacy levels should include the design of new surveys and methodologies.

Disparities in computer literacy as shown between manufacturing workers in the Unites States and In Germany are clear indicators of the workforce's education levels and increasing needs for training. However, in the German manufacturing companies there were no significant differences in computer literacy. This could be attributed to the fact that German companies train and retain their workforce for longer periods of time. German manufacturing workers enter the labor force with specific set of skills and with formal education that suits current industry needs. Moreover, current computer literacy gaps between Managers and Floor workers are reduced through company's sponsored trainings and workshops.

In the United States computer literacy levels varied a lot. Some workers showed updated computer skills while the vast majority demonstrated knowledge gaps in general computer skills, file management, online communication, and information competency. Furthermore, education level, professional experience, and the length of employment differed a lot from that of the workers in Germany. Demographic information from the workers in the United States suggested that individuals joined the labor force with different backgrounds.

Moreover, the short term employability in the United States dismisses the possibility of continuous training to update workers' skills. In addition, years of education for most workers in the United States were lower than their counterparts in Germany.

The results of this study are not conclusive for computer literacy levels of the manufacturing workers in the United States and in Germany. Several limitations of the study prevent the generalization of results; larger sample size, number of industries participating, inclusion of top executives, selection of specific industries within the manufacturing sector, and the need for more comprehensive surveys should be addressed in future studies. Finally, researchers also suggest that future research should also look into other demographic factors that may affect computer literacy of individuals in organizations, such as, education background, ownership of computers at home, current technology adoption indexes, and attitude towards new technologies available in the market.

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Appendix

Table 1. Respondent's Roles.

Respondent's roles in the manufacturing companies for this study

	Company's location		
Job Performed	United States	Germany	Total
Managerial workers	35	35	70
Floor workers	35	35	70
Total respondents	70	70	140

Managerial workers: Employees in the organization that perform administrative and supervisory tasks.
Floor workers: Employees in the organization that perform general labor work (i.e. machine operation, managing materials, packing, labeling) and maintenance related tasks (i.e. test machine, maintenance, set up, trouble shooting).

Table 2. Demographic Information.

Demographic information of survey respondents

	Subsidiary's location	
Demographic category	United States Total = 70 respondents	Germany Total = 70 respondents
Gender	60 % are males 40 % are females	65 % are males 25 % are females 10 % no response
Age	80 % are between 36 to 45 yrs. 20 % other categories	60 % are between 36 to 45 yrs. 40 % other categories
Education	40 % have 11 to 19 yrs. of school 60% have 0 to 10 yrs of school	70 % have 11 to 19 yrs of school 30 % have 0 to 10 yrs of school
Professional experience	60 % posses 6 to 10 years 20 % other 20 % no response	90 % posses 6 to 10 years 10 % other
Length of employment in the firm	30 % over 7 years 70 % other	90 % over 7 years 10 % other

Table 3. Test Statistics.
Test statistics from the MANOVA

Test statistics	*F*-ratio	Probability level (*p*)
Wilks' Lambda	6.69	0.0019
Hotelling-Lawley trace	10.19	0.0022
Pillai's trace	5.62	0.0005
Roy's largest root	31.12	0.0000

Table 4. ANOVA Results.

Summary of ANOVA results for similarities and differences found in computer literacy between the group of workers in the United States and Germany

	Group outcomes***								
	Germany		United States		Germany/United States		Germany/United States		
Dependent Variables**	IV1/IV3 *M*	*SE*	IV2/IV4 *M*	*SE*	IV1/IV2 *M*	*SE*	IV3/IV4 *M*	*ES*	*p*
DV1	6.45	0.65	6.60	0.65	8.78	0.95	8.82	0.90	0.031*
DV2	4.11	0.65	4.11	0.65	8.75	0.95	8.76	0.90	0.004*
DV3	8.60	0.65	8.75	0.65	8.75	0.95	9.13	0.90	0.046*
DV4	5.35	0.65	5.66	0.65	8.75	0.95	8.79	0.90	0.001*

Note: *Statistically significant at the 0.05 level.
** Dependent variables are the survey categories: DV1= General Computer Skills; DV2= File Management- word processing and printing skills; DV3= Online Communication skills; and DV4 = Information literacy skills.
*** Group outcomes are the survey respondents: IV1 = DEWK (Floor workers in Germany); IV2 = USAWK (Floor workers in USA); IV3 = DEADM (Managerial workers in Germany); IV4 = USADM (Managerial workers in USA).

Table 5. Summary of Differences and Similarities Found in Computer Literacy.

DV1 – General Computer Skills	Land Germany / USA	Job Germany Floorworker / Manager	Job USA Floorworker / Manager	Job Germany / USA Floorworkers	Job Germany / USA Manager
	significant difference	**significant difference**	**significant difference**	**significant difference**	**significant difference**
1. using basic computer parts	no	no	yes	no	no
2. using help menus	no	no	yes	no	yes
3. understanding file formats	no	no	yes	no	no
4. shutdown a computer	no	no	yes	yes	yes
5. do a restart	no	no	no	yes	yes
6. working with program-windows	yes	no	yes	yes	yes
7. using context menus	no	no	no	no	no

DV2 – File Manangement, Office Documents	Land Germany / USA	Job Germany Floorworker / Manager	Job USA Floorworker / Manager	Job Germany / USA Floorworkers	Job Germany / USA Manager
	significant difference	**significant difference**	**significant difference**	**significant difference**	**significant difference**
8. using windows explorer	yes	no	yes	yes	no
9. working with files	yes	no	yes	yes	no
10. deleting files / using the bin	yes	no	yes	yes	no
11. copying / pasting text blocks	yes	no	yes	yes	no
12. using redo / undo	yes	no	yes	yes	no
13. saving and printing files	yes	yes	yes	yes	no
14. using fonts and styles	yes	yes	yes	yes	no
15. creating lists	yes	no	yes	yes	no
16. using printing options	yes	no	yes	yes	no

DV3 - Online Communication Skills	Land Germany / USA	Job Germany Floorworker / Manager	Job USA Floorworker / Manager	Job Germany / USA Floorworkers	Job Germany / USA Manager
	significant difference	**significant difference**	**significant difference**	**significant difference**	**significant difference**
17. using internet browser	no	no	yes	yes	no
18. create an e-mail account	no	no	yes	yes	no
19. create and send e-mails	yes	no	yes	yes	no
20. using search engines	yes	no	yes	yes	no
21. understand differences between search engines and directories	no	no	yes	yes	no
22. understanding copyright restrictions	no	no	yes	no	no
23. using content in compliance to copyright restrictions	no	no	yes	no	no
24. understanding plagitarism	no	no	yes	yes	no
25. knowledge about privacy and security	no	no	yes	yes	no

DV4 - MS office skills and Information competence	Land Germany / USA	Job Germany Floorworker / Manager	Job USA Floorworker / Manager	Job Germany / USA Floorworkers	Job Germany / USA Manager
	significant difference	**significant difference**	**significant difference**	**significant difference**	**significant difference**
26. open office documents	yes	no	yes	yes	no
27. working with messages / documents	yes	no	yes	yes	no
28. working with outlook calendars	no	no	yes	no	no
29. working with e-mails	no	no	yes	yes	no
30. search for information	no	no	yes	yes	yes
31. using literacy databases	yes	no	yes	no	yes
32. analyze information and sources	yes	no	yes	no	yes
33. using information efficiently	yes	no	yes	no	yes
34. understanding economic, legal and social aspects	yes	no	yes	no	yes