

Culture, Profession, and Attitudes Towards Educational Technology: A Large-Scale, German-Romanian Study

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ABSTRACT

Cultural dimensions and attitudes towards educational technology may differ between countries and ethnicities, but also between professional groups. This study examines a bicultural, German and Romanian sample ($N = 2834$) that includes both participants with technical and with non-technical professions. Results show large differences between Germans and Romanians as well as small differences between participants of technical and non-technical professions regarding Hofstede's cultural dimensions and regarding attitudes towards technology. The results will be discussed with respect to expanding Hofstede's framework towards differentiating between cultural sub-samples.

Author Keywords

Cultural dimensions, attitudes towards educational technology, professional background, Germany, Romania

ACM Classification Keywords

K.3.0 General. K.3.1 Computer Uses in Education: Computer-assisted instruction (CAI)

General Terms

Human Factors, Measurement, Theory

INTRODUCTION

Cultures differ in their members' value orientations, attitudes, and behavior. Not only ethnicities, but also specific professional groups and academic disciplines may share values and may be regarded as cultures. Cultural differences may, for instance, also be observed between technical and non-technical professions. Geert Hofstede's [6] research on cultures is based to a large extent on a survey among IBM staff, i.e. on persons with technical professions. This paper aims to contribute to the empirical evidence for cultural differences by examining the

differences between technical and non-technical professional and student groups.

Moreover, cultures may be relatively stable, but still subject to long-term changes, for instance, in the halo of the continuing political changes in Eastern Europe since 1989. To contribute to analysis of this ongoing cultural change, we focus on German and Romanian samples of technical and non-technical professional groups to replicate Hofstede's assumptions and findings on these two cultures.

Against the background of the progressive diffusion of information and communication technologies (ICT), we analyze participants' attitudes towards technology in addition to Hofstede's cultural dimensions. Given the growing significance of ICT in educational settings across cultures since the 1990s, we focus on attitudes towards educational technology.

Educational technology was first disseminated in North American and Western European countries. In Eastern Europe, dissemination coincided with the expansion of the European Union. In Romania, educational technology has come to extensive and increasing use ever since the end of the 1990s. Therefore we expect to find differences between Romania and founder EU members such as Germany both with respect to culture and values, and to people's attitude towards educational technology.

THEORETICAL BACKGROUND

Culture and Attitudes towards Educational Technology

Hofstede [6] defines culture as patterns of thinking, feeling and potential acting, which have been learned throughout lifetime, therefore they are likely to be used repeatedly and are unlikely (or difficult) to be changed by the individual. Cultural patterns are shared within a social environment. Based on a study among IBM staff in 72 countries, Hofstede identified five dimensions of culture: power distance, collectivism vs. individualism, femininity vs. masculinity, uncertainty avoidance, and long-term vs. short-term orientation.

Analogous to Hofstede's view of culture, we regard attitudes towards educational technology as socially shared patterns of thinking, feeling and behavior towards technology. These attitudes towards technology may be subject to change as a function of experience and learning

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and in turn be related to technology adoption and diffusion (see below). The attitudes towards educational technology may co-vary with Hofstede's cultural dimensions [13]; we are however not aware of related empirical evidence.

The Adoption of Educational Technology

The process of spreading new technologies over time is described by adoption-diffusion theories [11]. The adoption process refers to the individual's decisions to use technologies, while the diffusion describes a collective process of technology use over time. According to the reasoned action perspective [1], technology adoption on the individual level is influenced by user's attitude towards technology and the intention to use the technology. Technology anxiety is an important component of the attitude towards technology use (ATTU) [3, 4]. Davis and colleagues [5] shows the causal relationship between ATTU and usage. Nistor and colleagues [10] observe that technology anxiety is a strong predictor of educational technology usage, especially with Romanian users.

The German / Romanian Context

In this study, we analyze Romanian in contrast to German cultural dimensions, attitudes and use of educational technology. Hofstede's cultural dimensions were studied in Romania first around the year 2000 with a sample of approx. 200 persons [8]. According to this study, Romanians display relatively high power distance, collectivism, and uncertainty avoidance, and relatively low levels of masculinity long time orientation. Germans, in contrast, display relatively high levels of masculinity and uncertainty avoidance, but relatively low levels of power distance and collectivism [6].

Besides cultural differences, material conditions vary between Romania and Germany and co-determine the infrastructure as well as technology diffusion. As a former communist country, Romania has suffered from poverty and isolation, which implied a restrictive access to ICT. Much technology was introduced later than in Western countries, and the austerity policy did usually not allow the acquisition of high-performance equipment. Beginning in 1990, the economical and social-political situation changed. ICT was introduced in schools and universities, as well as in private life, so that in the 2000s a significant part of the younger Romanians, i.e. especially students became familiar with computers and educational technology [2, 9]. Findings in 2004 show that 97% of Romanian university students used computers and 95% used the Internet either at their university or at home. Besides, 70% of all the Internet users (aged between 15 and 35 and located in seven major cities of Romania) used it to communicate via e-mail, 68% to learn and 48% to search for study-related information. As key-qualification necessary "to get a good job", the computer skills were ranked in third place, closely following foreign language skills and professional qualifications.

RESEARCH QUESTIONS

The Influence of Culture

To what extent do Romanians and Germans differ with respect to (a) Hofstede's cultural dimensions, and (b) attitudes towards educational technology?

The Influence of Profession

To what extent do persons with technical and persons with non-technical profession differ with respect to (a) Hofstede's cultural dimensions, and (b) attitudes towards educational technology?

METHODS

This study comprises of a sample ($N = 2834$) of Romanian ($n = 1016$) and German ($n = 1818$) students and professionals of technical ($n = 861$) and non-technical disciplines ($n = 1972$).

Research Design

Data was collected from April 2008 to May 2010 in pen & paper as well as targeted online surveys in East and South Germany as well as in the three historical regions of Romania, namely Moldavia, Transylvania, and Wallachia. Addressees of the survey in both cultures were participants in universities, technical colleges, and adult education centers.

Independent variables are culture (German versus Romanian) and profession (technical versus non-technical); dependent variables are Hofstede's cultural dimensions, ATTU, technology anxiety, and use intention. We have applied Hofstede's Value Survey Modules VSM94 [7] in Romanian and German translation. For ATTU, technology anxiety and use intention, we adopted the five-point Likert subscales 'Attitude towards the use of technology', 'Anxiety' and 'Behavioral intention to use the system' proposed by Venkatesh and colleagues [12].

A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of culture and profession on the five Hofstede dimensions, ATTU, technology anxiety, and use intention.

RESULTS

Overall, MANOVA results show that the influence of culture on Hofstede's cultural dimensions and attitudes towards educational technology is large, $F(4,2822) = 118.42, p < .001, \eta^2 = .25$, whereas profession influence is small, $F(4,5644) = 6.26, p < .001, \eta^2 = .02$, and interaction effects can be disregarded, $F(4,2822) = 1.92, n. s.$

The Influence of Culture

Descriptive results show that the Romanian participants are less power distant, more collectivistic, more masculine (i.e. they perceive greater differences between sexes), more uncertainty avoidant and more long-time oriented than the German participants (Table 1).

Table 1: Hofstede’s cultural dimensions indices of Germans and Romanians

| | Romanians (<i>n</i> = 1016) | Germans (<i>n</i> = 1818) |
|--------------------------------------|---------------------------------|-------------------------------|
| Power distance index (PDI) | 20.1 | 36.1 |
| Collectivism vs. individualism (IDV) | 67.4 | 92.5 |
| Masculinity vs. femininity (MAS) | 38.5 | -29.9 |
| Uncertainty avoidance (UAI) | 65.2 | 76.9 |
| Long-time orientation (LTO) | 53.7 | 45.6 |

As for participants’ attitudes towards educational technology, Romanians have a more positive attitude, higher anxiety and a stronger intention to use educational technology than Germans (Table 2).

Table 2: Attitudes towards educational technology of Germans and Romanians

| | Romanians (<i>n</i> = 1016) M (SD) | Germans (<i>n</i> = 1818) M (SD) |
|--|---|---|
| Attitude towards technology use (ATTU) | 4.20 (.70) | 3.85 (.89) |
| Technology anxiety | 2.21 (.96) | 1.80 (.88) |
| Use intention | 4.09 (.90) | 3.60 (1.21) |

Inferential statistics show that these single differences are significant ($p < .001$) and small in effect size – except for a medium-sized effect on masculinity.

The Influence of Profession

Observing the differences between professional groups, the participants with technical professions are less power distant, more collectivistic, more masculine (i.e. they perceive greater differences between sexes), less uncertainty avoidant and more long-time oriented than the participants with non-technical professions (Table 3).

Table 3: Hofstede’s cultural dimensions indices of technical and non-technical professionals

| | Technical professions (<i>n</i> = 1016) | Non-technical professions (<i>n</i> = 1818) |
|--------------------------------------|---|---|
| Power distance index (PDI) | 27.3 | 32.1 |
| Collectivism vs. individualism (IDV) | 78.2 | 85.9 |
| Masculinity vs. femininity (MAS) | 12.7 | -13.3 |
| Uncertainty avoidance (UAI) | 67.0 | 75.2 |
| Long-time orientation (LTO) | 50.1 | 47.8 |

As for participants’ attitudes towards educational technology, the participants with technical professions have a more positive attitude, lower technology anxiety and a stronger intention to use technology than the participants with non-technical professions (Table 4).

Inferential statistics show only the differences of masculinity, attitude towards educational technology, and anxiety between technical and non-technical professionals are significant on the level of $p < .001$ (and small in effect size).

Table 4: Attitudes towards educational technology of technical and non-technical professionals

| | Technical professions (<i>n</i> = 1016) M (SD) | Non-technical professions (<i>n</i> = 1818) M (SD) |
|--|---|---|
| Attitude towards technology use (ATTU) | 4.05 (.86) | 3.94 (.84) |
| Technology anxiety | 1.82 (.91) | 2.00 (.93) |
| Use intention | 3.90 (1.08) | 3.72 (1.15) |

CONCLUSIONS

The present study replicates previous research on Hofstede’s cultural dimensions in Germany, and performs pioneer work in Romania. Both countries are represented by a large and diverse sample.

As hypothesized by Hofstede [6], differences can be found with respect to the investigated cultural dimensions, power distance (PDI), individualism vs. collectivism (IDV), uncertainty avoidance (UAI), masculinity vs. femininity (MAS), and long-time orientation (LTO). Nevertheless, the indices of the cultural dimensions are somewhat different than expected from earlier research. In Germany, we measured for PDI and UAI similar values, for IDV and LTO values still relatively close to those measured by Hofstede; MAS, however, appears to be substantially different from Hofstede’s findings. With respect to the Romanian sample, differences to earlier assumptions and findings can be found [10]; the differences regard both the absolute indices and the sense of the difference between Romania and Germany. Except for MAS, the differences are smaller than expected by Hofstede. This may be due to the dynamic changes taking place in contemporary Romania as well as in other new members of the European Union (including East Germany) that may be culturally converging towards Western European countries.

As an extension of the previous research, we found differences in cultural dimensions also between the different professional groups. This suggests that national frontiers and cultural boundaries may be quite different. The adoption of technology has consequences not only in economy and education, but also on the cultural level. People may think, feel and act different with respect to

their attitude towards educational technology, and with their professional background.

The attitude towards educational technology was generally positive, however at different levels for Romanians and Germans. Technology diffusion took place first in Germany and several years later in Romania, therefore the Romanians are less familiar to technology than Germans. Possibly as a result of this different pace, Romanians have a more positive attitude, a stronger intention to use technology, and, at the same time, they are more anxious in this respect. Germans may display a saturation effect, being insofar familiar with technology that they tend to display a less positive attitude towards computers than Romanians, but also lesser levels of technology anxiety. At the same time, it is no surprise that persons with technical professions have a more positive attitude and less anxiety towards educational technology.

In conclusion, differences in attitudes may be found between cultures, but also between professional groups. Cultural differences may be geared to societal changes. Particularly dynamic changes can be found in new EU member states and may be interconnected with the diffusion of the educational technologies. Therefore we suggest further investigation of cultural differences along the lines of attitudes towards technology in addition to Hofstede's cultural dimensions.

To this end, our future research will focus on the dynamics of cultural and technology-related changes in Europe. We intend to focus on the differences between regions of the countries involved, i.e. Western vs. Eastern Germany, and between the historical regions of Romania [8, 10]. Differences between the regional sub-samples may better explain differences to earlier assumptions and findings.

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